



DULUTH INTERNATIONAL AIRPORT

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**DULUTH INTERNATIONAL AIRPORT
NEW PASSENGER TERMINAL
BID PACKAGE 2C- SITEWORK, APRON, CONCESSIONS & FURNISHINGS
CONTRACT DOCUMENTS
ISSUE FOR BID**

FAA AIP No. - 3-27-0024-54-12
RS&H PROJ. No. – 213.1882.091
CITY OF DULUTH BID No. 12-4401

**PROJECT MANUAL
VOLUME 1 OF 4**

Date: FEBRUARY 10, 2012



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SECTION 00001

CERTIFICATION PAGE

CIVIL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

JOHN E. HIPPCHEN, P.E. MN REGISTRATION #: 22088 DATE: _____
REYNOLDS, SMITH AND HILLS, INC.

ARCHITECTURAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

MARK K. IP, I.A.I. MN REGISTRATION #: 46001 DATE: _____
REYNOLDS, SMITH AND HILLS, INC.

STRUCTURAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND I AM A DULY LICENSED ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PAUL A. JOHNSON, P.E. MN REGISTRATION #: 20379 DATE: _____
MBJ ENGINEERING, INC.

MECHANICAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND I AM A DULY LICENSED ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DOUGLAS C. MASS, P.E. MN REGISTRATION #: 21067 DATE: _____
COSENTINI ASSOCIATES INC.

PLUMBING

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND I AM A DULY LICENSED ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DOUGLAS C. MASS P.E. MN REGISTRATION #: 21067 DATE: _____
COSENTINI ASSOCIATES INC.

ELECTRICAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND I AM A DULY LICENSED ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DOUGLAS C. MASS, P.E. MN REGISTRATION #: 21067 DATE: _____
COSENTINI ASSOCIATES INC.

Invitation to Bid

Project Name/Description: Duluth International Airport - New Passenger Terminal
Bid Package 2C – Sitework & Apron
Concessions and Furnishings

City of Duluth Bid No. 12-4401

Sealed bids will be received for the Duluth Airport Authority by the City Purchasing Agent in and for the Corporation of the City of Duluth at his office, Room 100 City Hall, Duluth, MN 55802 (218) 730-5340 at 2:00 p.m. local time on Thursday, March 8, 2012, for the above named project, and will be publicly opened and read aloud immediately thereafter.

The project scope consists of: Bid Package 2C is a continuation of the new Airport Terminal construction project built upon the Work Scopes completed in the first phases of Civil/Site work, Building Structure/Shell, Interior Systems and Interior Finishes. Bid Package 2C consists of the following Work Scopes: 2.21C Civil, Apron and Building Demolition; 2.22C Landscaping; 3.21C Concrete and Excavation; 5.21C Structural Steel & Misc. Metal Fabrication; 6.22C General Construction (Concessions Build-Out); 7.22C Metal Wall & Roof Panels; 8.22C Doors, Frames & Hardware (Material Only); 8.23C High-Speed Overhead Doors; 9.25C Painting; 10.22C Signage; 10.23C Pay Booth; 10.24C X-Ray Machine; 11.20C Food Service Equipment; 12.21C Window Treatments; 12.22C Public, Office and Concession Area Furniture; 13.21C Fire Protection System; 13.22C Computer Controlled Access; 13.23C Flight Display; 13.23C Breach Control; 14.21C Passenger Boarding Bridges; 15.21C Mechanical Systems and 16.22C Electrical Systems. The package consists primarily of additional interior finishes, building demolition, tug tunnel extensions and apron construction as part of the already under construction new terminal building. The existing terminal facility must remain fully functional and unobstructed by construction throughout the entire duration of this project. See Section 01014 Work Scope Descriptions for more detailed information on the specifics of the content for each of the Work Scopes. Bidders are cautioned to examine the Work Scope Descriptions and contract documents closely to ensure **only the applicable portion** of the scope is included in bids for this Bid Package 2C. Bidders are also to review previously completed work and future work which may be part of other bid packages. These documents are available for viewing at the Kraus-Anderson® Construction Company jobsite trailer upon request.

BASIS OF BIDS: Multiple Prime Bids will be received for labor and materials as outlined in the Work Scope Descriptions as described in Section 01014.

A separate Bid Form Packet will be furnished for bid submission. All bidders must use the original Bid Form Packet for submission of their bid. Contact Kim Lofquist, Kraus-Anderson® Construction Company, 218-727-8363 for the Bid Form Packet. Faxed bids will not be allowed.

A Mandatory Pre-bid conference will be held on Thursday, March 1, 2012, at 2:00 p.m. in the Skyline Room, 2nd Floor of the existing Passenger Terminal Building, Duluth International Airport, after which there will be an opportunity to examine the site of the proposed work.

PROJECT LABOR AGREEMENT: Each contractor and subcontractor, having submitted a bid on this project certifies that it is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the project. In the interests of such harmony and the long-term supply of skilled manpower, each successful contractor and any and all levels of subcontractors, as a condition of being awarded a contract or subcontract, will agree to abide by the provisions of Project

Labor Agreement as executed by and between Owner, Kraus-Anderson® Construction Company (Construction Manager for project) and the Duluth Building and Construction Trades Council and its affiliated local unions, and will be bound by the provisions of that agreement in the same manner as any other provision of the Contract. A draft copy of the agreement is available for inspection at the office of the Construction Manager, Kraus-Anderson® Construction Company, 4525 Haines Road, Duluth, MN 55811, and is included by reference in these Contract Documents as fully as if herein set forth.

Under Minnesota Statute S473.144, the Authority may not accept any bid or proposal for a contract or execute a contract for goods or services in excess of \$100,000 with any business having more than 40 full time employees in Minnesota at any time during the previous 12 months, unless the business has an affirmative action plan for the employment of minority persons, women, and the disabled that has been approved by the Commission of Human Rights. The Commission's certificate of compliance form and any required documentation indicating a bidder's compliance or exemption from this requirement must be submitted within three business days following the opening of the bids and prior to award of the contract. Bids will be considered non-responsive if the certificate of compliance requirement as set forth in the specifications is not met.

The schedule of minimum wages as established by the Secretary of Labor and set forth in the specifications is to govern on this project, and bids shall be based on these established minimum wage rates. However, in accordance with Minnesota law, overtime must be paid for work in excess of 8 hours per day and 40 hours per week.

Nondiscrimination in Employment: The proposed contract shall be under and subject to Executive Order No. 11246 of September 24, 1965, as amended, and to the equal opportunity clause, mandated by the regulations promulgated pursuant thereto. The proposed contract must incorporate the terms set forth in the affirmative action attachments included in the specifications for this project. The bidder (proposer) must supply all the information required by the bid or proposal form. Certification of Non-Segregated Facilities will be required as described in the Instructions to Bidders.

The Airport Authority, in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award. Women will be afforded equal opportunity in all areas of employment. However, the employment of women shall not diminish the standards or requirements for employment of minorities.

The bidder/offerer certifies, by submission of this proposal or acceptance of this contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by a Federal department or agency. It further agrees by submitting this proposal that it will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts and subcontracts. Where the bidder/offerer/contractor or any lower tier participant is unable to certify to this statement, it shall attach an explanation to this solicitation/proposal.

The contractor, by submission of an offer and/or execution of a contract, certifies that it is in compliance with Restrictions on Federal Public Works Projects as set forth in Attachment 3 to the construction contract. Further, the contractor agrees that, if awarded a contract resulting from this

solicitation, it will incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The bidder shall make good faith efforts as defined in Appendix A of 49 CFR Part 23, Regulations of the Office of the Secretary of Transportation to subcontract Four and nine and a one-half tenths percent (4.95%) of the dollar value of the contract to small business concerns owned and controlled by socially and economically disadvantaged individuals (DBE).

The individuals who are presumed to be socially and economically disadvantaged include Women, Blacks, Hispanics, Native Americans, Asian-Pacific Americans, and Asian-Indian Americans.

In the event that the apparent successful bidder of this solicitation qualifies as a DBE, the contract goal shall be deemed to have been met.

Bidders will submit, in writing, the names of the DBEs included in their bid, a description of the work DBEs will perform, and the dollar value of each DBE subcontract.

Exclusive agreements between DBEs and bidders are forbidden. The DAA reserves the right to waive failure of a bidder to meet the DBEs goals if sufficient effort as determined by DAA has been made to comply with the DBE goals and the requirements are not met.

The bids shall be accompanied by an Affidavit of Non-Collusion and written assurance that the bidder has made a good faith effort towards meeting DBE goals.

A bidder's or proposer's failure to show a good faith effort to achieve the specified contract goal for the participation of Disadvantaged Business Enterprise in the completion of this project will be grounds for finding the bid or proposal non-responsive.

Notice of Requirements for Affirmative Action to Ensure Equal Employment Opportunity - State of Minnesota Requirements:

The offerer's or bidder's attention is called to the "equal opportunity clause" set forth herein.

The goals and timetables for minority and female participation, expressed in percentage terms for the contractor's aggregate workforce in each trade on all construction work in the Covered Area as follows: Goals for minority participation in each trade, 1.0%; goals for female participation in each trade, 6.9%.

These goals are applicable to all contractors' construction work performed in the Covered Area.

The contractor's compliance with Minnesota Statutes, section 473.144 and part 5000.3520 shall be based on its implementation of the equal opportunity clause, specific affirmative action obligations required by part 5000.3540, and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, Minnesota Statutes, section 473.144 and part 5000.3520. Compliance with the goals will be measured against the total work hours performed.

The contractor shall provide written notification to the Compliance Division of the Minnesota Department of Human Rights within ten working days of award of any construction contract at any tier

for construction work under the contract resulting from the solicitation. The notification must list the name, address and telephone number of the subcontractor; employer identification number, estimated dollar amount of the subcontract; and the geographical area in which the contract is to be performed.

As used in this notice, and in the contract resulting from this solicitation, the "Covered Area" is the City of Duluth in St. Louis County, Minnesota.

See Instructions to Bidders for Federal requirements for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246, as amended).

Each bid proposal shall be accompanied by a "Bid Security" in the form of a certified check made payable to the City of Duluth in the amount of not less than 5% of the total bid or a surety bond in the amount payable to the Authority with the surety company thereon duly authorized to do business in the State of Minnesota, such Bid Security to be a guarantee that the bidder will not, without the consent of the Authority, withdraw his bid for a period of 90 days after the opening of bids, and if the successful bidder, will enter into a contract with the Duluth Airport Authority and in connection therewith, give Public Contractor's Bond as required by law; and the amount of the certified check will be retained or bond enforced by the Authority in case the bidder fails so to do.

The Bid Security of the three lowest bidders will be retained until the contract is executed, but in no event longer than 90 days provided that the Bid Security of the lowest responsible bidder shall be retained in any event until the contract is executed and Public Contractor's Bond furnished as herein provided.

The bid of the lowest responsible bidder, provided said low bidder has made a good faith effort to meet the DBE contract goal will be accepted on or before the expiration of 90 days after the date of the opening of bids. In the event that the Authority deems it in its best interest to delay the award of the contract (i.e. if the federal funding for the project is delayed) the 90 day time period may be extended for up to one year if mutually agreed upon by both the bidder and the Authority. The Authority, reserves the right to reject any or all bids and to waive any minor irregularities, informalities or discrepancies.

Inquiries regarding Plans and Specifications may be directed to the Architect/Engineer of Record Reynolds, Smith & Hills, Inc. at (218) 722-1227, or the Construction Manager of Record, Kraus Anderson® Construction Company at (218) 727-8363. Plans and Specification will also be on file at the Duluth Purchasing Agent, the Duluth, Hibbing, Minneapolis & St. Paul Builders Exchanges, Reed Construction Document Processing, McGraw-Hill, and MEDA Plan Rooms.

Copies of Drawings and Specifications may be obtained on or after February 15, 2012. Order printed sets through Shel/Don Group Inc.'s online Plan Room at www.sheldonplanroom.com. Contact Jeanette Herubin, Shel/Don Group Inc., at 218-727-2817, for final non-refundable deposit cost. Non-refundable checks made payable to Shel/Don Group Inc. Plans can be picked up at Shel/Don Group Inc., 124 E Superior Street, Duluth, MN 55802 once required deposit has been received by Shel/Don Group Inc. This payment will not be refunded.

For a non-refundable \$20 fee you may obtain a CD containing an electronic version of the plans/specs/addendums and a hard copy of Bid Form Packet. Make check payable to Kraus-Anderson® Construction Company, 3716 Oneota Street, Duluth, MN 55807. For a CD, contact Deb Coffman, phone 218-722-3775. For a Bid Form Packet, contact Kim Lofquist, phone 218-727-8363.

Examination of Documents: Bidders shall carefully examine entire contents of Contract Documents prepared for the Work to become thoroughly familiar with all requirements.

Additional Compensation: Contractors shall not receive extra payments for conditions which can be determined by examining the site and the Contract Documents.

Duluth Airport Authority

By: Dennis Sears
City of Duluth Purchaser
100 City Hall
Duluth, MN 55802

To appear in DBT: February 10th & 11th 2012

This advertisement is also available on the City of Duluth website at :
http://www.duluthmn.gov/purchasing/bid_information.cfm

NOTICE TO BIDDERS

Minnesota Statutes that require prompt payment to subcontractors:

471.425 Prompt payment of local government bills.

Subd. 1. Definitions. For the purposes of this section, the following terms have the meanings here given them.

(d) "Municipality" means any home rule charter or statutory city, county, town, school district, political subdivision or agency of local government. "Municipality" means the metropolitan council or any board or agency created under chapter 473.

Subd. 4a. Prompt payment to subcontractors.

Each contract of a municipality must require the prime contractor to pay any subcontractor within ten days of the prime contractor's receipt of payment from the municipality for undisputed services provided by the subcontractor. The contract must require the prime contractor to pay interest of 1-1/2 percent per month or any part of a month to the subcontractor on any undisputed amount not paid on time to the subcontractor. The minimum monthly interest penalty payment for an unpaid balance of \$100 or more is \$10. For an unpaid balance of less than \$100, the prime contractor shall pay the actual penalty due to the subcontractor. A subcontractor who prevails in a civil action to collect interest penalties from a prime contractor must be awarded its costs and disbursements, including attorney's fees, incurred in bringing the action.

HIST: 1985 c 136 s 5; 1995 c 31 s 1

INSTRUCTIONS TO BIDDERS

1. Use of Separate Bid Forms. These contract documents include a complete set of bidding and contract forms which are for the convenience of bidders and are not to be detached from the contract document, filled out, or executed. **Separate copies of bid forms are furnished for that purpose.**
2. Interpretations or Addenda. No oral interpretation will be made to any bidder as to the meaning of the contract documents or any part thereof. Every request for such an interpretation shall be made in writing to the City of Duluth. Any inquiry received seven or more days prior to the date fixed for opening of bids will be given consideration. Every interpretation made to a bidder will be in the form of an addendum to the contract documents, and when issued, will be on file in the offices of the Purchasing Agent and City Architect at least five days before bids are opened. In addition, all addenda will be mailed to each person holding contract documents, but it shall be the bidder's responsibility to make inquiry as to the addenda issued. All such addenda shall become part of the contract, and all bidders shall be bound by such addenda, whether or not received by the bidders.
3. Inspection of Site. Each bidder should visit the site of the proposed work and fully acquaint himself with the existing conditions there relating to construction and labor, and should fully inform himself as to the facilities involved, the difficulties, and the restrictions attending the performance of the contract. The bidder should thoroughly examine and familiarize himself with the drawings, technical specifications, and all other contract documents. The contractor, by the execution of the contract, shall in no way be relieved of any obligation under it due to his failure to receive or examine any form or legal instrument or to visit the site and acquaint himself with the conditions there existing; and the City of Duluth will be justified in rejecting any claim based on facts regarding which he should have been on notice as a result thereof.
4. Alternative Bids. No alternative bids will be considered unless alternative bids are specifically requested by the technical specifications.
5. Bids.
 - a. All bids must be submitted on forms supplied by the City of Duluth Purchasing Agent and shall be subject to all requirements of the contract documents, including the drawings, and these **Instructions to Bidders**. All bids must be regular in every respect; and no interlineations, excisions, or special conditions shall be made or included in the bid form by the bidder.

- b. Bid documents including the bid and the bid guaranty shall be enclosed in an envelope which shall be sealed and clearly labeled with the project number, if any, name of bidder, and date and time of bid opening, in order to guard against premature opening of the bid. If proposal is mailed, this envelope shall be placed in another envelope which shall be sealed and labeled with project number, if any, name of bidder, and date and time of bid opening -- and addressed to City of Duluth Purchasing Agent, 100 City Hall, Duluth, Minnesota 55802.
- c. The City of Duluth may consider as irregular any bid on which there is an alteration of or departure from the bid form hereto attached, and at its option may reject the same.
- d. If the contract is awarded, it will be awarded by the City of Duluth to a responsible bidder on the basis of the lowest bid and the selected alternative bid items. The contract will require the completion of the work according to the contract documents.
- e. Each bidder shall include in his bid the following information:

Principals -- Names
 Social Security Numbers
 Home Addresses, including city, state, & zip code

Firm -- Name
 Treasury Number
 Address
 City, State & Zip Code

Mechanical & Electrical Subcontractors -- Names of firms that will do the mechanical and electrical work and the amounts of the mechanical and electrical sub-bids, if applicable and when (where indicated on Bid Proposal Form).

6. Bid Guaranty.

- a. The bid must be accompanied by a bid guaranty which shall not be less than five percent (5%) of the amount of the bid. At the option of the bidder, the guaranty may be a certified check, bank draft, negotiable U.S. Government bond (at par value), or a bid bond. No bid will be considered unless it is accompanied by the required guaranty. Certified check or bank draft must be made payable to the order of the City of Duluth, Minnesota. Cash deposits will not be accepted. The bid guaranty shall insure the execution of the agreement and the furnishing of the surety bond or bonds by the successful bidder, all as required by the contract documents.
- b. Revised bids submitted before the opening of bids, whether forwarded by mail or telegram, if representing an increase in excess of two percent (2%) of the original bid, must have bid guaranty adjusted accordingly; otherwise, the bid will not be considered.
- c. Certified checks or bank drafts, or the amount thereof, bid bonds, and negotiable U.S. Government bonds of unsuccessful bidders, will be returned as soon as practical after the

opening of bids.

7. Collusive Agreements

- a. The successful bidder on each City of Duluth construction project shall be required to execute a City of Duluth non-collusive affidavit to the effect that he has not entered into a collusive agreement with any other person, firm, or corporation in regard to any bid submitted.
- b. Before executing any subcontract, the successful bidder shall submit the name of any proposed subcontractor for prior approval, and an affidavit substantially in the form provided in Section 103 of General Conditions hereof.

8. Unit Prices. The unit price for each of the several items in the proposal of each bidder shall include its prorata share of overhead so that the sum of the products obtained by multiplying the quantity shown for each item by the unit price bid represents the total bid. Any bid not conforming to this requirement may be rejected as informal. The special attention of all bidders is called to this provision; for should conditions make it necessary to revise the quantities, no limit will be fixed for such increased or decreased quantities nor extra compensation allowed, provided the net monetary value of all such additive and subtractive changes in quantities of such items of work (i.e., difference in cost) shall not increase or decrease the original contract price by more than twenty-five percent (25%), except for work not covered in the drawings and technical specifications as provided for in Section 109 hereof.

9. Corrections. Erasures or other changes in the bids must be explained or noted over the signature of the bidder.

10. Time for Receiving Bids.

- a. Bids received prior to the advertised hour of opening will be securely kept, sealed. The officer whose duty it is to open them will decide when the specified time has arrived, and no bid received thereafter will be considered; except that when a bid arrives by mail after the time fixed for opening, but before the reading of all other bids is completed, and it is shown to the satisfaction of the City Purchasing office that the non-arrival on time was

due solely to delay in the mails for which the bidder was not responsible, such bid will be received and considered.

- b. Bidders are cautioned that, while telegraphic modifications of bids may be received as provided above, such modifications, if not explicit and if in any sense subject to misinterpretation, shall make the bid so modified or amended, subject to rejection.
11. Opening of Bids. At the time and place fixed for the opening of bids, the City Purchasing Agent will cause to be opened and publicly read aloud every bid received within the time set for receiving bids, irrespective of any irregularities therein. Bidders and other persons properly interested may be present, in person or by representative.
 12. Withdrawal of Bids. Bids may be withdrawn on written or telegraphic request dispatched by the bidder in time for delivery in the normal course of business to the time fixed for opening; provided, that written confirmation of any telegraphic withdrawal over the signature of the bidder is placed in the mail and postmarked prior to the time set for bid opening. The bid guaranty of any bidder withdrawing his bid in accordance with the foregoing conditions will be returned promptly.
 13. Award of Contract: Rejection of Bids.
 - a. The contract will be awarded to the responsible bidder submitting the lowest bid complying with the conditions of the Invitation to Bid. The bidder to whom the award is made will be notified at the earliest possible date. The City of Duluth, however, reserves the right to reject any and all such bids and to waive any informality in bids received whenever such rejection or waiver is in its interest.
 - b. The City of Duluth reserves the right to consider as unqualified to do the work of general construction, any bidder who does not habitually perform with his own forces the major portions of the work involved in construction of the improvements embraced in the contract documents.
 14. Execution of Agreement: Performance and Payment Bond.
 - a. Subsequent to the award and within ten (10) days after the prescribed forms are presented for signature, the successful bidder shall execute and deliver to the City of Duluth an agreement in the form as furnished by the City, in such number of copies as the City of Duluth may require.
 - b. Having satisfied all conditions of award as set forth elsewhere in these documents, the successful bidder shall, within the period specified in paragraph "a" above, furnish:
 - 1) A performance bond for the use and benefit of the City of Duluth to complete the contract according to its terms, and conditioned on saving the City of Duluth harmless from all costs and charges that may accrue on account of completing the specified work; and

- 2) A payment bond for the use and benefit of all persons furnishing labor and materials for the performance of the contract conditioned upon the payment, as they become due, of all just claims for labor and materials.

Both the performance bond and the payment bond shall be in a penal sum of not less than the amount of the contract awarded. Such bonds shall be in the same form as that included in the contract documents and shall bear the same date as, or a date subsequent to, that of the agreement. A current power of attorney for the person who signs for any surety company shall be attached to such bonds.

- c. The failure of the successful bidder to execute such agreement to supply the required bond or bonds within ten (10) days after the prescribed forms are presented for signature, or within such extended period as the City of Duluth may grant, based on reasons determined sufficient by the City of Duluth, shall constitute a default, and the City of Duluth may either award the contract to the next lowest responsible bidder or re-advertise for bids, and may charge against the bidder the difference between the amount of the bid and the amount for which a contract for the work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the bid bond. If a more favorable bid is received by re-advertising, the defaulting bidder shall have no claim against the City of Duluth for a refund.

15. Wages and Salaries.

- a. Attention of bidders is particularly called to the requirements concerning the payment of not less than the prevailing wage and salary rates specified in the contract documents and the conditions of employment with respect to certain categories and classifications of employees.
- b. The rates of pay set forth under **General Conditions** are the minimums to be paid during the life of the contract. It is therefore the responsibility of bidders to inform themselves as to local labor conditions, such as the length of work day and work week, overtime compensations, health and welfare contributions, labor supply, and prospective changes or adjustments of rates.

16. Equal Employment Opportunity. Attention of bidders is particularly called to the requirement for ensuring that employees and applicants for employment are not discriminated against because of their race, color, religion, sex, or national origin. (See Supplementary General Conditions, Part II, Section II).

17. Employment and Business. Attention of bidders is particularly called to the requirement that, to the greatest extent feasible, opportunities for training and employment made possible by this project shall be given to lower income residents of the City of Duluth. Additionally, efforts should be made, if any work is subcontracted, to award subcontracts to concerns located in or owned in substantial part by persons residing in the City of Duluth.

18. Sales and Use Taxes. It is assumed that, in the preparation of his proposal, the bidder has taken into consideration his liability from any sales, use, or excise tax that might be assessed in the

purchase of, storage, use, or consumption of any materials, services, or supplies for performance of the contract work. Any such tax paid by the contractor will be considered as his expense, for which no direct compensation will be made by the City to the contractor over and above the accepted bid.

19. Pre-Bid/Pre-Construction Meetings.

- a. Seven (7) days prior to bid date, a pre-bid meeting will be held (see **Bid Form** for time and place). All prime bidders are requested to attend. All bidders will be allowed to make inquiries regarding the contract documents. All formal decisions will be documented by addendum. Failure of any prime bidders to attend this meeting could jeopardize the contract award.
- b. Approximately seven (7) days after City Council approval of contract award, the successful bidder is required to attend a pre-construction meeting. At this meeting, the successful bidder will present his construction schedule, cost breakdown, required submittals, etc.

20. Equal Employment Opportunity (EEO) Affirmative Action Policy Statement and Compliance Certificate.

- a. The successful bidder on each City of Duluth construction project shall be required to execute a certificate substantially in the form herein provided.
- b. Before executing any subcontract in excess of \$2,500, the successful bidder shall require the subcontractor to execute a form similar in nature to the form herein provided.

DIVISION 0
PROJECT IDENTIFICATION

00100 - INSTRUCTIONS TO BIDDERS

1. **NOTICE FOR BIDS:** Stipulated sum bids will be received for New Passenger Terminal, Duluth International Airport, Duluth, MN, for Bid Package 2C, as stated in the Invitation to Bid.
2. **RECEIVING AND OPENING OF BIDS:** Bids will be received as stated in the Invitation to Bid and will be opened immediately after the bid closing hour at a location designated by Owner. All bids must be submitted on the original Bid Form Packet provided with Contract Documents.

The Owner may consider informal any bid not prepared and submitted in accordance with provisions herein and may waive any informalities or reject any and all bids.

3. **MODIFICATION OF BIDS:** Oral, telephone or telegraphic bids or modifications to bids will not be considered.
4. **CONTRACTS:** Bids will be received and the project will be constructed under prime contracts as outlined in the Work Scope Descriptions.
5. **DRAWINGS AND SPECIFICATIONS ON FILE:** Bidding requirements, drawings and specifications are on file at the offices of the Construction Manager and RS&H, Inc., and the following locations:

Duluth Builders Exchange
802 Garfield Avenue
Duluth, MN 55802
Telephone: 218-722-2836

Minneapolis Builders Exchange
1123 Glenwood Avenue
Minneapolis, MN 55405
Telephone: 612-381-2620

St. Paul Builders Exchange
445 Farrington Street
St. Paul, MN 55103
Telephone: 651-224-7545

McGraw-Hill
Website: www.construction.com
Telephone: 651-528-8872

Hibbing Plan Room
211 E. Howard Street
Hibbing, MN 55746
Telephone: 218-262-3895

Reed Construction Data
30 Technology Parkway South, Suite 500
Norcross, GA 30092-2912
Telephone: 800-424-3996

MEDA
Website: www.constructionconnection.org

00100 - INSTRUCTIONS TO BIDDERS

6. INQUIRIES REGARDING PROJECT - DISCREPANCIES OR AMBIGUITIES:

All inquiries, requests for clarifications, requests for consideration of materials not specified and similar questions shall be directed to RS&H, Inc. in writing. Discrepancies or ambiguities in, or omissions from, the drawings, specifications or other Contract Documents, or should there be doubt as to their meaning, an interpretation shall be requested from RS&H, Inc., in writing. All inquiries, requests for clarification, requests for consideration of materials and products, must be received by RS&H, Inc. by 5:00 p.m. CST on Thursday, March 1, 2012 (unless longer periods are specified elsewhere in the specifications for certain work). It is the bidder's (and Contractor's) responsibility to bring all discrepancies, ambiguities, omissions or matters in need of clarification to the attention of RS&H, Inc. for interpretation and decision. If there is a discrepancy that is unclarified prior to the Bid, the Contractor shall be responsible for the more stringent interpretation of the unclarified condition.

7. ADDENDA AND INTERPRETATIONS: Replies to inquiries, requests for interpretations or clarifications and requests for consideration of materials which involve or provide information that is not already a part of bidding information will be contained in addenda and shall become a part of Contract Documents and incorporated in all bids submitted.

All bidders, submitting labor and/or supply bids, are responsible to ascertain what addenda have been issued prior to bid date, examining the addenda and determining the affect of addenda provisions on their Work Scope.

Interpretations, clarifications, modifications and supplemental instructions in form of written addenda will be provided to all prime contract bidders on record at the Construction Manager's office, and to Builders Exchanges where plans are on file. RS&H, Inc. and Owner will not be responsible for or honor any claims resulting from, or alleged to be the result of, misunderstanding by the bidder (or Contractor) of verbal discussion of the Project conditions prior to receiving bids. All verbal comments made during the bidding period are subject to inclusion in addenda; otherwise, they shall not be binding on Owner or RS&H, Inc.

During construction, discrepancies, ambiguities and intent not clarified by addenda will be subject to interpretation of RS&H, Inc. only, and work shall be provided in accordance with RS&H, Inc.'s interpretations.

Bidders shall state on bid form the number of addenda received.

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00100 - INSTRUCTIONS TO BIDDERS

8. **PROCUREMENT OF DOCUMENTS FOR BIDDERS ON PRIME CONTRACTS:** Copies of Drawings and Specifications may be obtained on or after February 15, 2012. Order printed sets through Shel/Don Group Inc.'s online Plan Room at www.sheldonplanroom.com. Contact Jeanette Herubin, Shel/Don Group Inc., at 218-727-2817, for final non-refundable deposit cost. Non-refundable checks made payable to Shel/Don Group Inc. Plans can be picked up at Shel/Don Group Inc., 124 E Superior Street, Duluth, MN 55802 once required deposit has been received by Shel/Don Group Inc. This payment will not be refunded.

For a non-refundable \$20 fee you may obtain a CD containing an electronic version of the plans/specs/addendums and a hard copy of Bid Form Packet. Make check payable to Kraus-Anderson® Construction Company, 3716 Oneota Street, Duluth, MN 55807. For a CD, contact Deb Coffman, phone 218-722-3775. For a Bid Form Packet, contact Kim Lofquist, phone 218-727-8363.

9. **PLANS FOR SUBCONTRACTORS, MATERIAL DEALERS & QUANTITY SURVEYORS:** A complete set of drawings and specifications may be obtained as stated in #8 above.
10. **OBLIGATION OF BIDDER - EXAMINATION OF DOCUMENTS & SITE:** Each bidder (including subcontract bidder where appropriate) is responsible to visit the site and to fully inform himself and record his own investigations as to the extent of the Work, the extent of the work performed by other contractors under other construction packages, conditions under which the Work is to be performed, existing buildings and streets, conditions of the area, existing utilities and other features, type of soil, available facilities and difficulties that may be encountered in connection therewith, and other relevant items which will affect his bid or the Work.

Prior to submitting a bid, each bidder is required to examine all of the bidding requirements, all Contract Documents, all drawings and specifications for the Project (including those primarily for other Subcontracts), become thoroughly familiar with the scope of the Project and all factors and items of work which will affect his bid or the Work, whether shown or specified in documents primarily for Work of others or Work of this Contract.

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No extras will be allowed the Contractor as a result of misunderstanding of the extent of scope of the Work as a result of his failure to study and record his own findings. Submission of a bid shall be proof that such examinations have been made and that bidder has recorded his own investigation and has become thoroughly familiar with all contract documents (including all addenda). The failure or omissions of any bidder to examine any form, instrument or document shall in no way relieve any bidder from any obligation in respect to his bid.

11. **CONDITIONS OF WORK:** Each bidder must inform himself fully of conditions relating to the construction of the Project and the availability and employment of labor thereon. Failure to do so will not relieve a successful bidder of his obligation to furnish all materials and labor necessary to carry out the provisions of his contract. Contractor, in carrying out his work, must employ such methods or means as will not cause any interruption of or interference with the Work of any other Contractor.
12. **PREPARATION OF BID:** Submit bids to Owner in accordance with the following requirements:
 - A. Submit Bid Form Packet in duplicate on the prescribed form, which is furnished with the specification, with full name and address of the bidder.
 - B. Completely fill in all blank spaces on the Bid Form, in ink or typewriter, in both words and figures.
 - C. Sign in longhand, executed by a principal duly authorized to enter into an agreement. If a bidder is a co-partnership, then signatures on the bid shall be by an authorized member of the firm, with names and addresses of each member of partnership.
 - D. Base bid (Basic Proposal) and all alternate bids shall be stated both in writing and in figures. In all cases, written and numerical figures must agree; otherwise at Owner's option, it shall be cause for rejection of bid. Complete form without interlineation, alteration, erasure.
 - E. Submit alternate prices (bid) for either increasing or decreasing the cost as called for on bid form and Description of Alternates. Submit a bid for all alternates, except those which may be denoted as optional.
 - F. Do not stipulate any other conditions, alternates or qualifications. Owner will not accept any condition not contained in specifications or other documents.

00100 - INSTRUCTIONS TO BIDDERS

G. Submit bid in a sealed envelope bearing (on the outside) name of the bidder, address, name of the Project and Work Scope for which bid is submitted. The official Bid Form Packet must be submitted. If forwarded by mail or other means of delivery, sealed envelope containing the bid must be enclosed in another envelope addressed as specified.

13. **BID SECURITY - EXECUTION OF CONTRACT:** With each bid, submit a certified check or cashier's check on a solvent bank, or bid bond, equal to five percent (5%) of amount of maximum bid submitted (including additive alternates) and made payable without recourse to City of Duluth.

For bid bonds, form may be surety's standard form or AIA Form A-310, duly executed by the bidder as principal, issued by a corporate surety company authorized to do business in the State of Minnesota, with copy of Power of Attorney attached, as well as proper acknowledgments.

Bid security in form of certified or cashier's check will be returned to all but the three lowest bidders within ten (10) days after opening of bids.

Bid security shall be forfeited to Owner as liquidated damages in the event bidder is awarded a Contract and he fails or refuses to execute the Agreement and furnish specified bond within ten (10) days after award, provided Agreement is ready for signature. If Agreement has not been prepared within ten (10) days, Contractor shall have two (2) days after its preparation for execution.

14. **WITHDRAWAL OF BIDS:** A bidder may withdraw his bid at any time prior to date set for receiving bids (or authorized postponement thereof). Thereafter, the bids may be withdrawn only after ninety (90) days has elapsed after bid date, provided Owner has not acted thereon.
15. **QUALIFICATIONS OF BIDDERS:** Owner may make such investigations as he deems necessary to determine the ability and responsibility of the bidder to perform the work, and any bidder shall furnish to Owner all such information and data for this purpose, as the Owner may request. Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the contract and to complete the Work contemplated therein. The competence and responsibility of bidder will be considered in making an award, including, but not limited to: (1) proof of financial responsibility, (2) quality of similar work, (3) amount of experience with similar projects, (4) facilities, personnel and equipment, (5) reputation for performance, and (6) ability to complete the work within specified time. Owner reserves the right to reject any Bid where there is reasonable doubt as to the qualifications of the bidder.

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PROJECT IDENTIFICATION

00100 - INSTRUCTIONS TO BIDDERS

16. **ACCEPTANCE OF BID - AWARD OF CONTRACT:** Owner reserves the right to (1) accept bidder's Base Bid only, (2) accept any one or more of bidder's Alternate Bids, in any order regardless of the order in which they were listed, (3) reject all Bids, (4) award contract based on his investigation of bidders, as well as acceptance of alternates, all of which Owner deems to be in his best interest, (5) waive informalities or minor irregularities in bids and waive minor irregularities or discrepancies in bidding procedure.
17. **PERFORMANCE BOND:** Upon award of Contract, Contractor shall provide Performance and Payment Bonds in the amount of 100% of Contract Sum using the forms specified in the Contract Documents.
18. **SUBCONTRACTS - SUPPLIERS:** Proposed subcontractors are subject to Owner's, Construction Manager's and RS&H, Inc.'s acceptance. The right of rejection may be exercised when there is reasonable doubt the subcontractor (supplier) will be able to satisfactorily perform work under the Contract.
19. **COMPLETION TIME:** Commencement of Work and time of completion shall be an essential condition of the Contract. Work shall be completed within time specified, agreed upon and entered into Contract. Refer to Section 01041 for dates and further requirements of completion.
20. **WORK UNDER PREVIOUS CONSTRUCTION PHASES:** Bidders shall acknowledge that project work is being conducted under previous construction phases. Bidders shall acquaint themselves with the work of these previous phases in order to coordinate and understand the work of this contract. Plans and specifications for these phases are available for review at RS&H, Inc.'s office and Construction Manager's office.

END OF SECTION 00100



REQUEST FOR BID
DATE 2/10/2012
BID # 12-4401

RETURN BY BID OPENING TIME TO:

PURCHASING DIVISION
100 CITY HALL
Duluth, MN 55802
Buyer: Dennis Sears
PHONE: 218-730-5340
FAX: 218-730-5921

NEW PASSENGER TERMINAL BP-2C SITEWORK & APRON CONCESSIONS AND FURNISHINGS

THIS BID FORM INCORPORATES THREE (3) COMBINED FORMS TO INCLUDE:

- NO. 1 - LINE ITEM BID SCHEDULE FOR CIVIL SITEWORK & APRON**
NO. 2 - ITEMIZED BID FORM SECTION 11400 FOOD SERVICE EQUIPMENT
NO. 3 - WORK SCOPE DIVISIONS 1-16

BID OPENING AT 2:00 PM on THURSDAY, MARCH 8, 2012

Note: all bids must be written, signed and transmitted in a sealed envelope, plainly marked with the bid number, subject matter and opening date. The City of Duluth reserves the right to split award where there is a substantial savings to the City, waive informalities and to reject any and all bids. Bidder should state in proposal if bid price is based on acceptance of total order. Sales tax shall be included in the unit price. Bidder to state freight charges if the proposal F.O.B. is shipping point, freight not allowed. Low bid will not be the only consideration for award of bid. Bid Form shall be signed by authorized bidder's representative as indicated on signature lines and addedndums need to be acknowledged with this request for bid form.

RETURN BID IN DUPLICATE WITH DUPLICATE DESCRIPTIVE LITERATURE
FOR BID RESULTS, ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE WITH BID

BID DEPOSIT REQUIREMENTS: 5% OF BID AMOUNT

Deposit shall mean cash, cashier's check or corporate surety bond payable to or in favor of the City of Duluth.

A PERFORMANCE BOND AND A PAYMENT BOND shall be required of the successful bidder, BOTH in the full amount of the bid.

INSURANCE CERTIFICATE required per attached requirements.

Designated F.O.B. Point: Jobsite

Tax: Federal Excise Tax Exemption
Account No. 41-74-0056 K

Vendor Email Address: _____ FREIGHT CHARGE \$ N/A

NAME: _____ TOTAL BID PRICE # _____

ADDR1: _____ TO INCLUDE ANY ADDITIONAL PAGES.

ADDR2: _____

ADDR3: _____

BY: _____ PAYMENT TERMS \$ _____

(Print) (Title) F.O.B. POINT Duluth Airport

(Signature) (Tele. #) DELIVERY DATE _____

The City of Duluth is an Equal Opportunity Employer.

DULUTH AIRPORT AUTHORITY
DULUTH INTERNATIONAL AIRPORT
NEW PASSENGER TERMINAL
BP-2C SITEWORK APRON
CONCESSIONS AND FURNISHINGS

Bid Docs.xls
FEBRUARY 10, 2012
ISSUE FOR BID

BID EXTENSION ATTACHMENT

C I T Y O F D U L U T H

DATE: 2/10/2012

BID #: 12-4401

*******SCHEDULE OF PRICES*******

**NEW PASSENGER TERMINAL BP-2C SITEWORK & APRON
CONCESSIONS AND FURNISHINGS**

Make all extensions and total the bid.

This Bid Form will consist of a Line Item Base Bid for the Civil Sitework & Apron including four (4) Add Alternates; plus Multiple Bid Divisions for the Concessions and Furnishings (Building work)

(Civil Sitework & Apron)--Total Base Bid Line Item \$ _____

(Civil Sitework & Apron)--Total Add Alternate No. 1 \$ _____

(Civil Sitework & Apron)--Total Add Alternate No. 2 \$ _____

(Civil Sitework & Apron)--Total Add Alternate No. 3 \$ _____

(Civil Sitework & Apron)--Total Add Alternate No. 4 \$ _____

(Civil Sitework & Apron) Total Base Bid including Add Alternates \$ _____

SEE ATTACHED BID FORM FOR CONCESSIONS AND FURNISHINGS WORK SCOPE DIVISIONS

The basis of award shall be the lowest bid for either the Line Item Total or Line Item Totals with any combination of Add Alternates No 1, 2, 3 and 4. The basis of the award of the contract shall be at the sole discretion of the City of Duluth/Duluth Airport Authority. The award of the individual Additive Alternates is at the sole discretion of the City of Duluth/DAA, based on available Federal Funding. The City of Duluth/DAA reserves the right to award either the Base Bid or the Base Bid and Alternates No. 1, 2, 3 and/or 4. There will be no additional allowance in the Contract Time if the Additive Alternate is awarded.

A Mandatory pre-bid meeting will be held on Thursday, March 1, 2012 at 2:00 p.m. In the Skyline Room, 2nd Floor, Passenger Terminal Building, Duluth International Airport

DULUTH AIRPORT AUTHORITY
DULUTH INTERNATIONAL AIRPORT
NEW PASSENGER TERMINAL
BP-2C SITEWORK APRON
CONCESSIONS AND FURNISHINGS

C I T Y O F D U L U T H

ADDENDUM RECEIPT ACKNOWLEDGEMENTS:

ADDENDUM NO. _____, DATED _____

ADDENDUM NO. _____, DATED _____

ADDENDUM NO. _____, DATED _____

ADDENDUM NO. _____, DATED _____

ADDENDUM NO. _____, DATED _____

ADDENDUM NO. _____, DATED _____

CONTRACTOR NAME:

THE CONTRACTOR AGREES TO ALL OF THE PROVISIONS CONTAINED IN THE CONTRACT DOCUMENTS. ENCLOSED HERewith FIND A CERTIFIED CHECK OR BID BOND IN THE AMOUNT OF AT LEAST 5% OF THE AMOUNT OF PROPOSAL MADE PAYABLE TO THE CITY OF DULUTH AS A PROPOSAL GUARANTEE WHICH IT (see additional page(s))

IS AGREED BY THE UNDERSIGNED WILL BE FORFEITED IN THE EVENT THE FORM OF CONTRACT AND BOND IS NOT EXECUTED, IF AWARDED TO THE UNDERSIGNED.

SIGNED: _____ FOR

A PARTNERSHIP (OR)_____
A CORPORATION INCORPORATED UNDER THE
LAWS OF THE STATE OF:_____
PRESIDENT_____
VICE-PRES._____
SECRETARY_____
TREASURER_____
ADDRESS (ES)

BEING DULY SWORN, DEPOSES AND SAYS THAT THERE ARE NO OTHER PERSONS COMPRISING ABOVE COMPANY OR FIRM THAN THE ABOVE NAMES, AND THAT THERE ARE NO PERSONS OR

C I T Y O F D U L U T H

2/10/2012

12-4401

CORPORATIONS INTERESTED IN THE FORGOING PROPOSALS, EITHER AS PRINCIPAL OR
SUBCONTRACTOR, OTHER THAN THE ABOVE NAMES; ALSO THAT THE PROPOSALS ARE MADE
WITHOUT ANY CONNECTION WITH ANY PERSON OR PERSONS MAKING ANY PROPOSAL FOR THE
ABOVE WORK; THAT THEY ARE IN ALL RESPECTS FAIR AND WITHOUT COLLUSION OR FRAUD;
AND THAT NO PERSON ACTING IN ANY OFFICIAL CAPACITY FOR THE CITY OF DULUTH IS
IRECTLY OR INDIRECTLY INTERESTED THEREIN, OR IN ANY PORTION OF THE PROFIT THEREOF

SUBSCRIBED AND SWORN TO BEFORE ME THIS

DAY OF

A.D.,

NOTARY PUBLIC

IMPORTANT NOTE BIDDERS:

ALL APPLICABLE SALES AND/OR USE TAXES ARE
TO BE INCLUDED IN BID PRICING. ALSO,
ALL BIDS ARE TO BE F.O.B. JOBSITE.

LOCATION: Duluth International Airport

Reynolds, Smith and Hills, Inc.

PROJECT DESCRIPTION:

Date Prepared: FEBRUARY 10, 2012

NEW PASSENGER TERMINAL - SITEWORK/APRON

Prepared By: PTF/AMA/RDRE

RS&H Project No. 213-1882-091

BID ITEM	SPEC. NUMBER	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
1	P-100.3.1	MOBILIZATION	LS	1		
2	P-102.10.1	SAFETY AND SECURITY	LS	1		
3	P-104.5.1	PROJECT SURVEY AND STAKEOUT	LS	1		
4	P-105.5.1	TEMPORARY CONSTRUCTION ITEMS	LS	1		
5	P-106.5.1	PAVEMENT MARKING REMOVAL	SF	1990		
6	P-107.4.1	REMOVE AND DISPOSE COMPOSITE PAVEMENT FULL DEPTH (INCLUDES CONCRETE AND ASPHALT AIRFIELD PVMT)	SY	12964		
7	P-107.4.2	REMOVE AND DISPOSE CONCRETE SIDEWALK	SY	1810		
8	P-107.4.3	REMOVE AND DISPOSE ASPHALT PAVEMENT FULL DEPTH	SY	18213		
9	P-107.4.4	REMOVE CONCRETE CURB AND GUTTER	LF	2300		
10	P-107.4.5	REMOVE STREET SIGN	EACH	75		
11	P-109.5.1	SAWING CONCRETE PAVEMENT (FULL DEPTH)	LF	1000		
12	P-109.5.2	SAWING BITUMINOUS PAVEMENT (FULL DEPTH)	LF	364		
13	P-152.4.1	UNCLASSIFIED EXCAVATION	CY	59571		
14	P-152.4.2	ROCK EXCAVATION	CY	1000		
15	P-152.4.3	UNSUITABLE EXCAVATION AND SAND BACKFILL	CY	1000		
16	P-152.4.5	EXCAVATION FROM HOLDING PONDS	CY	2013		
17	P-152.4.6	CONTAMINATED SOIL DISPOSAL	CY	2013		
18	P-154.6.1	SAND SUBBASE COURSE	CY	32135		
19	P-156.5.1	EROSION CONTROL - INLET PROTECTION ON PAVEMENT	EACH	39		
20	P-156.5.2	EROSION CONTROL - INLET PROTECTION OFF PAVEMENT	EACH	15		
21	P-156.5.3	EROSION CONTROL - SILT FENCE	LF	2400		
22	P-156.5.4	EROSION CONTROL - RIP RAP, CLASS III	SYD	50		
23	P-209.5.1	CRUSHED AGGREGATE BASE COURSE	CY	6424		
24	MNDOT 2104.501	REMOVE WATER MAIN AND VALVES	LF	70		
25	MNDOT 2104.509/0011	REMOVE HYDRANT	EACH	1		
26	MNDOT 2105.521/0003	GRANULAR BORROW MOD 7% (CV)	CY	2400		
27	MNDOT 2105.604	GEOTEXTILE FABRIC TYPE V	SY	40911		
28	MNDOT 2112.604/0001	SUBGRADE PREPARATION	SY	6755		
29	MNDOT 2211.503	CRUSHED AGGREGATE BASE COURSE	CY	1741		
30	2401.515	CONCRETE SIDEWALK (MIX #3A32) W/ 6" x 6" WWF, AS SPECIFIED	SY	730		
31	P-401.8.1	BITUMINOUS BASE COURSE, 1" MAXIMUM AGGREGATE	TON	6751		
32	P-401.8.2	BITUMINOUS SURFACE COURSE, 3/4" MAXIMUM AGGREGATE	TON	1120		
33	P-501.8.1	12" THICK PORTLAND CEMENT CONCRETE PAVEMENT	SY	26225		
34	P-501.8.2	9" THICK PORTLAND CEMENT CONCRETE PAVEMENT	SY	3400		
35	P-501.8.3	BURIED TRANSITION-CONCRETE	SY	475		
36	P-603.5.1	BITUMINOUS TACK COAT	GAL	4400		
37	P-610.5.1	CONCRETE CURB AND GUTTER D424	LF	389		
38	P-610.5.2	CONCRETE CURB AND GUTTER B624	LF	356		
39	P-610.5.3	6 INCH CONCRETE SLAB W/ 6x6 WWF	SY	34		
40	P-620.5.1	PAVEMENT MARKING (YELLOW) WITH REFLECTIVE BEADS INCLUDING SURFACE PREPARATION	SF	3400		
41	P-620.5.2	PAVEMENT MARKING (BLACK) WITHOUT REFLECTIVE BEADS INCLUDING SURFACE PREPARATION	SF	4300		
42	P-620.5.3	PAVEMENT MARKING (WHITE) WITH REFLECTIVE BEADS INCLUDING SURFACE PREPARATION	SF	7972		
43	P-620.5.4	PAINTED PARKING POSITION SIGN WITH REFLECTIVE BEADS	EACH	4		
44	P-620.5.5	HANDICAP SYMBOL PAVEMENT MARKING WITH REFLECTIVE BEADS	EACH	13		
45	P-620.5.6	PAVEMENT MARKING - TURN ARROW	EACH	2		

LOCATION: Duluth International Airport

Reynolds, Smith and Hills, Inc.

Date Prepared: FEBRUARY 10, 2012

PROJECT DESCRIPTION:

Prepared By: PTF/AMA/RDRE

NEW PASSENGER TERMINAL - SITEWORK/APRON

RS&H Project No. 213-1882-091

BID ITEM	SPEC. NUMBER	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
46	D-701.5.1	STORM SEWER PIPE, 12" CL V, C76	LF	26		
47	D-701.5.2	STORM SEWER PIPE, 18" CL V, C76	LF	80		
48	D-701.5.3	STORM SEWER PIPE, 24" CL V, C76	LF	640		
49	D-701.5.4	STORM SEWER PIPE, 30" CL V, C76	LF	255		
50	D-701.5.5	STORM SEWER PIPE, 36" CL V, C76	LF	1355		
51	D-701.5.6	STORM SEWER PIPE, 42" CL V, C77	LF	25		
52	D-701.5.7	STORM SEWER PIPE, 4" SDR35	LF	1600		
53	D-705.5.1	INSTALL 6" UNDERDRAIN WITH FABRIC PIPE WRAP AND POROUS BACKFILL	LF	9070		
54	D-705.5.3	REMOVE SEWER PIPE (STORM), 12" - 18" DIA.	LF	980		
55	D-705.5.4	REMOVE SEWER PIPE (STORM), 19" AND GREATER	LF	405		
56	D-751.7.1	REMOVE MANHOLES OR CATCH BASINS	EACH	17		
57	D-751.7.2	INSTALL NEW MANHOLE/CATCHBASIN, 4' DIA	EACH	5		
58	D-751.7.3	INSTALL NEW MANHOLE/CATCHBASIN, 5' DIA	EACH	4		
59	D-751.7.4	INSTALL NEW MANHOLE/CATCHBASIN, 6' DIA	EACH	9		
60	D-751.7.5	INSTALL NEW MANHOLE/CATCHBASIN, 7' DIA	EACH	2		
61	D-751.7.6	INSTALL NEW 42" DIA. END SECTION	EACH	1		
62	D-751.7.7	RECONSTRUCT MANHOLES OR CATCH BASINS	EACH	10		
63	D-751.7.8	STORM CHAMBER DETENTION SYSTEM	LSUM	1		
64	D-751.7.9	STORM DRAINAGE FRAME AND COVER, AS SPECIFIED	EACH	26		
65	D-751.7.10	WATER QUALITY UNIT	LSUM	1		
66	D-751.7.11	ADJUST EXISTING STORM OR SANITARY MH CASTING	EACH	8		
67	F-162.5.1	REMOVE FENCE	LF	1750		
68	F-162.5.2	REMOVE GATES	EACH	3		
69	F-162.5.3	6' CHAIN LINK FENCE W/ 3 STRANDS BARBED WIRE	LF	1610		
70	F-162.5.4	TEMPORARY FENCE 6' CHAIN LINK FENCE, NO CONCRETE PULL POSTS, NO TOP RAIL, OR BARBED WIRE	LF	800		
71	F-162.5.5	REINFORCED FENCE SECTION	EACH	1		
72	T-901.5.1	HYDROSEEDING AND WOOD FIBER MULCH WITH FERTILIZER	ACRE	6		
73	T-905.5.1	TOPSOILING (FURNISHED FROM OFF THE SITE)	CY	3000		
74	L-105.7.4	REMOVE LIGHT AND FOUNDATION (STREET)	EACH	9		
75	L-105.7.5	REMOVE LIGHT AND FOUNDATION (SIDEWALK)	EACH	17		
76	L-108-5.1	1/C NO. 8 AWG, 5KV, TYPE L-824 CABLE, SERIES LIGHTING CABLE INSTALLED IN DUCTBANK OR CONDUIT	LF	60		
77	L-108-5.2	1/C NO. 6 AWG, BARE COPPER COUNTERPOISE WIRE INSTALLED IN TRENCH, INCLUDING GROUND RODS AND GROUNDING CONNECTORS	LF	20		
78	L-108-5.3	4/C #8 600V THHN CABLE	LF	532		
79	L-108-5.4	2/C #6 600V THHN CABLE	LF	2355		
80	L-108-5.5	1/C #4 EQUIPMENT GROUND	LF	2889		
81	L-110.5.1	1-WAY, 2" SCHEDULE 80 PVC, DIRECT BURIED	LF	656		
82	L-125-5.1	MEDIUM INTENSITY TAXIWAY EDGE LIGHT, L861, 30" HEIGHT, 6.6A, BASE MOUNT, 360 BLUE LENS, LED LAMP	EACH	1		
83	L-125-5.4	TEMPORARY TAXIWAY EDGE LIGHTING	LS	1		
84	NDOT 2401.521/0003	STRUCTURE EXCAVATION CLASS R	CY	300		
85	NDOT 2504.602/0002	INSTALL HYDRANT & VALVE	EACH	1		
86	NDOT 2504.603/1016	6" WATERMAIN DUCTILE IRON CL 53	LF	35		
87	NDOT 2564.537/0001	HANDICAP PARKING SIGN R7-8M	EACH	13		

LOCATION: Duluth International Airport Reynolds, Smith and Hills, Inc.
PROJECT DESCRIPTION: Date Prepared: FEBRUARY 10, 2012
 NEW PASSENGER TERMINAL - SITEWORK/APRON Prepared By: PTF/AMA/RDRE
 RS&H Project No. 213-1882-091

BID ITEM	SPEC. NUMBER	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
88	SP 5.3	TYPE 'C' LIGHT ON EXISTING FOUNDATION	EACH	3		
89	SP 6.3	PROGRAMMABLE CIRCUIT BREAKER, SQUARE D TYPE NF POWERLINK OR APPROVED EQUAL	EACH	2		
90	SP 7.3	ENTRANCE & EXIT GATES W/ DETECTOR LOOPS W/ FOUNDATION	EACH	4		
91	SP 8.3	PROVIDE AND INSTALL PARKING STOPS	EACH	36		
92	SP 9.3	BUILDING DEMOLITION	LS	1		
93	SP 10.3	REMOVE VALVE AND CAP WATER LINE	EACH	1		
94	SP 11.3	BUILDING UTILITY COORDINATION AND DEMOLITION (UTILITY ALLOWANCE)	AL	1		
95	SP 12.4	TRAFFIC CONTROL ALLOWANCE	AL	1		
96	SP 14.3	COMMERCIAL VEHICLE GATE W/ DETECTOR LOOPS , PROXIMITY ACCESS TAGS, AND FOUNDATION	EACH	1		
97	SP 15.9	EXIT PAY STATION	EACH	1		
98	SP 16.3	PRIVATE UTILITY LOCATING SERVICE	LS	1		
					BASE BID TOTAL CIVIL SITEWORK & APRON	\$

ALTERNATIVE #1 -CONSTRUCT EAST APRON & TAXIWAY 'A' WIDENING AND SHOULDERS						
BID ITEM	SPEC. NUMBER	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
99	P-109.5.2	SAWING BITUMINOUS PAVEMENT (FULL DEPTH)	LF	636		
100	P-107.4.3	REMOVE AND DISPOSE ASPHALT PAVEMENT FULL DEPTH	SY	2151		
101	P-152.4.1	UNCLASSIFIED EXCAVATION	CY	12579		
102	MNDOT 2105.604	GEOTEXTILE FABRIC TYPE V	SY	7186		
103	P-154.6.1	SAND SUBBASE COURSE	CY	9389		
104	P-209.5.1	CRUSHED AGGREGATE BASE COURSE	CY	1597		
105	P-401.8.1	BITUMINOUS BASE COURSE, 1" MAXIMUM AGGREGATE	TON	1413		
106	P-401.8.2	BITUMINOUS SURFACE COURSE, 3/4" MAXIMUM AGGREGATE	TON	312		
107	P-501.8.1	12" THICK PORTLAND CEMENT CONCRETE PAVEMENT	SY	3722		
108	L-105.7.1	REMOVE GUIDANCE SIGN AND FOUNDATION	EACH	1		
109	L-105.7.2	REMOVE ELECTRICAL HANDHOLE	EACH	13		
110	L-105.7.3	REMOVE BASE MOUNTED AIRFIELD EDGE LIGHT	EACH	11		
111	L-108-5.1	1/C NO. 8 AWG, 5KV, TYPE L-824 CABLE, SERIES LIGHTING CABLE INSTALLED IN DUCTBANK OR CONDUIT	LF	740		
112	L-108-5.2	1/C NO. 6, BARE COPPER COUNTERPOISE WIRE INSTALLED IN TRENCH, INCLUDING GROUND RODS AND GROUNDING CONNECTORS	LF	580		
113	L-110.5.1	1-WAY, 2" SCHEDULE 40 PVC, DIRECT BURIED	LF	65		
114	L-110.5.2	1-WAY, 2" SCHEDULE 40 PVC, IN PAVED AREAS	LF	500		
115	L-125-5.1	MEDIUM INTENSITY TAXIWAY EDGE LIGHT, L861, 30" HEIGHT, 6.6A, BASE MOUNT, 360 BLUE LENS, LED LAMP	EACH	9		
116	L-125-5.2	L-858 GUIDANCE SIGN, SIZE 1, STYLE 3, MODE 2, 2 MODULE	EACH	1		
117	L-125-5.3	JUNCTION BOX, L-867, CLASS 1, SIZE B, 24" DEEP, 12" WIDE	EACH	2		
					ALTERNATE NO. 1 TOTAL CONSTRUCT EAST APRON & TAXIWAY A WIDENING AND SHOULDERS	\$

LOCATION: Duluth International Airport
PROJECT DESCRIPTION: NEW PASSENGER TERMINAL - SITEWORK/APRON
Reynolds, Smith and Hills, Inc.
Date Prepared: FEBRUARY 10, 2012
Prepared By: PTF/AMA/RDRE
RS&H Project No. 213-1882-091

BID ITEM	SPEC. NUMBER	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
ALTERNATIVE #2 -CONSTRUCT PERIMETER ROAD EXTENSION & SNOW MELT PAVEMENT						
BID ITEM	SPEC. NUMBER	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
118	P-107.4.3	REMOVE AND DISPOSE ASPHALT PAVEMENT FULL DEPTH	SY	5456		
119	P-152.4.1	UNCLASSIFIED EXCAVATION	CY	10912		
120	MNDOT 2105.604	GEOTEXTILE FABRIC TYPE V	SY	5456		
121	P-154.6.1	SAND SUBBASE COURSE	CY	6972		
122	P-209.5.1	CRUSHED AGGREGATE BASE COURSE	CY	1212		
123	P-401.8.1	BITUMINOUS BASE COURSE, 1" MAXIMUM AGGREGATE	TON	818		
124	P-401.8.2	BITUMINOUS SURFACE COURSE, 3/4" MAXIMUM AGGREGATE	TON	491		
					ALTERNATE NO. 2 TOTAL CONSTRUCT PERIMETER ROAD EXTENSION & SNOW MELT PAVEMENT	\$

ALTERNATIVE #3 -APRON DEICING CONTAINMENT SYSTEM						
BID ITEM	SPEC. NUMBER	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
125	S-101.5.1	GEOSYNTHETIC CLAY LINER AND CUSHION LAYER	SY	40900		
126	D-705.5.2	INSTALL 6" UNDERDRAIN WITH FABRIC PIPE WRAP AND POROUS BACKFILL (ALT)	LF	1320		
					SUBTOTAL	
					ALTERNATE NO. 3 TOTAL APRON DEICING CONTAINMENT SYSTEM	\$

ALTERNATIVE #4 -CONSTRUCT WEST APRON PAVEMENT						
BID ITEM	SPEC. NUMBER	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
127	P-107.4.1	REMOVE AND DISPOSE COMPOSITE PAVEMENT FULL DEPTH (INCLUDES CONCRETE AND ASPHALT AIRFIELD PVMT)	SY	26		
128	P-107.4.3	REMOVE AND DISPOSE ASPHALT PAVEMENT FULL DEPTH	SY	1080		
129	P-152.4.1	UNCLASSIFIED EXCAVATION	CY	1938		
130	MNDOT 2105.604	GEOTEXTILE FABRIC TYPE V	SY	1203		
131	P-154.6.1	SAND SUBBASE COURSE	CY	1604		
132	P-209.5.1	CRUSHED AGGREGATE BASE COURSE	CY	267		
133	P-401.8.1	BITUMINOUS BASE COURSE, 1" MAXIMUM AGGREGATE	TON	288		
134	P-501.8.1	12" THICK PORTLAND CEMENT CONCRETE PAVEMENT	SY	1203		
					ALTERNATE NO. 4 TOTAL CONSTRUCT WEST APRON PAVEMENT	\$

Duluth International Airport

Section 11400 Foodservice Equipment

ITEMIZED BID FORM

Name of Bidder: _____

Address: _____

Telephone: _____ Date: _____

We the undersigned, will furnish all labor, materials, equipment, facilities, etc, and perform all work required for the construction and completion of the foodservices equipment work for the foodservice facilities at Duluth International Airport in accordance with the drawings and specifications dated February 10, 2012.

The following is a subdivision of our tender for the work:

(A) Equipment \$ _____

(B) Installation \$ _____

(C) Tax (if applicable) \$ _____

TOTAL \$ _____

_____ Dollars
(written amount)

Addenda

We include, in the above bid the sum, the modifications to the work described in the following Addenda received prior to the submission of the Bid.

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

Bond

The bid does not include allowance for performance bond and payment bonds. If such bonds are required, said bonds will be furnished and executed for the additional sum of:

\$ _____

Subcontractors

The following subcontractors will be used

Duluth International Airport

Section 11400 Foodservice Equipment

ITEMIZED BID FORM

- a. Custom Fabrication _____
- b. Installation _____
- c. Refrigeration _____
- d. Other _____

Proposal Guarantee

The price stated in this bid is guaranteed for a period of not less than sixty(60) days, nor more than _____ days from the date hereof, and if authorized to proceed within that period, we agree to complete the work covered by this bid at said price.

The undersigned _____ is licensed
(individual, partnership, corporation)
to do business in the State of _____.

License No. _____

By _____

Title _____

Information Required

Bidder to state:

1. If Partnership, list names of all partners:

2. If the corporation, give state of incorporation:

Itemized Bid

The following itemized equipment bid is an integral part of this Proposal. The Owner reserves the right to delete any item and receive full credit up until the time that the equipment contractor is authorized by the Owner's representatives to purchase or fabricate that equipment item. Installation and tax (if applicable) must be included within the cost of each item.

Duluth International Airport

Section 11400 Foodservice Equipment

ITEMIZED BID FORM

Item #	Qty	Description	Remarks	Item Cost	Total Cost
1	1	SERVING COUNTER		_____	_____
2	1	SERVING COUNTER		_____	_____
3	1	SELF SERVICE ORDER INTERFACE	NOT IN SECTION 114000		
4	1	MENU BOARD	NOT IN SECTION 114000		
5	1	MOP HOLDER & DETERGENT SHELF		_____	_____
6	1	MOP SINK	BY MECHANICAL		
7	1	ICE BIN	EXISTING/RELOCATE	_____	_____
8	1	WATER FILTER		_____	_____
9		OPEN NUMBER			
10	1	ICE MAKER	EXISTING/RELOCATE	_____	_____
11		OPEN NUMBER			
12	1	WALK-IN FREEZER		_____	_____
13	1	FREEZER SYSTEM		_____	_____
14	2	REFRIGERATOR/FREEZER SHELVING		_____	_____
15	1	REFRIGERATOR/FREEZER SHELVING	EXISTING/RELOCATE	_____	_____
16	3	DRY STORAGE SHELVING	EXISTING/RELOCATE	_____	_____
17	1	DESK & CHAIR	NOT IN SECTION 114000		
18	1	SAFE	NOT IN SECTION 114000		
19	1	WALL CABINET	NOT IN SECTION 114000		
20		OPEN NUMBER			
21		OPEN NUMBER			
22	1	REACH-IN REFRIGERATOR, 2-SEC.		_____	_____
23	1	PREP COUNTER W/SINKS		_____	_____
24	1	DISPOSER W/SPRAY RINSE		_____	_____
25		OPEN NUMBER			
26	1	MOBILE TRASH BIN		_____	_____
27	2	WALL SHELF		_____	_____
28	1	MICROWAVE OVEN		_____	_____

Duluth International Airport

Section 11400 Foodservice Equipment

ITEMIZED BID FORM

Item #	Qty	Description	Remarks	Item Cost	Total Cost
29	1	EXHAUST HOOD		_____	_____
30	1	WALL SHELF		_____	_____
31		OPEN NUMBER			
32	1	FIRE PROTECTION SYSTEM	EXISTING/MODIFY	_____	_____
33	1	4-BURNER RANGE W/STAND		_____	_____
34	1	HALF-SIZE CONVECTION OVEN		_____	_____
35	1	MOBILE EQUIPMENT STAND			
36	1	STAINLESS STEEL WALL PANEL		_____	_____
37	1	HAND SINK		_____	_____
38	1	POT & PAN SINK	EXISTING/MODIFY	_____	_____
39		OPEN NUMBER			
40		OPEN NUMBER			
41		OPEN NUMBER			
42	1	REFRIGERATED PREP TABLE		_____	_____
43	1	WORKCOUNTER		_____	_____
44	1	CONVEYOR TOASTER		_____	_____
45		OPEN NUMBER			
46	1	SANDWICH GRILL		_____	_____
47	2	SOUP WELL	EXISTING/RELOCATE	_____	_____
48	1	ICE MAKER, UNDERCOUNTER	EXISTING/RELOCATE	_____	_____
49	1	BLENDER	EXISTING/MODIFY	_____	_____
50		OPEN NUMBER			
51		OPEN NUMBER			
52	1	COFFEE GRINDER	EXISTING/RELOCATE	_____	_____
53	1	AIRPOT BREWER	EXISTING/RELOCATE	_____	_____
54		OPEN NUMBER			
55	1	WORKCOUNTER		_____	_____
56	1	WORKCOUNTER		_____	_____

Duluth International Airport

Section 11400 Foodservice Equipment

ITEMIZED BID FORM

Item #	Qty	Description	Remarks	Item Cost	Total Cost
57	1	SERVING COUNTER		_____	_____
58 A	3	P.O.S. KEYBOARD	BY OWNER		
58 B	3	P.O.S. PRINTER	BY OWNER		
58 C	6	P.O.S. CASH DRAWER	BY OWNER		
59	1	SYRUP BOTTLE RACK	EXISTING/RELOCATE	_____	_____
60	1	BAKERY DISPLAY CASE		_____	_____
61	1	WORKCOUNTER W/SINK & HAND SINK		_____	_____
62	2	TRASH BIN		_____	_____
63	1	DIPPERWELL & FAUCET		_____	_____
64	1	ESPRESSO GRINDER	EXISTING/RELOCATE	_____	_____
65		OPEN NUMBER			
66	1	UNDERCOUNTER REFRIGERATOR	EXISTING/MODIFY	_____	_____
67	1	ESPRESSO MACHINE	EXISTING/RELOCATE	_____	_____
68	1	DISPLAY REFRIGERATOR	EXISTING/RELOCATE	_____	_____
69	2	GIFT SHOP DISPLAY	NOT IN SECTION 114000		
70	1	CONDIMENT COUNTER		_____	_____
71		OPEN NUMBER			
72		OPEN NUMBER			
73		OPEN NUMBER			
74		OPEN NUMBER			
75		OPEN NUMBER			
76	1	BEER REFRIGERATOR		_____	_____
77	1	REFRIGERATION SYSTEM		_____	_____
78	2	KEG SHELVING		_____	_____
79		OPEN NUMBER			
80		OPEN NUMBER			
81	2	STORAGE CABINET, 2-SEC		_____	_____
82 A	1	SODA RACK	BY OWNER'S VENDOR		

Duluth International Airport

Section 11400 Foodservice Equipment

ITEMIZED BID FORM

Item #	Qty	Description	Remarks	Item Cost	Total Cost
82 B	1	SODA CARBONATOR	BY OWNER'S VENDOR		
82 C	2	SODA GUN	BY OWNER'S VENDOR		
83 A	1	BEER SYSTEM	BY OWNER'S VENDOR		
83 B	1	BEER SYSTEM - WALL SHELF		_____	_____
83 C	1	BEER TOWER	BY OWNER'S VENDOR		
84	1	BACK BAR REFRIGERATOR, 2-SEC		_____	_____
85		OPEN NUMBER			
86	1	BACK BAR TOP		_____	_____
87	1	BACK BAR TOP		_____	_____
88	3	DRAINBOARD	ONE FUTURE	_____	_____
89	4	SPEED RAIL	TWO FUTURE	_____	_____
90	1	BAR TOP		_____	_____
91	2	STAINLESS STEEL DRINK RAIL		_____	_____
92	1	BACK BAR REFRIGERATOR, 3 SEC.		_____	_____
93		OPEN NUMBER			
94		OPEN NUMBER			
95		OPEN NUMBER			
96		OPEN NUMBER			
97	1	BLENDER	BY OWNER		
98		OPEN NUMBER			
99	2	P.O.S. CABINET		_____	_____
100		OPEN NUMBER			
101		OPEN NUMBER			
102	2	ICE BIN W/INSULATED BOTTLE WELLS	ONE FUTURE	_____	_____
103		OPEN NUMBER			
104	2	SODA GUN TUBING CHASE	ONE FUTURE	_____	_____
105		OPEN NUMBER			
106	1	GLASS WASHER		_____	_____

Duluth International Airport

Section 11400 Foodservice Equipment

ITEMIZED BID FORM

Item #	Qty	Description	Remarks	Item Cost	Total Cost
107	1	DUMP SINK W/ WASTE		_____	_____
108	1	HAND SINK		_____	_____
				TOTAL \$	_____

00305 - BID FORM

(Bidder may copy this form on his own letterhead)
SUBMIT IN DUPLICATE

BID FORM

BID TO: Duluth Airport Authority;
By the City Purchasing Agent
Room 100 City Hall
Duluth, MN 55802

BID FROM: _____

FOR REFERENCE ONLY

Actual Bid Form

MUST be obtained through

Kraus-Anderson® Construction Company

In accordance with the Invitation to Bid and the proposed Contract Documents prepared by Reynolds, Smith and Hills, Inc., relating to the construction of:

Duluth International Airport
New Passenger Terminal
Bid Package 2C
Duluth, Minnesota

the undersigned, having visited the site of proposed construction and having become thoroughly familiar with local conditions affecting the cost and performance of the Work and with all requirements of the Contract Documents and related Addenda, hereby proposes and agrees to provide all labor, materials, equipment, applicable permits and taxes required to construct and complete the Work in accordance with the Contract Documents and Addenda for the following amounts:

Base Bids:

Instructions for Submitting Base Bids:

- For bidders wishing to submit bids on more than one Work Scope, space has been provided to submit bids for Multiple Work Scopes on the same Bid Form.
- State Base Bid in both words and figures in spaces provided.
- Bidders submitting bids for more than one Work Scope are invited to submit a combined bid for work included under all Work Scopes for which Bidder is submitting a bid.

DULUTH INTERNATIONAL AIRPORT
NEW PASSENGER TERMINAL
BID PACKAGE 2C
ISSUE FOR BID

SECTION 00305 - 1

00305 - BID FORM

1. Base Bid for Work Scope No. 2.21C Title Civil, Apron and Building Demolition

Bid Amount: _____ \$ _____

Add Civil Alternate No. 1: \$ _____

Add Civil Alternate No. 2: \$ _____

Add Civil Alternate No. 3: \$ _____

Add Civil Alternate No. 4: \$ _____

Total Civil Bid Amount: \$ _____

2. Base Bid for Work Scope No. 2.22C Title Landscaping

Bid Amount: _____ \$ _____

3. Base Bid for Work Scope No. 3.21C Title Concrete & Excavation

Bid Amount: _____ \$ _____

4. Base Bid for Work Scope No. 5.21C Title Struct. Steel & Misc. Metal Fabrication

Bid Amount: _____ \$ _____

5. Base Bid for Work Scope No. 6.22C Title General Construction (Concessions Buildout)

Bid Amount: _____ \$ _____

6. Base Bid for Work Scope No. 7.22C Title Metal Wall Panels & Furring

Bid Amount: _____ \$ _____

7. Base Bid for Work Scope No. 8.23C Title Overhead Fabric Doors

Bid Amount: _____ \$ _____

8. Base Bid for Work Scope No. 9.25C Title Painting

Bid Amount: _____ \$ _____

9. Base Bid for Work Scope No. 10.22C Title Exterior Signage

Bid Amount: _____ \$ _____

10. Base Bid for Work Scope No. 11.20C Title Food Service Equipment

Bid Amount: _____ \$ _____

11. Base Bid for Work Scope No. 11.21C Title X-Ray Inspection Equipment

Bid Amount: _____ \$ _____

00305 - BID FORM

12. Base Bid for Work Scope No. 12.21C Title Window Treatments

Bid Amount: _____ \$ _____

13. Base Bid for Work Scope No. 12.22C Title Public, Office & Concessions Furniture

Bid Amount: _____ \$ _____

14. Base Bid for Work Scope No. 13.21C Title Fire Protection System

Bid Amount: _____ \$ _____

15. Base Bid for Work Scope No. 13.22C Title Breach Control

Bid Amount: _____ \$ _____

16. Base Bid for Work Scope No. 13.23C Title Prefabricated Control Booth

Bid Amount: _____ \$ _____

17. Base Bid for Work Scope No. 14.21C Title Passenger Boarding Bridges

Bid Amount: _____ \$ _____

18. Base Bid for Work Scope No. 15.21C Title Mechanical Systems

Bid Amount: _____ \$ _____

19. Base Bid for Work Scope No. 16.22C Title Electrical, Computer Controlled Access
& Flight Display Systems

Bid Amount: _____ \$ _____

Combined Base Bid:

Work Scope Numbers and Titles on which Combined Bid is based:

Work Scope No. _____ Title: _____

Work Scope No. _____ Title: _____

Work Scope No. _____ Title: _____

Work Scope No. _____ Title: _____

Work Scope No. _____ Title: _____

Combined Bid Amount: _____ \$ _____

00305 - BID FORM**Unit Prices:**

Refer to Section 01014 individual Work Scopes for complete description of Unit Prices.

		ADD	DEDUCT
Unit Price No. _____	to Work Scope _____	\$ _____/_____	\$ _____/_____
Unit Price No. _____	to Work Scope _____	\$ _____/_____	\$ _____/_____
Unit Price No. _____	to Work Scope _____	\$ _____/_____	\$ _____/_____
Unit Price No. _____	to Work Scope _____	\$ _____/_____	\$ _____/_____
Unit Price No. _____	to Work Scope _____	\$ _____/_____	\$ _____/_____
Unit Price No. _____	to Work Scope _____	\$ _____/_____	\$ _____/_____
Unit Price No. _____	to Work Scope _____	\$ _____/_____	\$ _____/_____
Unit Price No. _____	to Work Scope _____	\$ _____/_____	\$ _____/_____
Unit Price No. _____	to Work Scope _____	\$ _____/_____	\$ _____/_____
Unit Price No. _____	to Work Scope _____	\$ _____/_____	\$ _____/_____
Unit Price No. _____	to Work Scope _____	\$ _____/_____	\$ _____/_____
Unit Price No. _____	to Work Scope _____	\$ _____/_____	\$ _____/_____

Alternates:

Refer to Section 01230 for complete description of Alternates.

		ADD	DEDUCT
Alternate No. _____	to Work Scope _____	\$ _____	\$ _____
Alternate No. _____	to Work Scope _____	\$ _____	\$ _____
Alternate No. _____	to Work Scope _____	\$ _____	\$ _____
Alternate No. _____	to Work Scope _____	\$ _____	\$ _____
Alternate No. _____	to Work Scope _____	\$ _____	\$ _____

00305 - BID FORM

	ADD	DEDUCT
Alternate No. _____ to Work Scope _____	\$ _____	\$ _____
Alternate No. _____ to Work Scope _____	\$ _____	\$ _____
Alternate No. _____ to Work Scope _____	\$ _____	\$ _____
Alternate No. _____ to Work Scope _____	\$ _____	\$ _____
Alternate No. _____ to Work Scope _____	\$ _____	\$ _____
Alternate No. _____ to Work Scope _____	\$ _____	\$ _____
Alternate No. _____ to Work Scope _____	\$ _____	\$ _____
Alternate No. _____ to Work Scope _____	\$ _____	\$ _____
Alternate No. _____ to Work Scope _____	\$ _____	\$ _____

Addenda: Receipt of the following Addenda to the Contract Documents and their costs being incorporated into the Bid is acknowledged (provide Addenda numbers below):

Addenda No.	Dated	Addenda No.	Dated
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Bid Acceptance: If written notice of the acceptance of this Bid is received by the undersigned within 90 days after date set for opening of this Bid, or at any other time thereafter before Bid is withdrawn, the undersigned agrees to enter into and execute a Contract with the Owner in accordance with this Bid as accepted and in a form acceptable to Owner, and to furnish and deliver to the Construction Manager the Performance Bond, Payment Bond, and proof of insurance coverage, all within 10 days after notice of acceptance of this Bid.

00305 - BID FORM

Execution of Proposal: The entity(ies) signing this proposal is fully authorized to sign on behalf of the named firm and to fully bind the named firm to all of the conditions and provisions of the Contract. This proposal shall remain valid and not be withdrawn for 90 calendar days after bid due date.

Submitted this _____ day of _____, 20_____.

Name of Firm: _____

Street Address: _____

City: _____ State: _____ Zip: _____

Phone Number: _____ Fax Number: _____

Bidder is: (check one)

☐ Individual

☐ Partnership

☐ Corporation

If Bidder is a corporation, give legal name of corporation, state where incorporated, and names of president and secretary. If a partnership, give names of all individual co-partners composing the firm. If an individual, give first and last name in full.

Name (typed or printed): _____

Signature: _____

Title: _____

END OF DOCUMENT

City of Duluth Purchasing Division

General Specifications

The word "City" used in these specifications shall mean the city of Duluth and/or its Authorities.

1. Instruction to Bidders:

- A. All bids must be completed in a non-erasable format on the form provided by city of Duluth, errors are to be crossed out and initialed.
- B. All bids must be enclosed in a sealed envelope.
- C. The enclosed blue and white sticker must be placed on the outside of envelope.
- D. The bid envelope shall be addressed to the city of Duluth, Purchasing Division, Room 100 City Hall, Duluth, Minnesota 55802.

2. Non-Collusion Clause:

Vendor, their agent/employee hereby agree to comply and fully perform in accordance with the law and state that they have not, directly or indirectly, entered into an agreement or understanding, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the proposal submitted with respect to the above-referenced invitation to bid. Vendor fully acknowledges that such an act of non-compliance may be deemed unlawful and would be considered a violation of the law and subject to prosecution.

3. Award of Contract - Rejection of Bids:

The Contract will be awarded to the responsible bidder submitting the lowest bid complying with the conditions of the Invitation for bids. The bidders, to whom the award is made, will be notified at the earliest possible date. The city of Duluth, however, reserves the right to reject any and all bids and to waive any informality in bids received whenever such rejection or waiver is in its interest.

5. Obligation of Bidder:

At the time of the opening of bids, each bidder will be presumed to have read and to be thoroughly familiar with the plans, specifications and contract documents (including all addenda). The failure or omission of any bidder to examine any form, instrument, or document shall in no way relieve any bidder from any obligation in respect to their bid.

6. Liquidated Damages for Failure to Enter into Contract:

The successful bidder, upon their failure or refusal to accept a purchase order or execute and deliver the contract and bonds required within 10 days after receipt of a notice of the acceptance of their bid, shall forfeit to the city, as liquidated damages for such failure or refusal, the security deposited with their bid (if required).

7. Completion of Bid Request:

The city may consider as irregular any bid on which there is an alteration of or departure from the Bid Form hereto attached and at its option may reject the same.

8. E.E.O. Regulations:

Contractor will be required to comply with all applicable Equal Employment Opportunity (E.E.O.) laws and regulations. Affirmative action must be taken to insure that the employees and applicants for employment are not discriminated against because of their race, color, creed, sex or national origin.

The city of Duluth is an equal opportunity employer.

9. Participation:

This document is intended to serve the city of Duluth, its Agents and Authorities. Each authority may issue their own purchase order and will be responsible for it. The City of Duluth Authorities are as follows:

- 1. Duluth Airport Authority
- 2. Spirit Mountain Recreational Area Authority
- 3. Duluth Entertainment and Convention Center
- 4. Duluth Transit Authority
- 5. Duluth Economic Development Authority
- 6. Duluth Housing and Redevelopment Authority

The city has a cooperative purchasing agreement with St. Louis county allowing the county to purchase from this bid when requested. St. Louis county will issue and be responsible for its own purchase orders.

10. Qualifications of Bidder

The city may make such investigations as deemed necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the city all such information and data for this purpose as the city may request. The city reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the city that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.

11. Addenda and Interpretations

Responses to general questions and clarifications of bids may be made at the discretion of the city. However, no interpretation of the meaning of the specifications or other pre-bid documents will be made to any bidder orally.

Every request for such interpretation should be in writing and delivered or sent by facsimile to the city purchasing agent or the buyer shown on the bid request, Duluth, Minnesota 55802, and to be given consideration must be received at least five days prior to the date fixed for the opening of bids.

12. Award of Contract - Rejection of Bids:

In determining the successful bidder, there will be considered in addition to price (per Ordinance 7050):

- A. The ability, capacity and skill of the bidder to perform the contract.

- B. The character, integrity, reputation, judgement, experience and efficiency of the bidder.
- C. The quality of performance of previous contract.

- D. The sufficiency of the financial resources, equipment available and ability of the bidder to perform the contract.

13. Quantities:

The city reserves the right to increase or decrease the quantities of items on this bid as required. Any exception to this provision must be noted by the vendor in its bid or proposal.

14. Wages and Salaries:

- A. Attention of bidders is particularly called to the requirements concerning the payment of not less than the prevailing wage and salary rates specified in the contract documents and the conditions of employment with respect to certain categories and classifications of employees for all "Public Works" type projects estimated to exceed \$2,000.

B. The rates of pay set forth under General Conditions are the minimums to be paid during the life of the contract. It is therefore the responsibility of bidders to inform themselves as to local labor conditions, such as the length of work day and work week, overtime compensations, health and welfare contributions, labor supply, and prospective changes or adjustments of rates.

15. Validity of Bids: 90

All bids shall be valid for 60 days from the date of bid opening, unless an other period is noted in bid documents or if an extension is agreed upon, in writing prior to the end of the 60 day period.

90

16. Facsimile Bids:

Facsimile bids are acceptable if: bids are received at the designated facsimile number prior to the scheduled bid opening and an original copy of the bid, identical to the "faxed" bid, is received within 48 hours of the bid opening. Facsimile bid deposits are not acceptable. The city shall endeavor to keep bids confidential, but will accept no responsibility for the confidentiality of facsimile bids. All bids or proposals returned by facsimile are understood to incorporate these general specifications.

17. Insurance:

All vendors doing work on city property, except vendors making routine deliveries, shall submit an insurance certificate indicating insurance coverage as per current city requirements.

18. Website:

ci.duluth.mn.us/city/service/purchasing/index.htm

DIVISION 0
CONDITIONS OF THE CONTRACT

00500 - LIST OF CONTRACT FORMS

1. FORMS INCLUDED

A. The following is a list of forms and standards applicable to this Project.

- Bid Form: As bound in this Project Manual. Submit exact form in duplicate. Use of Bid Form Packet is mandatory.
- Bid Bond Form: The standard form of a surety, authorized to do business in Minnesota and meeting all requirements, will be acceptable. Standard AIA Document A-310 will be acceptable. Submit with Bid with proper Power of Attorney certificate and acknowledgment. See attached.
- Agreement: The Contract form as specified in Contract Documents. See attached.
- Performance/Payment Bond: Forms shall be submitted by awarded contractor using the Duluth Airport Authority forms as specified in the Contract Documents. See attached. Submit in two copies, with proper Power of Attorney and acknowledgment upon execution of contract agreement with Owner.

END OF SECTION 00500

THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A310

Bid Bond

Bond No. _____

KNOW ALL MEN BY THESE PRESENTS, that we _____
(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called the Principal, and _____
(Here insert full name and address or legal title of Surety)

a corporation duly organized under the laws of the State of _____
as Surety, hereinafter called the Surety, are held and firmly bound unto _____
(Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called Obligee, in the sum of _____
Dollars (\$ _____).

For the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for Project No.: _____
(Here insert full name, address, and description of project)

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ day of _____, 20____.

(Witness)

{ _____
(Principal) (Seal)

(Title)

(Witness)

{ _____
(Surety) (Seal)

(Title)

CONTRACT

"CONTRACTOR NAME"

NEW PASSENGER TERMINAL
BID PACKAGE 2C-SITEWORK & APRON
CONCESSIONS AND FURNISHINGS

"Duluth International Airport Project Name"

FAA AIP No. 3-27-0024-54-12

Mn/DOT Project No. _____

THIS CONTRACT is made and is in effect as of this ____ day of _____, 2012, by and between the Duluth Airport Authority, (the "OWNER") and "_____", (the "CONTRACTOR").

THE PARTIES AGREE AS FOLLOWS: The Contractor, for and in consideration of the mutual promises contained herein, and the payment to Contractor of an amount not to exceed _____

"CONTRACT AMOUNT IN WORDS" \$ _____ "CONTRACT AMOUNT IN NUMBERS"

based on the Contractor's bid, dated March 8, 2012, which is hereby made a part of this Contract and appended hereto as Exhibit A, agrees to competently perform the various items of work and construct the projects therein indicated at Duluth International Airport (the "Airport") in accordance with the "New Passenger Terminal Bid Package 2C - Sitework & Apron, Concessions and Furnishings" Contract Documents and Specifications hereinafter referred to as Exhibit B dated

"DATE OF DOCUMENTS"

Said Exhibit B is hereby made a part of and basis of this Contract, and a true copy of said Exhibit B is now on file in the office of the Owner.

In the event of a conflict between any of the terms and conditions of this Contract and the Exhibits, such terms and conditions shall be deemed to be controlling in this order:

(1) This Contract, (2) then Exhibit B, (3) then Exhibit A.

The parties further agree as follows:

1. That in consideration of the foregoing, the Owner hereby agrees to pay to the Contractor, promptly and according to the requirements of this Contract, the amount set forth above subject to the conditions as set forth in this Contract.
2. That it is understood that the parties named herein are the only persons interested in this Contract as principals. The parties do not intend to create any third party beneficiaries to this Contract. No employee or agent of Contractor shall be an employee or agent of Owner for any purpose.
3. That the Contractor has examined the site of the proposed work, plans and specifications, special provisions, contract documents, and all addenda in order that the Contractor might become familiar with the character, quality, and quantity of the work to be performed, the materials to be furnished and the requirements of the specifications, special provisions and contract documents.
4. That the Contractor certifies to be in compliance with all Human Rights, Affirmative Action and Equal Opportunity Requirements of state, federal, or local laws, all applicable drug and alcohol regulations, including the DAA drug and alcohol policy, and all other laws, rules, and regulations as are included in this Contract or are otherwise applicable to Contractor. Violation of any of these rules is grounds to void this contract.
5. That in the event any surety upon any bond furnished in connection with this Contract becomes unacceptable to the Owner, or if any such surety shall fail to furnish reports as to its financial condition from time to time as requested by the Owner, the Contractor agrees to furnish promptly such additional surety as may be required from time to time to protect the interests of the Owner or of persons supplying labor or materials in the prosecution of the work contemplated by this Contract.

6. That the Contractor shall not commence any work to be performed under this Contract until the Contractor has obtained from responsible insurance companies all insurance required as set forth in the provision entitled "Insurance and Indemnification Requirements" found in Part 5 - Supplementary General Conditions as contained in Exhibit B. The Owner and the City of Duluth, (the "City") shall be named as additional insureds on Contractor's Certificate of Insurance specific to Public Liability and Automobile Liability coverage. The Contractor shall maintain this insurance in full force and effect until the work to be performed under this Contract has been accepted by the Owner. Further, the Contractor shall indemnify the Owner and the City as set forth in said "Insurance and Indemnification Requirements" found in Part 5- Supplemental General Conditions contained in Exhibit B.
7. That should it become necessary to change any feature of the project from the terms and conditions set forth herein, this shall be done by written and dated supplemental agreement (change order). The Contractor shall not start working on any work requiring a supplemental agreement until the written agreement setting forth the adjusted prices shall be dated and executed by the Owner and the Contractor.
8. That the Contractor at all times shall observe and comply with all Federal, State, Territory or Possessions, and local laws, codes, ordinances, and regulations in any manner affecting the conduct of the work, including MSA 471.425 on prompt payment to subcontractors as set forth in Exhibit B, and 49 CFR Part 1520, Protection of Sensitive Security Information.
9. That it is further understood and agreed by the parties to this Contract that the work specified herein shall be commenced in accordance with Exhibit B. The time of commencing and completion of said work is the essence of this Contract and the Contractor shall complete all work in accordance with Exhibit B. Liquidated damages shall be assessed as listed in the Contract

Documents and Specifications: General Provisions, 80-08 Failure to Complete Work on Time on page GP-38-39 (\$3,000.00 per Calendar Day).

10. The books, records, documents and accounting procedures and practices of the Contractor as they relate to this Contract are subject to examination of the Owner, the City, and either the Legislative Auditor or the State Auditor, as appropriate, for a period of six (6) years following termination or expiration of this Contract.

The Federal Government, including the Comptroller General of the United States, has the right to examine or audit relevant financial records regarding this Contract for a period not to exceed six (6) years after expiration of the term of this Contract. Contractor shall maintain an established accounting system that complies with generally accepted accounting principles. Records related to disputes arising out of this Contract shall be maintained and made available until such disputes have been resolved. As used in this provision, "records" includes books, documents, accounting procedures and practices, and other data, regardless of type and regardless of whether such items are in written form, in the form of computer data, or in any other form.

The Contractor shall maintain all records and other evidence sufficient to reflect costs claimed to have been incurred or anticipated to be incurred directly or indirectly in performance of this Contract. The Transportation Security Administration Contracting Officer "TSA CO" or the authorized representative of the TSA CO shall have the right to examine and audit those records at any time, or from time to time. The right of examination shall include inspection at all reasonable times at the offices of the Contractor.

11. Kraus-Anderson Construction Company as the Construction Manager and Reynolds Smith and Hills, Inc. as the architect/engineer, will provide administration of this Contract and will be the Owner's representatives for purposes of this Contract; provided, however, that the Owner's Executive Director (the

“Executive Director”) will be the Owner’s representative for purposes of Paragraph 13.

12. The Contractor shall not contract with a proposed person or entity to whom the Owner reasonably objects.
13. In addition to the events of default set forth in Paragraph a through I in Section 80-09 of Exhibit B, it shall be deemed to be an event of default by the Contractor if the Contractor fails to observe or perform any of the terms, provisions, conditions, covenants or agreements required to be observed or performed under this Contract or so fails to administer the work as to endanger the performance of this Contract.

The Executive Director shall have the discretion to implement one or more of the following remedies in the event of a default:

- a. Terminate this Agreement immediately upon written notice.
- b. Provide Contractor with written notice of default setting forth a time period within which to cure the default, and if such default is not cured to the satisfaction of the Executive Director within said time period, the Executive Director may immediately terminate this Contract.
- c. Take the prosecution of the work out of the hands of the Contractor or surety, appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable, enter into an agreement(s) for the completion of said Contract according to the terms and provisions hereof, and/or use such other methods as in the opinion of the Executive Director will be required for the completion of said Contract in an acceptable manner. All costs and charges incurred by the Owner, together with the cost of completing the work under Contract, will be deducted from any monies due or which may become due the Contractor. If such expense exceeds the sum which would have been payable under the Contract, then the Contractor and the surety shall be liable and shall pay to the Owner the

amount of such excess.

- d. Seek and be entitled to injunctive or declaratory relief to prevent violation of the terms and conditions of this Contract or compel Contractor's performance of its obligations hereunder.
- e. Seek such other legal or equitable relief as a court of competent jurisdiction may determine is available to Owner.

The remedies provided under this Contract shall be deemed to be cumulative and non-exclusive and the election of one remedy shall not be deemed to be the waiver of any other remedy with regard to any event of default under this Contract.

- 14. Any waiver by any party of any provision of this Contract shall not imply a subsequent waiver of that or any other provision.
- 15. This Contract is made in the State of Minnesota and shall be construed and interpreted in accordance with the laws of the State of Minnesota. The appropriate venue and jurisdiction for any litigation hereunder shall be in a court located in St. Louis County, Minnesota. However, litigation in the federal courts involving the parties shall be in the appropriate federal court within the State of Minnesota.
- 16. Notice to the Owner or the Contractor provided for herein shall be sufficient if sent by the regular United States mail, postage prepaid, addressed to the Owner as follows: Duluth Airport Authority, 4701 Grinden Dr., Duluth, MN 55811 and addressed to the Contractor as follows: _____

"NAME AND COMPLETE ADDRESS OF CONTRACTOR" or to such other respective persons or addresses as the parties may designate to each other in writing from time to time.

- 17. This Contract, including all exhibits and addenda, constitutes the entire Contract between the Owner and the Contractor and supersedes all prior written oral agreements and negotiations between the parties relating to the subject matter hereto.

18. The Contractor represents to the Owner that the officers of the Contractor who executed this Contract on its behalf are fully authorized to do so, and that this Contract when thus executed by said officers of the Contractor on its behalf shall constitute and be the binding obligation and agreement of the Contractor in accordance with the terms and conditions hereof.

The parties hereto have duly executed this Contract for the purpose herein expressed this _____ day of _____, 2012.

DULUTH AIRPORT AUTHORITY

"NAME OF CONTRACTOR"

By _____
John M. Eagleton
President

By _____
NAME: _____
TITLE: _____

By _____
Michael Lundstrom
Secretary

By _____
NAME: _____
TITLE: _____

Approved as to form:

Joan Christensen
Assistant City Attorney



DULUTH AIRPORT AUTHORITY
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That we:

(contractor's name)

(hereinafter called the "Contractor") located at: _____

(contractor's address)

and _____

(surety's name)

(a corporation holding a certificate of the Insurance Commissioner of the State of Minnesota showing that it is authorized to contract as a surety, hereinafter called the "Surety") located at:

(surety's address)

are held and firmly bound unto the Duluth Airport Authority (hereinafter called the "Owner"), for the benefit of persons furnishing labor and materials for the contract set forth below, in the penal sum of _____ Dollars (\$_____) for the payment of which we bind ourselves, our heirs, executors and administrators, successors and assigns, for the payment of all labor and materials supplied by any person in the performance of a written contract for the purpose of:

according to plans, profiles, and specifications thereto annexed. A copy of that contract is incorporated herein by reference and is made a part hereof as if fully copied herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH That,

- A) If the Contractor shall make payments, as they may become due, to all persons supplying "labor and materials," as defined in Minnesota Statutes Section 574.26, used directly or indirectly by the Contractor, or his Subcontractor, in the prosecution of the work provided for in the contract,
- B) If the Contractor shall indemnify the owner or other claimant for all costs that may accrue on account of the enforcing of the terms of the bond, if action is brought on the bond, including reasonable attorney's fees, in any case where such action is successfully maintained,

Then, this obligation shall be void; otherwise it shall remain in full force and effect.

And, the said Contractor and Surety agree that in accordance with Minnesota Statutes Section 574.26 not only said Duluth Airport Authority, but any person furnishing "labor and materials," as defined in Minnesota Statutes 574.26, may sue on this bond for their use on account of any sums due them for anything so furnished.

The Contractor and the Surety do hereby expressly waive any objection that might be interposed as to the right of the Owner to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either and any of them might interpose to an action brought hereon by any person, firm, or corporation, including subcontractors, materialmen and third persons, for work, labor, services, supplies or material performed, rendered or furnished as aforesaid, upon the ground that there is no law authorizing the Owner to require the foregoing provisions to be placed in this bond.

And the Surety, for value received, hereby stipulates and agrees that the obligations of the Surety and this bond shall in no way be impaired or affected by any extension of time, modification, omission, addition or change in or to the contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provision thereof, or by any assignment, subletting or other transfer thereof, or of any part thereof, or of any work to be performed, or of any moneys due or to become due thereunder; and the said Surety does hereby waive notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby stipulates and agrees that any and all things done and omitted to be done by and in relation to executors, administrators, successors, assignees, subcontractors and other transferees, shall have the same effect as to said Surety as though done or omitted to be done by and in relation to the Contractor.

Signed this _____ day of _____, 20____.

Name of Principal

By

Name of Surety

By _____
Attorney-in-Fact

ACKNOWLEDGEMENTS

State of Minnesota)

) ss. Principal – Individual

County of St. Louis)

This instrument was acknowledged before me on _____
by _____.

Notary Seal

Notary Public

State of Minnesota)

) ss. Principal – Corporate or Partnership

County of St. Louis)

This instrument was acknowledged before me on _____
by _____ as _____
of _____.

Notary Seal

Notary Public

State of Minnesota)

) ss. Surety

County of St. Louis)

Be It Known, That on this _____ day of _____ A. D., 20____, came before me personally
_____, to me personally known, who being
by me duly sworn, did say that he/she is the _____ (title)
of _____

the above named corporation which executed the foregoing bond as surety; that the seal affixed to the foregoing
instrument is the corporate seal of said corporation; that said instrument was executed in behalf of said corporation, by
authority of its Board of Directors; that said corporation hold a certificate of the Insurance Commissioner of the State
of Minnesota showing that it is authorized to contract as a surety; and said _____
acknowledged said instrument to be the free act and deed of said corporation.

Notary Seal

Notary Public

APPROVED AS TO FORM, CORRECTNESS AND VALIDTY HEREOF

Dated this _____ day of _____, 20 ____ Dated this _____ day of _____, 20 ____

Finance Director Duluth MN

Assistant City Attorney, Duluth MN



DULUTH AIRPORT AUTHORITY
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That we:

(contractor's name)

(hereinafter called the "Contractor") located at: _____

(contractor's address)

and _____
(surety's name)

(a corporation holding a certificate of the Insurance Commissioner of the State of Minnesota showing that it is authorized to contract as a surety, hereinafter called the "Surety") located at:

(surety's address)

are held and firmly bound unto the Duluth Airport Authority (hereinafter called the "Owner"), in the penal sum of _____ Dollars (\$ _____) for the payment of which we bind ourselves, our heirs, executors and administrators, successors and assigns, for the faithful performance of a written contract for the purpose of:

according to plans, profiles, and specifications thereto annexed. A copy of that contract is incorporated herein by reference and is made a part hereof as if fully copied herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH That,

- A) If the Contractor shall in all respects comply with the terms and conditions of the Contract (which includes the contract documents) and such alterations as may be made in said contract as documents therein provide for, and shall complete the contract in accordance with its terms,
- B) If the Contractor shall indemnify, defend and save harmless the owner from all costs, expenses, damages, injury or conduct, want or care or skill, negligence or default, including patent infringement on the part of the Contractor, agents or employees, in the execution or performance of the contract,
- C) If the Contractor shall indemnify the Owner for all costs that may accrue on account of the enforcing of the terms of the bond, if action is brought on the bond, including reasonable attorney's fees, in any case where such action is successfully maintained,

D) If the Contractor shall comply with all laws pertaining to doing the work under the contract,

Then, this obligation shall be void; the Contractor and Surety jointly and severally agree to pay to the Owner any difference between the sum to which the Contractor will be entitled on the completion of the contract and that which the Owner may be obliged to pay for the completion of the work by contract or otherwise, and any damages, direct or indirect, or consequential, which the Owner may sustain on account of the work, or on account of the failure of the Contractor to properly and in all things, keep and execute all of the provisions of the Contract, provided however that Surety's liability to pay damages is limited to the amount of the Performance Bond as set forth above.

And, the said Contractor and Surety hereby further bind themselves, their successors, executors, administrators and assigns, jointly and severally, that they will employ and fully protect the said Owner against and will pay any and all amounts, damages, costs and judgments which may be recovered against or which the Owner may be called upon to pay to any person or corporation by reason of any damage arising from the performance of said work, repair or maintenance thereof, or the manner of doing the same, or the neglect of the said Contractor or his agents or servants, or the improper performance of the said work by the Contractor or his agents or servants, or the infringements of any patent rights by reason of the use of any material furnished or work done, as aforesaid, or otherwise. For the purpose of this paragraph, a subcontractor shall be deemed to be the agent or employee of the Contractor to the extent of his subcontract.

The Contractor and the Sureties do hereby expressly waive any objection that might be interposed as to the right of the Owner to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either and any of them might interpose to an action brought hereon by any person, firm, or corporation, including subcontractors, materialmen and third persons, for work, labor, services, supplies or material performed, rendered or furnished as aforesaid, upon the ground that there is no law authorizing the Owner to require the foregoing provisions to be placed in this bond.

And the Surety, for value received, hereby stipulates and agrees that the obligations of the Surety and this bond shall in no way be impaired or affected by any extension of time, modification, omission, addition or change in or to the contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provision thereof, or by any assignment, subletting or other transfer thereof, or of any part thereof, or of any work to be performed, or of any moneys due or to become due thereunder; and the said Surety does hereby waive notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby stipulates and agrees that any and all things done and omitted to be done by and in relation to executors, administrators, successors, assignees, subcontractors and other transferees, shall have the same effect as to said Surety as though done or omitted to be done by and in relation to the Contractor.

Signed this _____ day of _____, 20____.

Name of Principal

By

Name of Surety

By
Attorney-in-Fact

ACKNOWLEDGEMENTS

State of Minnesota)
) ss. Principal – Individual
County of St. Louis)

This instrument was acknowledged before me on _____
by _____.

Notary Seal

Notary Public

State of Minnesota)
) ss. Principal – Corporate or Partnership
County of St. Louis)

This instrument was acknowledged before me on _____
by _____ as _____
of _____.

Notary Seal

Notary Public

State of Minnesota)
) ss. Surety
County of St. Louis)

Be It Known, That on this _____ day of _____ A. D., 20____, came before me personally
_____, to me personally known, who being
by me duly sworn, did say that he/she is the _____ (title) of _____

the above named corporation which executed the foregoing bond as surety; that the seal affixed to the foregoing instrument is the corporate seal of said corporation; that said instrument was executed in behalf of said corporation, by authority of its Board of Directors; that said corporation hold a certificate of the Insurance Commissioner of the State of Minnesota showing that it is authorized to contract as a surety; and said _____ acknowledged said instrument to be the free act and deed of said corporation.

Notary Seal

Notary Public

APPROVED AS TO FORM, CORRECTNESS AND VALIDTY HEREOF

Dated this _____ day of _____, 20 ____

Dated this _____ day of _____, 20 ____

Finance Director, Duluth MN

Assistant City Attorney, Duluth MN

FINAL RELEASE OF LIEN

KNOWN ALL MEN BY THESE PRESENTS, that the undersigned, for and in consideration of the payment of the sum of _____ Dollars (\$ _____), paid by **the Duluth Airport Authority** hereinafter referred to as "Owner", receipt of which is hereby acknowledged as total compensation for performance of the below-described Contract for Bid Schedule(s) _____, does hereby fully and completely discharge and release the Owner from and waives any and all debts, accounts, promises, damages, liens, encumbrances, causes of action, suits, bonds, judgments, claims and demands whatsoever, in law or in equity, which the undersigned ever had, now has or might hereafter have on account of labor performed, material furnished or services rendered, directly or indirectly, for the Contract between the parties dated _____, 20 ____, known as **New Passenger Terminal Bid Package 2C-Sitework & Apron, Concessions and Furnishings**, except for those claims, disputes and other matters arising out of or relating to said Contract which have been raised by written demand in accordance with the Contract Documents prior to this data and identified by the Contractor as unsettled in the final Application for Payment and are either in arbitration or court litigation, as the case may be, in accordance with the Contract Documents.

The undersigned further covenants that subcontractors, suppliers, and material suppliers, and any or all other persons supplying materials, supplies, service or labor used directly or indirectly in the prosecution of the work provided for in the Contract, have been paid in full for all work under this contract.

The undersigned agrees to maintain in full force and effect the provisions of the Contract Documents respecting the guaranty against defective work, and any other special guaranties required by the Contract Documents, for the terms provided in the Contract Documents, which terms shall begin to run from the date specified in the Contract Documents.

The undersigned represents and warrants that the statements contained in the foregoing Release are true and correct.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this ____ day of _____, 20____.

WITNESSES:

CONTRACTOR

By: _____

STATE OF _____

Title: _____

COUNTY OF _____

Sworn to and subscribed before me this ____ day of _____, 20____.

(NOTARY SEAL)

NOTARY PUBLIC

My Commission Expires:

AFFIDAVIT AND INFORMATION REQUIRED OF BIDDERS

Affidavit of Non-Collusion:

I hereby swear (or affirm) under penalty of perjury:

- 1) That I am the bidder (if the bidder is an individual), a partner in the bidder (if the bidder is a partnership), or an officer or employee of the bidding corporation having authority to sign on its behalf (if the bidder is a corporation);
- 2) That the attached bid or bids have been arrived at by the bidder independently and have been submitted without collusion with and without agreement, understanding, or planned common course of action with any other vendor or materials, supplied, equipment or services described in the invitation to bid, designed to limit independent bidding or competition;
- 3) That the contents of the bid or bids have not been communicated by the bidder or its employees or agents to any person not an employee or agent of the bidder or its surety on any bond furnished with the bid or bids and will not be communicated to any such person prior to the official opening of the bid or bids; and
- 4) That I have fully informed myself regarding the accuracy of the statements made in this affidavit.

Signed: _____

Firm Name: _____

Subscribed and sworn to me before this ____ day of _____, _____

NOTARY PUBLIC _____

My commission expires: _____

Bidder's E.I. Number _____

(Number used on employer's quarterly Federal Tax return)

DATA FOR LABOR COST BIDDING

Project No.: 03-27-0024-54-12

NEW PASSENGER TERMINAL BID PACKAGE 2C-SITEWORK & APRON CONCESSIONS AND FURNISHINGS

This **project is funded** by (bold/underline those which apply):

City of Duluth

Federal Government

HUD/CDBG - see Section 10 of Supplementary
General Conditions, Part II

State of Minnesota

The **base workweek** may be (bold/underline those which apply):

Five 8-hour days

or

Four 10-hour days

Each certified payroll must indicate the base workweek on the accompanying Statement of Compliance form.

OVERTIME REQUIREMENTS:

For City, State, and Federal funded projects, overtime must be paid on daily hours worked in excess of the base daily hours. Contractors (including sub-contractors) are not allowed to pay overtime solely on hours in excess of forty per week.

HUD projects, however, do allow payment of overtime after forty hours per week—this is the only exception.

WAGE RATES

When both State of Minnesota and Federal Government (general decision) wage rates are included in a contract, the higher of the two rates for any classification must be paid.

State of Minnesota prevailing wages typically list two rates for each classification with two effective dates. Should any City of Duluth contract continue to and

past the second effective date, that rate and fringe benefit will be in effect through the remainder of the project.

T:\P\2131882.099 DLH TERMINAL DESIGN PHASE 2\TERMINAL CIVIL BID PKG 3 FROM DET\DOCS BP 2CJ-DELIVERABLES\J.3 PDF ISSUE FOR BID BP 2C
SPECIFICATIONS\BP2C
PART 2 BID INFO\17
BP2C DATA FOR LABOR
COST BIDDING.WPD

2/7/05

PROJECT LABOR AGREEMENT

NO STRIKE, NO LOCKOUT

PUBLIC SECTOR

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AGREEMENT

This Project Labor Agreement (hereinafter, the "Agreement") is entered into effective the 1st day of July, 2009, by and between the various contractors engaged in the construction of facilities to be known as the New Duluth International Airport Passenger Terminal Project (hereinafter "Project"). The parties are as follows: The Duluth Building and Construction Trades Council, on behalf of its affiliated Local Unions (hereinafter "Union" or "Unions"), the Duluth Airport Authority, (hereinafter "Owner") and Kraus-Anderson Construction Company (insert contractor), (hereinafter "Construction Manager", "Contractor" and "Contractors").

It is understood by the parties to this Agreement that it is the policy of the Owner that the construction work covered by this Agreement shall be contracted to Contractors who agree to be bound by the terms of this Agreement. As a condition of working on the Project, all contractors of whatever tier shall execute this agreement for the purpose of covering all work that falls within the scope of Agreement. This Project Labor Agreement is a material term of the bid specifications for the Project and therefore, regardless of whether a Contractor executes this Agreement, by virtue of the Owner and/or Construction Manager accepting the bid offer of the Contractor, a Contractor who performs work on this Project is bound to this Project Labor Agreement regardless of their execution of this Agreement. The Construction Manager shall monitor compliance with this Agreement by all Contractors who through their execution of this Agreement, together with their sub-contractors, have become bound hereto.

The term "Contractor" shall include all Contractors and subcontractors of whatever tier engaged in on-site construction work within the scope of this Agreement.

The Union and all signatory Contractors agree to abide by the terms and conditions contained in this Agreement with respect to the administration of the Agreement by the Owner and the performance of the construction by the Contractor of the Project. This Agreement represents the complete understanding of the parties with respect to this Project Labor Agreement, and it is further understood that no Contractor party is required to sign any local area agreement as a condition of performing work within the scope of this Agreement. No practice, understanding or agreement between a Contractor and a Union party which is not explicitly set forth in this Agreement shall be binding on any other party unless endorsed in writing by the Project Contractor.

ARTICLE I - PURPOSE

The New Duluth International Airport Passenger Terminal Project, an undertaking of the Owner, is a public project which will employ numbers of skilled and unskilled workers. Construction of the Project will entail utilization of the construction industry in an area having multiple labor contracts and employer associations. Consequently, conflicts within labor-management relations could cause delay or disruption of the efficient completion of the project unless maximum cooperation of all segments of the construction industry is obtained. This Agreement is to establish as the minimum standards on the Project the hours and working conditions as those prevailing for the largest number of workers engaged in the same classes of work within the area.

It is in the public interest that the Project progress and be completed in an expeditious and efficient manner, free of disruption or delay of any kind. Therefore, it is essential to secure optimum productivity and to eliminate any delays in the work. In recognition of the special needs of this Project and to maintain a spirit of harmony, labor-management peace and stability during the term of this Project Labor Agreement, the parties agree to establish effective and binding methods for the settlement of all misunderstandings, disputes or grievances which may arise. Therefore, the Unions agree not to engage in any strike, slowdown or interruption of work and the Contractor agrees not to engage in any lockout.

ARTICLE II - SCOPE OF THE AGREEMENT

Section 1. This Agreement, hereinafter designated as the "Project Labor Agreement" or "Agreement," shall apply and is limited to all construction work included in all Bid Categories for the Project, under the direction of the signatory Contractors and performed by those Contractor(s) of whatever tier which have contracts awarded for such work on or after the effective date of this Agreement with regard to the Project.

Such Project is generally described as the construction of: New Duluth International Airport Passenger Terminal Project ("Project").

Section 2. The Contractor shall ensure that all direct subcontractors of a Contractor, of whatever tier, who have been awarded contracts for work covered by this Agreement on or after the effective date of this Agreement shall be required to accept and be bound by the terms and conditions of the Project Labor Agreement.

Section 3. The provisions of this Project Labor Agreement shall apply to all craft employees represented by any Union listed in Schedule A hereto attached and shall not apply to other field personnel or managerial or supervisory employees as defined by the National Labor Relations Act.

Section 4. All employees covered by this Agreement shall be classified in accordance with work performed and paid the base hourly wage rates for those classifications as specified in the attached Schedule A.

Any contractor performing work on the project who is not party to a Local Area Labor Agreement (PLA Contractor) agrees to install the basic hourly wage rates, hours, working conditions, referral procedures and all other terms as fully set forth in the Local Area Agreements negotiated with the Local Unions set forth in Exhibit A work on the Project.

Section 5. The Contractors agree to pay contributions to the established employee benefit funds in the amounts designated in the appropriate Schedule A.

Contractors that are not signatory to a collective bargaining agreement beyond the scope of this Agreement ("PLA contractor") may select to participate in the legally established industry health reimbursement arrangement ("HRA") plan, in lieu of contributing to the respective bona fide benefit funds as designated in Schedule A. The amount of the contribution is based on the difference between the contribution amount of the bona fide Schedule A benefit funds and the cost of the PLA contractor's bona fide non-discretionary plans. Contributions must be made on behalf of named employees. Participating contractors will submit to the Trustees of the HRA trust and plan a copy of their plan, summary plan description, and the premium structure for workers covered under the PLA contractor's bona fide, non-discretionary plans. The value of the PLA contractor's benefit plans are subject to confirmation by the Trustees of the HRA trust and plan. This may include an independent audit according to a policy as established by the Trustees. Contractors are required to submit certified payroll reports to the Trustees or authorized administrator in order to confirm compliance with the terms of the HRA trust and plan.

The Contractors adopt and agree to be bound by the written terms of the legally-established Trust Agreements (or in lieu thereof, the aforementioned HRA plan and trust including any policies) specifying the detailed basis on which payments are to be made into, and benefits paid out of, such Trust Funds. The Contractors authorize the parties to such Trust Agreements to appoint trustees and successor trustees to administer the Trust funds and hereby ratify and accept the Trustees so appointed as if made by the Contractors.

Section 6. In the event of any conflict between any provisions of this Agreement and in the Local Area Agreements, the terms of this Agreement will be applied. In other words, where a subject covered by the provisions of this Project Labor Agreement is also covered by the Local Area Agreement the provisions of this Project Labor Agreement shall prevail. Where a subject is covered by the Local Area Agreement and not covered by this Project Labor Agreement, the Local Area Agreement provisions shall prevail.

Section 7. This Agreement shall only be binding on the signatory parties hereto and shall not apply to the parents, affiliates, subsidiaries, or other ventures of any such party.

Section 8. This Agreement shall be limited to work historically recognized as construction work. Nothing contained herein shall be construed to prohibit, restrict, or interfere with the performance of any other operation, work or function which may occur in or around the Project site or be associated with the development of the Project, or with the ongoing operations of the Owner.

Section 9. It is understood that the liability of any Contractor and the liability of the separate Unions under this Agreement shall be several and not joint. The Union agrees that this Agreement does not have the effect of creating any joint employment status between or among Owner and any Contractor.

Section 10. All workers delivering fill, sand, gravel, crushed rock, transit/concrete mix, asphalt or other similar materials and all workers removing any materials from the construction site as required by the specifications are subject to the provisions of the Minnesota state prevailing wage law and are entitled to the appropriate area standard wage. For purposes of this contract, such materials are for specified future use and per Minnesota state prevailing wage law delivery and pick up of the above-listed materials constitutes incorporation.

ARTICLE III - UNION RECOGNITION AND REPRESENTATION

Section 1. The Contractor recognizes the Union as the sole and exclusive bargaining representative of all craft employees working on facilities within the scope of this Agreement.

Section 2. Authorized representatives of the Union shall have access to the Project, provided they do not interfere with the work of employees and further provided that such representatives fully comply with the posted visitor and security and safety rules of the Project.

ARTICLE IV - LABOR HARMONY CLAUSE

The contractor shall furnish labor that can work in harmony with all other elements of labor employed on the Project and shall submit a labor harmony plan to demonstrate how this will be done. "Harmony" shall include the provision of labor that will not, either directly or indirectly, cause or give rise to any work disruptions, slow downs, picketing, stoppages, or any violence or harm to any person or property while performing any work, or activities incidental thereto at the Project. The labor harmony plan should include the company's labor management policies, collective bargaining agreements if any and their expiration dates, past labor relations history, a listing of activities anticipated under this contract that may potentially cause friction with on-site workers, and procedures the company will undertake to eliminate this friction.

The contractor agrees that it shall require every lower-tier subcontractor to provide labor that will work in harmony with all other elements of labor employed in the work, and will include the provisions contained in the paragraph above, in every lower-tier subcontract let for work under this contract.

The requirement to provide labor that can work in harmony with all other elements of labor employed in the work throughout the contract performance is a material element of this contract. Failure by the contractor or any of its lower-tier subcontractors to comply with this requirement shall be deemed a material breach of the contract which will subject the contractor to all rights and remedies the Owner may have, including without limitation the right to terminate the contract.

ARTICLE V - WORK STOPPAGES AND LOCKOUTS

Section 1. There shall be no strike, picketing, work stoppages, slowdowns or other disruptive activity for any reason by the Union or employees against any Contractor covered under this Agreement, and there shall be no lockout by the Contractor. Failure of any Union or employee to cross any picket line established by any union, signatory or non-signatory, or any other organization, at or in proximity to the Project site is a violation of this Article.

Section 2. Any party alleging a breach of Section 1., of Article IV shall have the right to petition a court for temporary and permanent injunctive relief. The moving party need not show the existence of irreparable harm, and shall be required to post bond only to secure payment of court costs and attorney fees as may be awarded by the court.

ARTICLE VI - DISPUTES AND GRIEVANCES

Section 1. This Agreement is intended to provide close cooperation between management and labor. The Construction Manager/General Contractor and the Building and Construction Trades Council shall each assign a representative to this Project for the purpose of assisting the Local Unions, together with the Contractor, to complete the construction of the Project economically, efficiently, continuously and without interruption, delays or work stoppages.

Each Contractor shall hold a pre-job conference with the Union and Construction Manager/General Contractor to clear up any project question and work assignments in which there is thought to be a difference in opinion. Every effort will be made to hold such conference well in advance of actual work performance.

Section 2. The Contractor, Union, and employees collectively and individually, realize the importance to all parties to maintain continuous and uninterrupted performance of the work of the Project, and agree to resolve disputes over grievances in accordance with the arbitration provisions set forth in the Local Area Agreements in effect with the Unions listed in Schedule A attached hereto.

ARTICLE VII - JURISDICTIONAL DISPUTES

Section 1. There will be no strikes, work stoppages, slowdowns, or other disruptive activity arising out of any jurisdictional dispute. Pending the resolution of the dispute, the work shall continue uninterrupted as assigned by the Contractor.

Section 2. Building construction work shall be assigned by the Contractor in accordance with the procedural rules of the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry (hereinafter the "Plan"). Any jurisdictional dispute over the Contractor's assignment of work shall be settled in accordance with the provisions of the Plan.

Section 3. Where a jurisdictional dispute involves the International Brotherhood of Teamsters, it shall be referred for resolution to that International Union and the disputing International Union. The resolution of the dispute shall be reduced to writing, signed by the authorized representative of the International Unions and the Contractor. The assignments made by the Contractor shall be followed until such time as the dispute is resolved in accordance with this Section.

ARTICLE VIII - NO DISCRIMINATION

Section 1. The Contractor and Union agree that they will not discriminate against any employee or applicant for employment because of his or her membership or non-membership in a Union or based upon race, color, religion, sex, national origin or age in any manner prohibited by law or regulation.

Section 2. Any complaints regarding application of the provisions of Section 1., should be brought to the immediate attention of the involved Contractor for consideration and resolution.

Section 3. The use of the masculine or feminine gender in this Agreement shall be construed as including both genders.

ARTICLE IX - SAVINGS AND SEPARABILITY

It is not the intention of the parties to violate any laws governing the subject matter of this Agreement. The parties hereto agree that in the event any provisions of the Agreement are finally held or determined to be illegal or void as being in contravention of any applicable law, the remainder of the Agreement shall remain in full force and effect unless the part or parts so found to be void are wholly inseparable from the remaining portions of this Agreement. Further, the Contractor and Union agree that if and when any and all provisions of this Agreement are finally held or determined to be illegal or void by Court of competent jurisdiction, the parties will promptly enter into negotiations concerning the substance affected by such decision for the purpose of achieving conformity with the requirements of an applicable law and the intent of the parties hereto.

ARTICLE X - DURATION OF THE AGREEMENT

The Project Labor Agreement shall be effective July 1, 2009 and shall continue in effect for the duration of the Project construction work described in Article II hereof. Construction of any phase, portion, section or segment of the project shall be deemed complete when such phase, portion, section or segment has been turned over to the Owner and has received the final acceptance from the Owner's representative.

Since there are provisions herein for no strikes or lockouts in the event any changes are negotiated and implemented under a Local Area Agreement during the term of this Agreement, the Contractor agrees that, except as specified herein, such changes shall be recognized and shall apply retroactively to the termination date in the particular Local Agreement involved. Each Contractor which has a Local Agreement with a Union at the time that its contract at the project commences shall continue it in effect with each said Union so long as the Contractor remains on the project. In the event any such Local Area Agreement expires, the Contractor shall abide by all of the terms of the expired Local Agreement until agreement is reached on a new Local Agreement, with any changes being subject to the provisions of this Agreement.

The Union agrees that there will be no strikes, work stoppages, sympathy actions, picketing, slowdowns or other disruptive activity affecting the Project by any Union involved in the negotiation of a Local Area Agreement nor shall there be any lockout on this Project affecting the Union during the course of such negotiations.

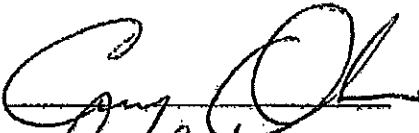
ARTICLE XI – COUNTERPARTS

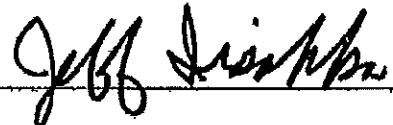
This Project Labor Agreement maybe executed in counterparts, each of which shall be deemed an original and all of which together shall constitute the binding and enforceable agreement of the parties hereto.

IN WITNESS WHEREOF the parties have entered into this Agreement to be effective as of the day and year above written.

Duluth Building and
Construction Trades Council

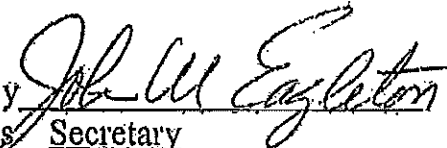
Construction Manager

By 
Its President

By 
Its VP-DIR. OF OPERATIONS

Owner

By 
Its President

By 
Its Secretary

AGREEMENT TO BE BOUND
PROJECT LABOR AGREEMENT

The undersigned EMPLOYER agrees that it has reviewed a copy of the Project Labor Agreement for the NEW DULUTH INTERNATIONAL AIRPORT TERMINAL Project located in Duluth, Minnesota and further agrees to become a party to and bound to the foregoing Agreement.

SIGNED FOR THE EMPLOYER:

Dated: _____

Company Name

Company Address

Phone No., Job Site and/or Office

Fax No.

By

Title

DIVISION 0
GENERAL REQUIREMENTS

00829 - PROJECT LABOR AGREEMENT

1. PROJECT LABOR AGREEMENT

- A. Each contractor and subcontractor, having submitted a bid on this project, certifies that it is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the project. In the interest of such harmony and the long-term supply of skilled manpower, each successful contractor and any and all levels of subcontractors, as a condition of being awarded a contract or subcontract, will agree to abide by the provisions of the Project Labor Agreement as made as of the 1st day of July, 2009, by and between Owner, Kraus-Anderson® Construction Company (Construction Manager for new construction projects in current overall construction program), and To Be Determined and its affiliated local unions, and will be bound by the provisions of that agreement in the same manner as any other provision of the Contract. A copy of the draft agreement is available for inspection at the office of the Construction Manager, Kraus-Anderson® Construction Company, 4525 Haines Road, Duluth, Minnesota, and is included by reference in these Contract Documents as fully as if herein set forth.

END OF SECTION 00829

00830 - WAGE DETERMINATION SCHEDULE

GENERAL

1. WAGE RATE REQUIREMENTS

- A. Contractor and subcontractors shall be subject to payment of prevailing wage rates for highway and heavy and commercial construction determined for Project by Minnesota Department of Labor and Industry. A laborer or mechanic employed directly on the Project site by Contractor or any subcontractor, agent or other person doing or contracting to do all or a part of the Work on the Project shall not be paid a lesser wage rate than prevailing wage rate determined for same or most similar trade or occupation in the Wage Rate Determination Schedule. If a prevailing wage determination is not scheduled for a trade or classification, Contractor is not relieved from responsibility for paying the prevailing wage rate for trade in question. Additional classifications may develop between determinations by the Minnesota Department of Labor and Industry. Therefore, no inferences may be drawn from the omission of a classification which has local usage. Further, the Owner will not be liable for increased labor costs, or errors or changes to the rates or classifications.

2. PREVAILING WAGE RATE DETERMINATION

- A. A copy of the applicable Prevailing Wage Determination Schedule, as provided by the Minnesota Department of Labor and Industry is included for Contractor's reference.

3. POSTING OF WAGE DETERMINATION SCHEDULES

- A. The Contractor shall post and maintain at least one copy of the schedule of Prevailing Wage Determination Schedule in a conspicuous location on the construction site until substantial completion of Project.

4. ENFORCEMENT AND COMPLIANCE

- A. Contractor is solely responsible for enforcement of compliance with Wage Rate Determination Schedule for persons employed directly by Contractor and persons in the employ of its subcontractors, including settlement of claims made by persons found to have received wages lower than rate classification included in said schedule.

END OF SECTION 00830

March 16, 1998

PREVAILING WAGE STATEMENT

A recent unpublished decision of the Minnesota Court of Appeals affirms the authority of the Minnesota Commissioner of Transportation to enforce the Minnesota Prevailing Wage Law on State Highway projects on a case-by-case basis. International Union of Operations Engineers, Local 49 vs. Minnesota Department of Transportation, et. Al., Court of Appeals Case No. C6-97-1582, also see Minnesota Statutes §§177.43 and 177.44 (1996).

The Department of Transportation will enforce the Minnesota Prevailing Wage Law in a manner consistent with the Court of Appeals decision notwithstanding any prior notices on this subject. A copy of the Court of Appeals decision is available to anyone who is interested in reviewing it. Please call Charles Groshens, Labor Compliance Unit at (651) 297-5716 to receive a copy.

June 26, 2001

PREVAILING WAGE STATEMENT II

On June 18, 2001, the Minnesota Department of Labor & Industry (MnL&I) published, in the State Register, a notice of modification and adoption of the rules as published in State Register, Volume 25, Number 14, Pages 772-778, October 2, 2000 (25 SR 772). The rules were promulgated under Minnesota Administrative Procedures Act, Minnesota Statutes Chapter 14, and affect all projects funded in whole or part with state monies that are advertised for bid 5 working days after the publication date.

The rules give guidance on the application of the State Prevailing Wage Statute, Minnesota Statutes §177.41 to 177.44, as it applies to contractors' laborers and mechanics working at off-site facilities, truck drivers performing hauling activities for state funded projects, and the calculation and application of truck rental rates.

The truck rental rates, when certified by the MnL&I, will take effect on state funded projects advertised after the rates are published in the State Register. Mn/DOT will incorporate the truck rental rates into the appropriate contracts when published after they have been published in the State Register.

Copies of the rules can be received by contacting the MnL&I, Labor Standards, Erik Oelker at (651) 296-6452 or Mn/DOT Labor Compliance Office, Charles Groshens, at (651) 297-5716.

Reference:

5200.1105 Rental Rates for Trucks on Public Works Highway Projects
www.revisor.leg.state.mn.us/arule/5200/1105.html

5200.1106 Coverage of Prevailing Wage Law Under Minnesota Statutes 177.41-177.44
www.revisor.leg.state.mn.us/arule/5200/1106.html

**MINNESOTA DEPARTMENT OF LABOR AND INDUSTRY PREVAILING WAGES FOR STATE
FUNDED CONSTRUCTION PROJECTS**



THIS NOTICE MUST BE POSTED ON THE JOBSITE IN A CONSPICUOUS PLACE

Construction Type: Commercial

County Number: 69

County Name: ST. LOUIS

Effective: 2010-04-05 Revised: 2010-04-29

This project is covered by Minnesota prevailing wage statutes. Wage rates listed below are the minimum hourly rates to be paid on this project.

All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at a rate of one and one half (1 1/2) times the basic hourly rate.

Violations should be reported to:

Department of Labor and Industry
Prevailing Wage Section
443 Lafayette Road N
St Paul, MN 55155
(651) 284-5091
DLI.PrevWage@state.mn.us

* Indicates that adjacent county rates were used for the labor class listed.

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
101	LABORER, COMMON (GENERAL LABOR WORK)	2010-04-05	21.55	13.18	34.73
		2010-05-01	21.55	14.38	35.93
102	LABORER, SKILLED (ASSISTING SKILLED CRAFT JOURNEYMAN)	2010-04-05	21.55	13.18	34.73
		2010-05-01	21.55	14.38	35.93
103*	LABORER, LANDSCAPING (GARDENER, SOD LAYER AND NURSERY OPERATOR)	2010-04-05	25.94	0.00	25.94

104* FLAG PERSON	2010-04-05	21.55	13.18	34.73
	2010-05-01	21.55	14.38	35.93
105* WATCH PERSON	2010-04-05	19.20	13.18	32.38
	2010-05-01	19.20	14.38	33.58
106 BLASTER	2010-04-05	22.25	13.18	35.43
	2010-05-01	22.25	14.38	36.63
107 PIPELAYER (WATER, SEWER AND GAS)	2010-04-05	27.24	13.38	40.62
	2010-05-01	27.64	14.58	42.22
108 TUNNEL MINER	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
109 UNDERGROUND AND OPEN DITCH LABORER (EIGHT FEET BELOW STARTING GRADE LEVEL)	2010-04-05	25.94	13.38	39.32
	2010-05-01	26.34	14.58	40.92
110 SURVEY FIELD TECHNICIAN (OPERATE TOTAL STATION, GPS RECEIVER, LEVEL, ROD OR RANGE POLES, STEEL TAPE MEASUREMENT; MARK AND DRIVE STAKES; HAND OR POWER DIGGING FOR AND IDENTIFICATION OF MARKERS OR MONUMENTS; PERFORM AND CHECK CALCULATIONS; REVIEW AND UNDERSTAND CONSTRUCTION PLANS AND LAND SURVEY MATERIALS). THIS CLASSIFICATION DOES NOT APPLY TO THE WORK PERFORMED ON A PREVAILING WAGE PROJECT BY A LAND SURVEYOR WHO IS LICENSED PURSUANT TO MINNESOTA STATUTES, SECTIONS 326.02 TO 326.15.	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
111 TRAFFIC CONTROL PERSON (TEMPORARY SIGNAGE)	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
112 QUALITY CONTROL TESTER (FIELD AND COVERED OFF-SITE FACILITIES; TESTING OF AGGREGATE, ASPHALT, AND CONCRETE MATERIALS); LIMITED TO MN DOT HIGHWAY AND HEAVY CONSTRUCTION	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			

PROJECTS WHERE THE MN DOT HAS RETAINED
QUALITY ASSURANCE PROFESSIONALS TO REVIEW
AND INTERPRET THE RESULTS OF QUALITY
CONTROL TESTERS. SERVICES PROVIDED BY THE
CONTRACTOR.

201 ARTICULATED HAULER

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

202* BOOM TRUCK

2010-04-05 32.38 15.25 47.63

203 LANDSCAPING EQUIPMENT, INCLUDES HYDRO
SEEDER OR MULCHER, SOD ROLLER, FARM
TRACTOR WITH ATTACHMENT SPECIFICALLY
SEEDING, SODDING, OR PLANT, AND TWO-FRAMED
FORKLIFT (EXCLUDING FRONT, POSIT-TRACK, AND
SKID STEER LOADERS), NO EARTHWORK OR
GRADING FOR ELEVATIONS

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

204* OFF-ROAD TRUCK

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

GROUP 2 *

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

302 HELICOPTER PILOT (HIGHWAY AND HEAVY ONLY)

303 CONCRETE PUMP (HIGHWAY AND HEAVY ONLY)

304 ALL CRANES WITH OVER 135-FOOT BOOM, EXCLUDING JIB (HIGHWAY AND HEAVY ONLY)

305 DRAGLINE, CRAWLER, HYDRAULIC BACKHOE (TRACK OR WHEEL MOUNTED) AND/OR
OTHER SIMILAR EQUIPMENT WITH SHOVEL-TYPE CONTROLS THREE CUBIC YARDS AND
OVER MANUFACTURER'S RATED CAPACITY INCLUDING ALL ATTACHMENTS. (HIGHWAY
AND HEAVY ONLY)

306 GRADER OR MOTOR PATROL (HIGHWAY AND HEAVY ONLY)

307 PILE DRIVING (HIGHWAY AND HEAVY ONLY)

308 TUGBOAT 100 H.P. AND OVER WHEN LICENSE REQUIRED (HIGHWAY AND HEAVY ONLY)

GROUP 3 *

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

- 309 ASPHALT BITUMINOUS STABILIZER PLANT (HIGHWAY AND HEAVY ONLY)
- 310 CABLEWAY (HIGHWAY AND HEAVY ONLY)
- 311 CONCRETE MIXER, STATIONARY PLANT (HIGHWAY AND HEAVY ONLY)
- 312 DERRICK (GUY OR STIFFLEG)(POWER)(SKIDS OR STATIONARY) (HIGHWAY AND HEAVY ONLY)
- 313 DRAGLINE, CRAWLER, HYDRAULIC BACKHOE (TRACK OR WHEEL MOUNTED) AND/OR SIMILAR EQUIPMENT WITH SHOVEL-TYPE CONTROLS, UP TO THREE CUBIC YARDS MANUFACTURER.S RATED CAPACITY INCLUDING ALL ATTACHMENTS (HIGHWAY AND HEAVY ONLY)
- 314 DREDGE OR ENGINEERS, DREDGE (POWER) AND ENGINEER (HIGHWAY AND HEAVY ONLY)
- 315 FRONT END LOADER, FIVE CUBIC YARDS AND OVER INCLUDING ATTACHMENTS. (HIGHWAY AND HEAVY ONLY)
- 316 LOCOMOTIVE CRANE OPERATOR (HIGHWAY AND HEAVY ONLY)
- 317 MIXER (PAVING) CONCRETE PAVING, ROAD MOLE, INCLUDING MUCKING OPERATIONS, CONWAY OR SIMILAR TYPE (HIGHWAY AND HEAVY ONLY)
- 318 MECHANIC . WELDER ON POWER EQUIPMENT (HIGHWAY AND HEAVY ONLY)
- 319 TRACTOR . BOOM TYPE (HIGHWAY AND HEAVY ONLY)
- 320 TANDEM SCRAPER (HIGHWAY AND HEAVY ONLY)
- 321 TRUCK CRANE . CRAWLER CRANE (HIGHWAY AND HEAVY ONLY)
- 322 TUGBOAT 100 H.P AND OVER (HIGHWAY AND HEAVY ONLY)

GROUP 4 *

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

- 323 AIR TRACK ROCK DRILL (HIGHWAY AND HEAVY ONLY)
- 324 AUTOMATIC ROAD MACHINE (CMI OR SIMILAR) (HIGHWAY AND HEAVY ONLY)
- 325 BACKFILLER OPERATOR (HIGHWAY AND HEAVY ONLY)
- 326 CONCRETE BATCH PLANT OPERATOR (HIGHWAY AND HEAVY ONLY)
- 327 BITUMINOUS ROLLERS, RUBBER TIRED OR STEEL DRUMMED (EIGHT TONS AND OVER) (HIGHWAY AND HEAVY ONLY)
- 328 BITUMINOUS SPREADER AND FINISHING MACHINES (POWER), INCLUDING PAVERS, MACRO SURFACING AND MICRO SURFACING, OR SIMILAR TYPES (OPERATOR AND SCREED PERSON) (HIGHWAY AND HEAVY ONLY)
- 329 BROKK OR R.T.C. REMOTE CONTROL OR SIMILAR TYPE WITH ALL ATTACHMENTS (HIGHWAY AND HEAVY ONLY)
- 330 CAT CHALLENGER TRACTORS OR SIMILAR TYPES PULLING ROCK WAGONS, BULLDOZERS AND SCRAPERS (HIGHWAY AND HEAVY ONLY)
- 331 CHIP HARVESTER AND TREE CUTTER (HIGHWAY AND HEAVY ONLY)
- 332 CONCRETE DISTRIBUTOR AND SPREADER FINISHING MACHINE, LONGITUDINAL FLOAT, JOINT MACHINE, AND SPRAY MACHINE (HIGHWAY AND HEAVY ONLY)

- 333 CONCRETE MIXER ON JOBSITE (HIGHWAY AND HEAVY ONLY)
- 334 CONCRETE MOBIL (HIGHWAY AND HEAVY ONLY)
- 335 CRUSHING PLANT (GRAVEL AND STONE) OR GRAVEL WASHING, CRUSHING AND SCREENING PLANT (HIGHWAY AND HEAVY ONLY)
- 336 CURB MACHINE (HIGHWAY AND HEAVY ONLY)
- 337 DIRECTIONAL BORING MACHINE (HIGHWAY AND HEAVY ONLY)
- 338 DOPE MACHINE (PIPELINE) (HIGHWAY AND HEAVY ONLY)
- 339 DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL (HIGHWAY AND HEAVY ONLY)
- 340 DUAL TRACTOR (HIGHWAY AND HEAVY ONLY)
- 341 ELEVATING GRADER (HIGHWAY AND HEAVY ONLY)
- 342 FORK LIFT OR STRADDLE CARRIER (HIGHWAY AND HEAVY ONLY)
- 343 FORK LIFT OR LUMBER STACKER (HIGHWAY AND HEAVY ONLY)
- 344 FRONT END, SKID STEER OVER 1 TO 5 C YD
- 345 GPS REMOTE OPERATING OF EQUIPMENT (HIGHWAY AND HEAVY ONLY)
- 346 HOIST ENGINEER (POWER) (HIGHWAY AND HEAVY ONLY)
- 347 HYDRAULIC TREE PLANTER (HIGHWAY AND HEAVY ONLY)
- 348 LAUNCHER PERSON (TANKER PERSON OR PILOT LICENSE) (HIGHWAY AND HEAVY ONLY)
- 349 LOCOMOTIVE (HIGHWAY AND HEAVY ONLY)
- 350 MILLING, GRINDING, PLANING, FINE GRADE, OR TRIMMER MACHINE (HIGHWAY AND HEAVY ONLY)
- 351 MULTIPLE MACHINES, SUCH AS AIR COMPRESSORS, WELDING MACHINES, GENERATORS, PUMPS (HIGHWAY AND HEAVY ONLY)
- 352 PAVEMENT BREAKER OR TAMPING MACHINE (POWER DRIVEN) MIGHTY MITE OR SIMILAR TYPE (HIGHWAY AND HEAVY ONLY)
- 353 PICKUP SWEEPER, ONE CUBIC YARD AND OVER HOPPER CAPACITY(HIGHWAY AND HEAVY ONLY)
- 354 PIPELINE WRAPPING, CLEANING OR BENDING MACHINE (HIGHWAY AND HEAVY ONLY)
- 355 POWER PLANT ENGINEER, 100 KWH AND OVER (HIGHWAY AND HEAVY ONLY)
- 356 POWER ACTUATED HORIZONTAL BORING MACHINE, OVER SIX INCHES (HIGHWAY AND HEAVY ONLY)
- 357 PUGMILL (HIGHWAY AND HEAVY ONLY)
- 358 PUMPCRETE (HIGHWAY AND HEAVY ONLY)
- 359 RUBBER-TIRED FARM TRACTOR WITH BACKHOE INCLUDING ATTACHMENTS (HIGHWAY AND HEAVY ONLY)
- 360 SCRAPER (HIGHWAY AND HEAVY ONLY)
- 361 SELF-PROPELLED SOIL STABILIZER (HIGHWAY AND HEAVY ONLY)
- 362 SLIP FORM (POWER DRIVEN) (PAVING) (HIGHWAY AND HEAVY ONLY)
- 363 TIE TAMPER AND BALLAST MACHINE (HIGHWAY AND HEAVY ONLY)

- 364 TRACTOR, BULLDOZER (HIGHWAY AND HEAVY ONLY)
- 365 TRACTOR, WHEEL TYPE, OVER 50 H.P. WITH PTO UNRELATED TO LANDSCAPING (HIGHWAY AND HEAVY ONLY)
- 366 TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER (HIGHWAY AND HEAVY ONLY)
- 367 TUB GRINDER, MORBARK, OR SIMILAR TYPE (HIGHWAY AND HEAVY ONLY)
- 368 WELL POINT DISMANTLING OR INSTALLATION (HIGHWAY AND HEAVY ONLY)

GROUP 5

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

- 369 AIR COMPRESSOR, 600 CFM OR OVER (HIGHWAY AND HEAVY ONLY)
- 370 BITUMINOUS ROLLER (UNDER EIGHT TONS) (HIGHWAY AND HEAVY ONLY)
- 371 CONCRETE SAW (MULTIPLE BLADE) (POWER OPERATED) (HIGHWAY AND HEAVY ONLY)
- 372 FORM TRENCH DIGGER (POWER) (HIGHWAY AND HEAVY ONLY)
- 373 FRONT END, SKID STEER UP TO 1C YD
- 374 GUNITE GUNALL (HIGHWAY AND HEAVY ONLY)
- 375 HYDRAULIC LOG SPLITTER (HIGHWAY AND HEAVY ONLY)
- 376 LOADER (BARBER GREENE OR SIMILAR TYPE) (HIGHWAY AND HEAVY ONLY)
- 377 POST HOLE DRIVING MACHINE/POST HOLE AUGER (HIGHWAY AND HEAVY ONLY)
- 378 POWER ACTUATED AUGER AND BORING MACHINE (HIGHWAY AND HEAVY ONLY)
- 379 POWER ACTUATED JACK (HIGHWAY AND HEAVY ONLY)
- 380 PUMP (HIGHWAY AND HEAVY ONLY)
- 381 SELF-PROPELLED CHIP SPREADER (FLAHERTY OR SIMILAR) (HIGHWAY AND HEAVY ONLY)
- 382 SHEEP FOOT COMPACTOR WITH BLADE . 200 H.P. AND OVER(HIGHWAY AND HEAVY ONLY)
- 383 SHOULDERING MACHINE (POWER) APSCO OR SIMILAR TYPE INCLUDING SELF-PROPELLED SAND AND CHIP SPREADER (HIGHWAY AND HEAVY ONLY)
- 384 STUMP CHIPPER AND TREE CHIPPER (HIGHWAY AND HEAVY ONLY)
- 385 TREE FARMER (MACHINE) (HIGHWAY AND HEAVY ONLY)

GROUP 6 *

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

- 387 CAT, CHALLENGER, OR SIMILAR TYPE OF TRACTORS, WHEN PULLING DISK OR ROLLER (HIGHWAY AND HEAVY ONLY)
- 388 CONVEYOR (HIGHWAY AND HEAVY ONLY)
- 389 DREDGE DECK HAND (HIGHWAY AND HEAVY ONLY)
- 390 FIRE PERSON OR TANK CAR HEATER (HIGHWAY AND HEAVY ONLY)

391	GRAVEL SCREENING PLANT (PORTABLE NOT CRUSHING OR WASHING) (HIGHWAY AND HEAVY ONLY)				
392	GREASER (TRACTOR) (HIGHWAY AND HEAVY ONLY)				
393	LEVER PERSON (HIGHWAY AND HEAVY ONLY)				
394	OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS, AND MILLING MACHINES, OR OTHER SIMILAR HEAVY EQUIPMENT) (HIGHWAY AND HEAVY ONLY)				
395	POWER SWEEPER (HIGHWAY AND HEAVY ONLY)				
396	SHEEP FOOT ROLLER AND ROLLERS ON GRAVEL COMPACTION, INCLUDING VIBRATING ROLLERS (HIGHWAY AND HEAVY ONLY)				
397	TRACTOR, WHEEL TYPE, OVER 50 H.P., UNRELATED TO LANDSCAPING				
GROUP 1		2010-04-05	34.64	15.25	49.89
501	HELICOPTER PILOT (COMMERCIAL CONSTRUCTION ONLY)				
502	TOWER CRANE 250 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
503	TRUCK CRAWLER CRANE WITH 200 FEET OF BOOM AND OVER, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 2		2010-04-05	34.55	14.19	48.74
504	CONCRETE PUMP WITH 50 METERS/164 FEET OF BOOM AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
505	PILE DRIVING WHEN THREE DRUMS IN USE (COMMERCIAL CONSTRUCTION ONLY)				
506	TOWER CRANE 200 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
507	TRUCK OR CRAWLER CRANE WITH 150 FEET OF BOOM UP TO AND NOT INCLUDING 200 FEET, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 3		2010-04-05	34.30	15.25	49.55
508	ALL-TERRAIN VEHICLE CRANES (COMMERCIAL CONSTRUCTION ONLY)				
509	CONCRETE PUMP 32-49 METERS/102-164 FEET (COMMERCIAL CONSTRUCTION ONLY)				
510	DERRICK (GUY & STIFFLEG) (COMMERCIAL CONSTRUCTION ONLY)				
511	STATIONARY TOWER CRANE 200 FEET AND OVER MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)				
512	SELF-ERECTING TOWER CRANE 100 FEET AND OVER MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)				
513	TRAVELING TOWER CRANE (COMMERCIAL CONSTRUCTION ONLY)				
514	TRUCK OR CRAWLER CRANE UP TO AND NOT INCLUDING 150 FEET OF BOOM, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 4		2010-04-05	32.55	15.25	47.80
515	CRAWLER BACKHOE INCLUDING ATTACHMENTS (COMMERCIAL CONSTRUCTION ONLY)				

- 516 FIREPERSON, CHIEF BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)
- 517 HOIST ENGINEER (THREE DRUMS OR MORE) (COMMERCIAL CONSTRUCTION ONLY)
- 518 LOCOMOTIVE (COMMERCIAL CONSTRUCTION ONLY)
- 519 OVERHEAD CRANE (INSIDE BUILDING PERIMETER) (COMMERCIAL CONSTRUCTION ONLY)
- 520 TRACTOR . BOOM TYPE (COMMERCIAL CONSTRUCTION ONLY)

GROUP 5 2010-04-05 32.38 15.25 47.63

- 521 AIR COMPRESSOR 450 CFM OR OVER (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)
- 522 CONCRETE MIXER (COMMERCIAL CONSTRUCTION ONLY)
- 523 CONCRETE PUMP UP TO 31 METERS/101 FEET OF BOOM
- 524 DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL WHEN USED FOR CAISSON FOR ELEVATOR OR BUILDING CONSTRUCTION (COMMERCIAL CONSTRUCTION ONLY)
- 525 FORKLIFT (COMMERCIAL CONSTRUCTION ONLY)
- 526 FRONT END, SKID STEER 1 TO 5 C YD
- 527 HOIST ENGINEER (ONE OR TWO DRUMS) (COMMERCIAL CONSTRUCTION ONLY)
- 528 MECHANIC-WELDER (ON POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)
- 529 POWER PLANT (100 KW AND OVER OR MULTIPLES EQUAL TO 100KW AND OVER) (COMMERCIAL CONSTRUCTION ONLY)
- 530 PUMP OPERATOR AND/OR CONVEYOR (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)
- 531 SELF-ERECTING TOWER CRANE UNDER 100 FEET MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)
- 532 STRADDLE CARRIER (COMMERCIAL CONSTRUCTION ONLY)
- 533 TRACTOR OVER D2 (COMMERCIAL CONSTRUCTION ONLY)
- 534 WELL POINT PUMP (COMMERCIAL CONSTRUCTION ONLY)

GROUP 6 FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVIEW@STATE.MN.US

- 535 CONCRETE BATCH PLANT (COMMERCIAL CONSTRUCTION ONLY)
- 536 FIREPERSON, FIRST CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)
- 537 FRONT END, SKID STEER UP TO 1 C YD
- 538 GUNITE MACHINE (COMMERCIAL CONSTRUCTION ONLY)
- 539 TRACTOR OPERATOR D2 OR SIMILAR SIZE (COMMERCIAL CONSTRUCTION ONLY)
- 540 TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER

GROUP 7 2010-04-05 29.75 15.25 45.00

- 541 AIR COMPRESSOR 600 CFM OR OVER (COMMERCIAL CONSTRUCTION ONLY)
- 542 BRAKEPERSON (COMMERCIAL CONSTRUCTION ONLY)
- 543 CONCRETE PUMP/PUMPCRETE OR COMPLACO TYPE (COMMERCIAL CONSTRUCTION ONLY)
- 544 FIREPERSON, TEMPORARY HEAT SECOND CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)
- 545 OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS AND MILLING MACHINES, OR OTHER SIMILAR POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)
- 546 PICK UP SWEEPER (ONE CUBIC YARD HOPPER CAPACITY) (COMMERCIAL CONSTRUCTION ONLY)
- 547 PUMP AND/OR CONVEYOR (COMMERCIAL CONSTRUCTION ONLY)

GROUP 8 *

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

- 548 ELEVATOR OPERATOR (COMMERCIAL CONSTRUCTION ONLY)
- 549 GREASER (COMMERCIAL CONSTRUCTION ONLY)
- 550 MECHANICAL SPACE HEATER (TEMPORARY HEAT NO BOILER LICENSE REQUIRED) (COMMERCIAL CONSTRUCTION ONLY)

GROUP 1

2010-04-05	25.75	12.40	38.15
2010-05-01	26.60	13.15	39.75

- 601 MECHANIC . WELDER
- 602 TRACTOR TRAILER DRIVER
- 603 TRUCK DRIVER (HAULING MACHINERY INCLUDING OPERATION OF HAND AND POWER OPERATED WINCHES)

GROUP 2 *

2010-04-05	22.25	11.10	33.35
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- 604 FOUR OR MORE AXLE UNIT, STRAIGHT BODY TRUCK

GROUP 3

2010-04-05	25.10	12.40	37.50
2010-05-01	25.95	13.15	39.10

- 605 BITUMINOUS DISTRIBUTOR DRIVER
- 606 BITUMINOUS DISTRIBUTOR (ONE PERSON OPERATION)
- 607 THREE AXLE UNITS

GROUP 4

2010-04-05	24.85	12.40	37.25
2010-05-01	25.70	13.15	38.85

- 608 BITUMINOUS DISTRIBUTOR SPRAY OPERATOR (REAR AND OILER)

609	DUMP PERSON				
610	GREASER				
611	PILOT CAR DRIVER				
612	RUBBER-TIRED, SELF-PROPELLED PACKER UNDER 8 TONS				
613	TWO AXLE UNIT				
614	SLURRY OPERATOR				
615	TANK TRUCK HELPER (GAS, OIL, ROAD OIL, AND WATER)				
616	TRACTOR OPERATOR, UNDER 50 H.P.				
701	HEATING AND FROST INSULATORS	2010-04-05	34.16	11.75	45.91
		2010-06-01	36.11	11.75	47.86
702	BOILERMAKERS	2010-04-05	34.79	18.07	52.86
703	BRICKLAYERS	2010-04-05	27.81	20.43	48.24
704	CARPENTERS	2010-04-05	26.40	13.80	40.20
705	CARPET LAYERS (LINOLEUM)	2010-04-05	24.80	14.99	39.79
706	CEMENT MASONS	2010-04-05	27.04	15.45	42.49
707	ELECTRICIANS	2010-04-05	31.24	19.84	51.08
		2010-05-30	32.40	20.58	52.98
708	ELEVATOR CONSTRUCTORS	2010-04-05	42.58	21.46	64.04
709	GLAZIERS	2010-04-05	24.85	13.20	38.05
		2010-05-01	26.25	13.20	39.45
710	LATHERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVVAGE@STATE.MN.US			
711	GROUND PERSON	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVVAGE@STATE.MN.US			

712	IRONWORKERS	2010-04-05	29.76	19.50	49.26
713	LINEMAN	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
714	MILLWRIGHT	2010-04-05	26.09	15.31	41.40
715	PAINTERS (INCLUDING HAND BRUSHED, HAND SPRAYED, AND THE TAPING OF PAVEMENT MARKINGS)	2010-04-05	27.28	13.20	40.48
716	PILEDRIIVER (INCLUDING VIBRATORY DRIVER OR EXTRACTOR FOR PILING AND SHEETING OPERATIONS)	2010-04-05	28.87	15.90	44.77
		2010-05-01	30.47	15.90	46.37
717	PIPEFITTERS . STEAMFITTERS	2010-04-05	35.34	14.97	50.31
		2010-05-01	37.44	14.97	52.41
718	PLASTERERS	2010-04-05	28.17	15.70	43.87
719	PLUMBERS	2010-04-05	35.34	14.97	50.31
		2010-05-01	37.44	14.97	52.41
720	ROOFER	2010-04-05	26.70	15.60	42.30
721	SHEET METAL WORKERS	2010-04-05	29.61	19.98	49.59
722	SPRINKLER FITTERS	2010-04-05	31.26	16.10	47.36
723	TERRAZZO WORKERS	2010-04-05	30.11	17.05	47.16
724	TILE SETTERS	2010-04-05	23.20	19.21	42.41
725	TILE FINISHERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			

726	DRYWALL TAPER	2010-04-05	27.88	13.20	41.08
727	WIRING SYSTEM TECHNICIAN	2010-04-05	30.98	12.18	43.16
728	WIRING SYSTEMS INSTALLER	2010-04-05	21.68	10.48	32.16
729	ASBESTOS ABATEMENT WORKER	2010-04-05	26.12	14.43	40.55
730	SIGN ERECTOR	2010-04-05	18.07	3.98	22.05

**MINNESOTA DEPARTMENT OF LABOR AND INDUSTRY PREVAILING WAGES FOR STATE
FUNDED CONSTRUCTION PROJECTS**



THIS NOTICE MUST BE POSTED ON THE JOBSITE IN A CONSPICUOUS PLACE

Construction Type: Highway and Heavy

Region Number: 01

Counties within region:

- CARLTON-09
- COOK-16
- ITASCA-31
- KOOCHICHING-36
- LAKE-38
- PINE-58
- ST. LOUIS-69

Effective: 2010-11-29 Revised: 2010-12-21

This project is covered by Minnesota prevailing wage statutes. Wage rates listed below are the minimum hourly rates to be paid on this project.

All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at a rate of one and one half (1 1/2) times the basic hourly rate.

Violations should be reported to:

Department of Transportation
Office of Construction
Transportation Building MS650
John Ireland Blvd
St. Paul, MN 55155
(651) 366-4209

Refer questions concerning the prevailing wage rates to:

Department of Labor and Industry
Prevailing Wage Section
443 Lafayette Road N
St Paul, MN 55155
(651) 284-5091
DLI.PrevWage@state.mn.us

LABOR CODE AND CLASS

	EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
101 LABORER, COMMON (GENERAL LABOR WORK)	2010-11-29	23.76	16.46	40.22
	2011-05-01	24.01	17.21	41.22
102 LABORER, SKILLED (ASSISTING SKILLED CRAFT JOURNEYMAN)	2010-11-29	23.76	16.46	40.22
	2011-05-01	24.01	17.21	41.22
103 LABORER, LANDSCAPING (GARDENER, SOD LAYER AND NURSERY OPERATOR)	2010-11-29	23.44	0.00	23.44
104 FLAG PERSON	2010-11-29	23.76	16.46	40.22
	2011-05-01	24.01	17.21	41.22
105 WATCH PERSON	2010-11-29	22.09	14.33	36.42
	2011-05-01	22.34	15.08	37.42
106 BLASTER	2010-11-29	28.64	14.58	43.22
	2011-05-01	28.89	15.33	44.22
107 PIPELAYER (WATER, SEWER AND GAS)	2010-11-29	25.76	16.46	42.22
	2011-05-01	26.01	17.21	43.22
108 TUNNEL MINER	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVIEWAGE@STATE.MN.US			
109 UNDERGROUND AND OPEN DITCH LABORER (EIGHT FEET BELOW STARTING GRADE LEVEL)	2010-11-29	24.46	16.46	40.92
	2011-05-01	24.71	17.21	41.92
110 SURVEY FIELD TECHNICIAN (OPERATE TOTAL STATION, GPS RECEIVER, LEVEL, ROD OR RANGE POLES, STEEL TAPE MEASUREMENT; MARK AND DRIVE STAKES; HAND OR POWER DIGGING FOR AND IDENTIFICATION OF MARKERS OR MONUMENTS; PERFORM AND CHECK CALCULATIONS; REVIEW AND UNDERSTAND CONSTRUCTION PLANS AND LAND	2010-11-29	25.64	14.58	40.22

SURVEY MATERIALS). THIS CLASSIFICATION DOES NOT APPLY TO THE WORK PERFORMED ON A PREVAILING WAGE PROJECT BY A LAND SURVEYOR WHO IS LICENSED PURSUANT TO MINNESOTA STATUTES, SECTIONS 326.02 TO 326.15.

	2011-05-01	25.89	15.33	41.22
111 TRAFFIC CONTROL PERSON (TEMPORARY SIGNAGE)	2010-11-29	25.64	14.58	40.22
	2011-05-01	25.89	15.33	41.22
112 QUALITY CONTROL TESTER (FIELD AND COVERED OFF-SITE FACILITIES; TESTING OF AGGREGATE, ASPHALT, AND CONCRETE MATERIALS); LIMITED TO MN DOT HIGHWAY AND HEAVY CONSTRUCTION PROJECTS WHERE THE MN DOT HAS RETAINED QUALITY ASSURANCE PROFESSIONALS TO REVIEW AND INTERPRET THE RESULTS OF QUALITY CONTROL TESTERS. SERVICES PROVIDED BY THE CONTRACTOR.	2010-11-29	16.50	4.09	20.59
201 ARTICULATED HAULER	2010-11-29	30.72	15.85	46.57
	2011-05-01	30.72	16.85	47.57
202 BOOM TRUCK	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PREVWAGE@STATE.MN.US</u>			
203 LANDSCAPING EQUIPMENT, INCLUDES HYDRO SEEDER OR MULCHER, SOD ROLLER, FARM TRACTOR WITH ATTACHMENT SPECIFICALLY SEEDING, SODDING, OR PLANT, AND TWO-FRAMED FORKLIFT (EXCLUDING FRONT, POSIT-TRACK, AND SKID STEER LOADERS), NO EARTHWORK OR GRADING FOR ELEVATIONS	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PREVWAGE@STATE.MN.US</u>			
204 OFF-ROAD TRUCK	2010-11-29	30.72	15.85	46.57
	2011-05-01	30.72	16.85	47.57
GROUP 2	2010-11-29	31.57	15.85	47.42
	2011-05-01	31.57	16.85	48.42
302 HELICOPTER PILOT (HIGHWAY AND HEAVY ONLY)				

- 303 CONCRETE PUMP (HIGHWAY AND HEAVY ONLY)
- 304 ALL CRANES WITH OVER 135-FOOT BOOM, EXCLUDING JIB (HIGHWAY AND HEAVY ONLY)
- 305 DRAGLINE, CRAWLER, HYDRAULIC BACKHOE (TRACK OR WHEEL MOUNTED) AND/OR OTHER SIMILAR EQUIPMENT WITH SHOVEL-TYPE CONTROLS THREE CUBIC YARDS AND OVER MANUFACTURER.S RATED CAPACITY INCLUDING ALL ATTACHMENTS. (HIGHWAY AND HEAVY ONLY)
- 306 GRADER OR MOTOR PATROL (HIGHWAY AND HEAVY ONLY)
- 307 PILE DRIVING (HIGHWAY AND HEAVY ONLY)
- 308 TUGBOAT 100 H.P. AND OVER WHEN LICENSE REQUIRED (HIGHWAY AND HEAVY ONLY)

GROUP 3	2010-11-29	31.02	15.85	46.87
	2011-05-01	31.02	16.85	47.87

- 309 ASPHALT BITUMINOUS STABILIZER PLANT (HIGHWAY AND HEAVY ONLY)
- 310 CABLEWAY (HIGHWAY AND HEAVY ONLY)
- 311 CONCRETE MIXER, STATIONARY PLANT (HIGHWAY AND HEAVY ONLY)
- 312 DERRICK (GUY OR STIFFLEG)(POWER)(SKIDS OR STATIONARY) (HIGHWAY AND HEAVY ONLY)
- 313 DRAGLINE, CRAWLER, HYDRAULIC BACKHOE (TRACK OR WHEEL MOUNTED) AND/OR SIMILAR EQUIPMENT WITH SHOVEL-TYPE CONTROLS, UP TO THREE CUBIC YARDS MANUFACTURER.S RATED CAPACITY INCLUDING ALL ATTACHMENTS (HIGHWAY AND HEAVY ONLY)
- 314 DREDGE OR ENGINEERS, DREDGE (POWER) AND ENGINEER (HIGHWAY AND HEAVY ONLY)
- 315 FRONT END LOADER, FIVE CUBIC YARDS AND OVER INCLUDING ATTACHMENTS. (HIGHWAY AND HEAVY ONLY)
- 316 LOCOMOTIVE CRANE OPERATOR (HIGHWAY AND HEAVY ONLY)
- 317 MIXER (PAVING) CONCRETE PAVING, ROAD MOLE, INCLUDING MUCKING OPERATIONS, CONWAY OR SIMILAR TYPE (HIGHWAY AND HEAVY ONLY)
- 318 MECHANIC . WELDER ON POWER EQUIPMENT (HIGHWAY AND HEAVY ONLY)
- 319 TRACTOR . BOOM TYPE (HIGHWAY AND HEAVY ONLY)
- 320 TANDEM SCRAPER (HIGHWAY AND HEAVY ONLY)
- 321 TRUCK CRANE . CRAWLER CRANE (HIGHWAY AND HEAVY ONLY)
- 322 TUGBOAT 100 H.P AND OVER (HIGHWAY AND HEAVY ONLY)

GROUP 4	2010-11-29	30.72	15.85	46.57
	2011-05-01	30.72	16.85	47.57

- 323 AIR TRACK ROCK DRILL (HIGHWAY AND HEAVY ONLY)
- 324 AUTOMATIC ROAD MACHINE (CMI OR SIMILAR) (HIGHWAY AND HEAVY ONLY)
- 325 BACKFILLER OPERATOR (HIGHWAY AND HEAVY ONLY)
- 326 CONCRETE BATCH PLANT OPERATOR (HIGHWAY AND HEAVY ONLY)

- 327 BITUMINOUS ROLLERS, RUBBER TIRED OR STEEL DRUMMED (EIGHT TONS AND OVER) (HIGHWAY AND HEAVY ONLY)
- 328 BITUMINOUS SPREADER AND FINISHING MACHINES (POWER), INCLUDING PAVERS, MACRO SURFACING AND MICRO SURFACING, OR SIMILAR TYPES (OPERATOR AND SCREED PERSON) (HIGHWAY AND HEAVY ONLY)
- 329 BROKK OR R.T.C. REMOTE CONTROL OR SIMILAR TYPE WITH ALL ATTACHMENTS (HIGHWAY AND HEAVY ONLY)
- 330 CAT CHALLENGER TRACTORS OR SIMILAR TYPES PULLING ROCK WAGONS, BULLDOZERS AND SCRAPERS (HIGHWAY AND HEAVY ONLY)
- 331 CHIP HARVESTER AND TREE CUTTER (HIGHWAY AND HEAVY ONLY)
- 332 CONCRETE DISTRIBUTOR AND SPREADER FINISHING MACHINE, LONGITUDINAL FLOAT, JOINT MACHINE, AND SPRAY MACHINE (HIGHWAY AND HEAVY ONLY)
- 333 CONCRETE MIXER ON JOBSITE (HIGHWAY AND HEAVY ONLY)
- 334 CONCRETE MOBIL (HIGHWAY AND HEAVY ONLY)
- 335 CRUSHING PLANT (GRAVEL AND STONE) OR GRAVEL WASHING, CRUSHING AND SCREENING PLANT (HIGHWAY AND HEAVY ONLY)
- 336 CURB MACHINE (HIGHWAY AND HEAVY ONLY)
- 337 DIRECTIONAL BORING MACHINE (HIGHWAY AND HEAVY ONLY)
- 338 DOPE MACHINE (PIPELINE) (HIGHWAY AND HEAVY ONLY)
- 339 DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL (HIGHWAY AND HEAVY ONLY)
- 340 DUAL TRACTOR (HIGHWAY AND HEAVY ONLY)
- 341 ELEVATING GRADER (HIGHWAY AND HEAVY ONLY)
- 342 FORK LIFT OR STRADDLE CARRIER (HIGHWAY AND HEAVY ONLY)
- 343 FORK LIFT OR LUMBER STACKER (HIGHWAY AND HEAVY ONLY)
- 344 FRONT END, SKID STEER OVER 1 TO 5 C YD
- 345 GPS REMOTE OPERATING OF EQUIPMENT (HIGHWAY AND HEAVY ONLY)
- 346 HOIST ENGINEER (POWER) (HIGHWAY AND HEAVY ONLY)
- 347 HYDRAULIC TREE PLANTER (HIGHWAY AND HEAVY ONLY)
- 348 LAUNCHER PERSON (TANKER PERSON OR PILOT LICENSE) (HIGHWAY AND HEAVY ONLY)
- 349 LOCOMOTIVE (HIGHWAY AND HEAVY ONLY)
- 350 MILLING, GRINDING, PLANNING, FINE GRADE, OR TRIMMER MACHINE (HIGHWAY AND HEAVY ONLY)
- 351 MULTIPLE MACHINES, SUCH AS AIR COMPRESSORS, WELDING MACHINES, GENERATORS, PUMPS (HIGHWAY AND HEAVY ONLY)
- 352 PAVEMENT BREAKER OR TAMPING MACHINE (POWER DRIVEN) MIGHTY MITE OR SIMILAR TYPE (HIGHWAY AND HEAVY ONLY)
- 353 PICKUP SWEEPER, ONE CUBIC YARD AND OVER HOPPER CAPACITY (HIGHWAY AND HEAVY ONLY)
- 354 PIPELINE WRAPPING, CLEANING OR BENDING MACHINE (HIGHWAY AND HEAVY ONLY)

355 POWER PLANT ENGINEER, 100 KWH AND OVER (HIGHWAY AND HEAVY ONLY)

356 POWER ACTUATED HORIZONTAL BORING MACHINE, OVER SIX INCHES (HIGHWAY AND HEAVY ONLY)

357 PUGMILL (HIGHWAY AND HEAVY ONLY)

358 PUMPCRETE (HIGHWAY AND HEAVY ONLY)

359 RUBBER-TIRED FARM TRACTOR WITH BACKHOE INCLUDING ATTACHMENTS (HIGHWAY AND HEAVY ONLY)

360 SCRAPER (HIGHWAY AND HEAVY ONLY)

361 SELF-PROPELLED SOIL STABILIZER (HIGHWAY AND HEAVY ONLY)

362 SLIP FORM (POWER DRIVEN) (PAVING) (HIGHWAY AND HEAVY ONLY)

363 TIE TAMPER AND BALLAST MACHINE (HIGHWAY AND HEAVY ONLY)

364 TRACTOR, BULLDOZER (HIGHWAY AND HEAVY ONLY)

365 TRACTOR, WHEEL TYPE, OVER 50 H.P. WITH PTO UNRELATED TO LANDSCAPING (HIGHWAY AND HEAVY ONLY)

366 TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER (HIGHWAY AND HEAVY ONLY)

367 TUB GRINDER, MORBARK, OR SIMILAR TYPE (HIGHWAY AND HEAVY ONLY)

368 WELL POINT DISMANTLING OR INSTALLATION (HIGHWAY AND HEAVY ONLY)

GROUP 5	2010-11-29	27.68	15.85	43.53
	2011-05-01	27.68	16.85	44.53

369 AIR COMPRESSOR, 600 CFM OR OVER (HIGHWAY AND HEAVY ONLY)

370 BITUMINOUS ROLLER (UNDER EIGHT TONS) (HIGHWAY AND HEAVY ONLY)

371 CONCRETE SAW (MULTIPLE BLADE) (POWER OPERATED) (HIGHWAY AND HEAVY ONLY)

372 FORM TRENCH DIGGER (POWER) (HIGHWAY AND HEAVY ONLY)

373 FRONT END, SKID STEER UP TO 1C YD

374 GUNITE GUNALL (HIGHWAY AND HEAVY ONLY)

375 HYDRAULIC LOG SPLITTER (HIGHWAY AND HEAVY ONLY)

376 LOADER (BARBER GREENE OR SIMILAR TYPE) (HIGHWAY AND HEAVY ONLY)

377 POST HOLE DRIVING MACHINE/POST HOLE AUGER (HIGHWAY AND HEAVY ONLY)

378 POWER ACTUATED AUGER AND BORING MACHINE (HIGHWAY AND HEAVY ONLY)

379 POWER ACTUATED JACK (HIGHWAY AND HEAVY ONLY)

380 PUMP (HIGHWAY AND HEAVY ONLY)

381 SELF-PROPELLED CHIP SPREADER (FLAHERTY OR SIMILAR) (HIGHWAY AND HEAVY ONLY)

382 SHEEP FOOT COMPACTOR WITH BLADE . 200 H.P. AND OVER(HIGHWAY AND HEAVY ONLY)

383 SHOULDERING MACHINE (POWER) APSCO OR SIMILAR TYPE INCLUDING SELF-PROPELLED SAND AND CHIP SPREADER (HIGHWAY AND HEAVY ONLY)

384 STUMP CHIPPER AND TREE CHIPPER (HIGHWAY AND HEAVY ONLY)

385 TREE FARMER (MACHINE) (HIGHWAY AND HEAVY ONLY)

GROUP 6	2010-11-29	26.47	15.85	42.32
	2011-05-01	26.47	16.85	43.32

387 CAT, CHALLENGER, OR SIMILAR TYPE OF TRACTORS, WHEN PULLING DISK OR ROLLER (HIGHWAY AND HEAVY ONLY)

388 CONVEYOR (HIGHWAY AND HEAVY ONLY)

389 DREDGE DECK HAND (HIGHWAY AND HEAVY ONLY)

390 FIRE PERSON OR TANK CAR HEATER (HIGHWAY AND HEAVY ONLY)

391 GRAVEL SCREENING PLANT (PORTABLE NOT CRUSHING OR WASHING) (HIGHWAY AND HEAVY ONLY)

392 GREASER (TRACTOR) (HIGHWAY AND HEAVY ONLY)

393 LEVER PERSON (HIGHWAY AND HEAVY ONLY)

394 OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS, AND MILLING MACHINES, OR OTHER SIMILAR HEAVY EQUIPMENT) (HIGHWAY AND HEAVY ONLY)

395 POWER SWEEPER (HIGHWAY AND HEAVY ONLY)

396 SHEEP FOOT ROLLER AND ROLLERS ON GRAVEL COMPACTION, INCLUDING VIBRATING ROLLERS (HIGHWAY AND HEAVY ONLY)

397 TRACTOR, WHEEL TYPE, OVER 50 H.P., UNRELATED TO LANDSCAPING

GROUP 1 FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

501 HELICOPTER PILOT (COMMERCIAL CONSTRUCTION ONLY)

502 TOWER CRANE 250 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)

503 TRUCK CRAWLER CRANE WITH 200 FEET OF BOOM AND OVER, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)

GROUP 2 FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

504 CONCRETE PUMP WITH 50 METERS/164 FEET OF BOOM AND OVER (COMMERCIAL CONSTRUCTION ONLY)

505 PILE DRIVING WHEN THREE DRUMS IN USE (COMMERCIAL CONSTRUCTION ONLY)

506 TOWER CRANE 200 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)

507 TRUCK OR CRAWLER CRANE WITH 150 FEET OF BOOM UP TO AND NOT INCLUDING 200 FEET, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)

GROUP 3

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

- 508 ALL-TERRAIN VEHICLE CRANES (COMMERCIAL CONSTRUCTION ONLY)
- 509 CONCRETE PUMP 32-49 METERS/102-164 FEET (COMMERCIAL CONSTRUCTION ONLY)
- 510 DERRICK (GUY & STIFFLEG) (COMMERCIAL CONSTRUCTION ONLY)
- 511 STATIONARY TOWER CRANE 200 FEET AND OVER MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)
- 512 SELF-ERECTING TOWER CRANE 100 FEET AND OVER MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)
- 513 TRAVELING TOWER CRANE (COMMERCIAL CONSTRUCTION ONLY)
- 514 TRUCK OR CRAWLER CRANE UP TO AND NOT INCLUDING 150 FEET OF BOOM, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)

GROUP 4

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

- 515 CRAWLER BACKHOE INCLUDING ATTACHMENTS (COMMERCIAL CONSTRUCTION ONLY)
- 516 FIREPERSON, CHIEF BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)
- 517 HOIST ENGINEER (THREE DRUMS OR MORE) (COMMERCIAL CONSTRUCTION ONLY)
- 518 LOCOMOTIVE (COMMERCIAL CONSTRUCTION ONLY)
- 519 OVERHEAD CRANE (INSIDE BUILDING PERIMETER) (COMMERCIAL CONSTRUCTION ONLY)
- 520 TRACTOR . BOOM TYPE (COMMERCIAL CONSTRUCTION ONLY)

GROUP 5

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

- 521 AIR COMPRESSOR 450 CFM OR OVER (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)
- 522 CONCRETE MIXER (COMMERCIAL CONSTRUCTION ONLY)
- 523 CONCRETE PUMP UP TO 31 METERS/101 FEET OF BOOM
- 524 DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL WHEN USED FOR CAISSON FOR ELEVATOR OR BUILDING CONSTRUCTION (COMMERCIAL CONSTRUCTION ONLY)
- 525 FORKLIFT (COMMERCIAL CONSTRUCTION ONLY)
- 526 FRONT END, SKID STEER 1 TO 5 C YD
- 527 HOIST ENGINEER (ONE OR TWO DRUMS) (COMMERCIAL CONSTRUCTION ONLY)
- 528 MECHANIC-WELDER (ON POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)
- 529 POWER PLANT (100 KW AND OVER OR MULTIPLES EQUAL TO 100KW AND OVER) (COMMERCIAL CONSTRUCTION ONLY)
- 530

PUMP OPERATOR AND/OR CONVEYOR (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)

531 SELF-ERECTING TOWER CRANE UNDER 100 FEET MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)

532 STRADDLE CARRIER (COMMERCIAL CONSTRUCTION ONLY)

533 TRACTOR OVER D2 (COMMERCIAL CONSTRUCTION ONLY)

534 WELL POINT PUMP (COMMERCIAL CONSTRUCTION ONLY)

GROUP 6

FOR RATE CALL 651-284-5091 OR
EMAIL

DLI.PREVWAGE@STATE.MN.US

535 CONCRETE BATCH PLANT (COMMERCIAL CONSTRUCTION ONLY)

536 FIREPERSON, FIRST CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)

537 FRONT END, SKID STEER UP TO 1 C YD

538 GUNITE MACHINE (COMMERCIAL CONSTRUCTION ONLY)

539 TRACTOR OPERATOR D2 OR SIMILAR SIZE (COMMERCIAL CONSTRUCTION ONLY)

540 TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER

GROUP 7

FOR RATE CALL 651-284-5091 OR
EMAIL

DLI.PREVWAGE@STATE.MN.US

541 AIR COMPRESSOR 600 CFM OR OVER (COMMERCIAL CONSTRUCTION ONLY)

542 BRAKEPERSON (COMMERCIAL CONSTRUCTION ONLY)

543 CONCRETE PUMP/PUMPCRETE OR COMPLACO TYPE (COMMERCIAL CONSTRUCTION ONLY)

544 FIREPERSON, TEMPORARY HEAT SECOND CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)

545 OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS AND MILLING MACHINES, OR OTHER SIMILAR POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)

546 PICK UP SWEEPER (ONE CUBIC YARD HOPPER CAPACITY) (COMMERCIAL CONSTRUCTION ONLY)

547 PUMP AND/OR CONVEYOR (COMMERCIAL CONSTRUCTION ONLY)

GROUP 8

FOR RATE CALL 651-284-5091 OR
EMAIL

DLI.PREVWAGE@STATE.MN.US

548 ELEVATOR OPERATOR (COMMERCIAL CONSTRUCTION ONLY)

549 GREASER (COMMERCIAL CONSTRUCTION ONLY)

550 MECHANICAL SPACE HEATER (TEMPORARY HEAT NO BOILER LICENSE REQUIRED) (COMMERCIAL CONSTRUCTION ONLY)

GROUP 1	2010-11-29	26.60	13.15	39.75
601 MECHANIC . WELDER				
602 TRACTOR TRAILER DRIVER				
603 TRUCK DRIVER (HAULING MACHINERY INCLUDING OPERATION OF HAND AND POWER OPERATED WINCHES)				
GROUP 2	2010-11-29	18.54	6.40	24.94
604 FOUR OR MORE AXLE UNIT, STRAIGHT BODY TRUCK				
GROUP 3	2010-11-29	25.95	13.15	39.10
605 BITUMINOUS DISTRIBUTOR DRIVER				
606 BITUMINOUS DISTRIBUTOR (ONE PERSON OPERATION)				
607 THREE AXLE UNITS				
GROUP 4	2010-11-29	25.70	13.15	38.85
608 BITUMINOUS DISTRIBUTOR SPRAY OPERATOR (REAR AND OILER)				
609 DUMP PERSON				
610 GREASER				
611 PILOT CAR DRIVER				
612 RUBBER-TIRED, SELF-PROPELLED PACKER UNDER 8 TONS				
613 TWO AXLE UNIT				
614 SLURRY OPERATOR				
615 TANK TRUCK HELPER (GAS, OIL, ROAD OIL, AND WATER)				
616 TRACTOR OPERATOR, UNDER 50 H.P.				
701 HEATING AND FROST INSULATORS				
	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
702 BOILERMAKERS				
	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
703 BRICKLAYERS				
	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
704 CARPENTERS	2010-11-29	29.32	17.05	46.37

705 CARPET LAYERS (LINOLEUM)	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			
706 CEMENT MASONS	2010-11-29	31.08	15.50	46.58
	2011-05-01	32.58	15.50	48.08
707 ELECTRICIANS	2010-11-29	31.24	20.79	52.03
	2011-06-01	32.19	20.79	52.98
708 ELEVATOR CONSTRUCTORS	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			
709 GLAZIERS	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			
710 LATHERS	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			
711 GROUND PERSON	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			
712 IRONWORKERS	2010-11-29	29.36	19.90	49.26
	2011-05-01	29.66	19.90	49.56
713 LINEMAN	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			
714 MILLWRIGHT	2010-11-29	30.12	14.65	44.77
715 PAINTERS (INCLUDING HAND BRUSHED, HAND SPRAYED, AND THE TAPING OF PAVEMENT MARKINGS)	2010-11-29	28.11	11.82	39.93
716 PILEDRIVER (INCLUDING VIBRATORY DRIVER OR	2010-11-29	29.22	17.05	46.27

EXTRACTOR FOR PILING AND SHEETING
OPERATIONS)

717 PIPEFITTERS . STEAMFITTERS	2010-11-29	36.74	15.67	52.41
718 PLASTERERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
719 PLUMBERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
720 ROOFER	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
721 SHEET METAL WORKERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
722 SPRINKLER FITTERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
723 TERRAZZO WORKERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
724 TILE SETTERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
725 TILE FINISHERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
726 DRYWALL TAPER	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
727 WIRING SYSTEM TECHNICIAN	2010-11-29	32.09	12.39	44.48

728 WIRING SYSTEMS INSTALLER	2010-11-29	22.46	10.61	33.07
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729 ASBESTOS ABATEMENT WORKER

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

730 SIGN ERECTOR

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

Construction Type: **Building**

County: St Louis County in Minnesota.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).Mod Nbr Pub Date
0 01/06/2012

ASBE0049-007 06/06/2011 Rates Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (includes the application of all insulating materials, protective coverings, coatings & finishes to all types of mechanical systems) \$ 36.76 14.90

BOIL0647-007 07/01/2009 **BOILERMAKER** \$ 33.84 18.53

BRMN0001-050 06/28/2010 ST LOUIS (remaining northern part) **TILE SETTER** \$ 27.35 18.18

BRMN0003-008 05/01/2011 **ST. LOUIS CO** (City of Duluth and south of a line btwn Townships #54 & #55, 2 miles north of Cotton) **BRICKLAYER** Rates Fringe
 \$ 31.58 18.66

BRMN0003-011 05/01/2008 **ST. LOUIS** (City of Duluth and south of Township Line 55) **TILE SETTER** Rate Fringe
 \$ 24.13 17.38

BRMN0016-002 05/01/2011 ST. LOUIS CO (north of a line btwn Townships #54 & #55, 2 miles north of Cotton) **BRICKLAYER** \$ 31.63 18.61

* CARP0361-012 07/11/2011 **DULUTH AREA** including Alborn, Arnold, Bartlett, Birch, Brookstone, Canyon, Clinton, Culver, Floodwood, Gowan, Island, Kelsey, Lakewood, Meadowlands, Munger, Palmers, Payne, Prasit, Shaw, Taft)

CARPENTER (including Acoustical Installation, Drywall Hanging, Form Work & Overhead Door Installation) \$ 27.20 14.75

CARP0596-005 06/01/2009 **SOFT FLOOR LAYER** Rate Fringe
 \$ 28.91 12.63

* CARP0606-001 05/01/2010 **EXCLUDING DULUTH AREA** Rate Fringe
 CARPENTER (including Acoustical Installation, Drywall Hanging, Form Work & Overhead Door Installation) \$ 26.75 14.65

ELEC0242-012 05/29/2011 **ST. LOUIS** (south part bounded on the north by the north line of Kelsey Township extended east & west) **ELECTRICIAN** Rates Fringe
 \$ 30.39 22.90

ELEC0294-006 05/29/2011 ST. LOUIS (north part bounded on the south by the south line of Ellsburg Township, extended east & west) **ELECTRICIAN** \$ 33.38 73.6%

ENGI0049-045 05/01/2011

OPERATOR: Power Equipment

GRP 1 \$ 34.64 15.85 GRP 3 \$ 32.89 15.85 GRP 5 \$ 32.38 15.85 GRP 7 \$ 29.75 15.85
 GRP 2 \$ 34.30 15.85 GRP 4 \$ 32.55 15.85 GRP 6 \$ 30.87 15.85 GRP 8 \$ 27.74 15.85

POWER EQUIPMENT OPERATOR CLASSIFICATIONS:

GRP 1: Truck & Crawler Crane with 200' of Boom & over, including Jib (\$50 premium with 300' of Boom & over, including jib); & Tower Crane 250' & over.

GRP 2: Truck & Crawler Crane with 150' of Boom, up to but not including 200' of Boom, including Jib; & Tower Crane 200' & over.

GRP 3: Traveling Tower Crane; Truck & Crawler Crane, up to but not including 150' of Boom, including Jib; Tower Crane (Stationary) up to 200'; All-Terrain Vehicle Crane, Boom Truck over 100 ft.

GRP 4: Backhoe/Track/Trackhoe, Hoist (3 drums or more); Overhead Crane (inside building perimeter), Excavator.

GRP 5: Asphalt Spreader, Bulldozer, Curb Machine, Drill, Forklift, Compressor 450 CFM or over (2 or more machines); Boom Truck up to 100 ft, Loader over 1 cu yd, Hoist (1 or 2 drums); Mechanic; Milling Machine, Roller, Scraper, Tractor over D2.

GRP 6: Bobcat/Skid Loader, Loader up to 1 cu. yd., Tractor D2 or similar size.

GRP 7: Compressor 600 CFM or over, Crane Oiler.

GRP 8: Oiler.

IRON0512-018 10/01/2011 **IRONWORKER, REINFORCING, ORNAMENTAL, & STRUCTURAL** Rates Fringe
 \$ 29.14 20.37

LABO1091-011 01/01/2011 **LABORER (ASBESTOS ABATEMENT)** Removal from Floors, Walls & Ceilings Rates Fringe
 \$ 29.67 12.79

LABO1091-013 05/01/2011 **ST. LOUIS** (south of T 55 N)

LABORERS:

GRP 1 \$ 23.55 12.64 GRP 2 \$ 23.70 12.64 GRP 3 \$ 23.95 12.64 GRP 4 \$ 24.25 12.64

LABORER CLASSIFICATIONS:

GRP 1: Common or General, Asphalt Shoveler, Carpenter Tender, Form Stripping

GRP 2: Vibrating Plate

GRP 3: Pipelayer

GRP 4: Mason Tender (Brick, Cement/Concrete)

LABO1097-008 05/01/2011 ST. LOUIS (north of T 55N) **LABORER** GRP 1 \$ 22.91 13.32 GRP 2 \$ 23.31 13.32 **LABORERS CLASSIFICATIONS:**

GRP 1 - Common or General, Asphalt Shoveler, Carpenter Tender, Form Stripping, Mason Tender (Brick, Cement/Concrete)

GRP 2 - Pipelayer, Vibrating Plate

PAIN0106-001 05/01/2011 **GLAZIER** \$ 24.93 15.07 FOOTNOTE: 1 to 4 yrs service - 1 wk pd vac; 5 to 11 years - 2 wks pd vac; 11 yrs or more - 3 wks pd vac

PAIN0106-013 05/01/2011 Rates Fringe
PAINTERS: **NEW:** Brush, Roller \$ 27.31 14.67 **Spray, Drywall Finisher/Taper** Rates Fringe
REPAINT: Brush, Roller \$ 25.81 14.67 **Spray, Drywall Finisher/Taper** \$ 27.91 14.67
 \$ 26.41 14.67

PLAS0633-024 07/11/2011 ST. LOUIS Co (north of White Face River) **CEMENT MASON/CONCRETE FINISHER** Rates Fringe
 \$ 25.71 14.34

PLAS0633-059 05/01/2011 CARLTON & **ST. LOUIS** Cos (south of T 55N) **CEMENT MASON/CONCRETE FINISHER** \$ 29.24 16.25

PLUM0011-019 05/09/2011 **ST. LOUIS** (south of an east-west line drawn through Cotton) **PLUMBER/PIPEFITTER** \$ 35.52 16.23

PLUM0589-007 05/01/2011 ST. LOUIS (north of an East- West line drawn through Cotton) **PLUMBER/PIPEFITTER** \$ 33.36 18.55

ROOF0096-024 07/05/2010 **ST. LOUIS** (south of Hwy 16, excluding City of Forbes) **ROOFER** \$ 29.20 13.62

ROOF0096-025 05/01/2011 ST. LOUIS (remaining northern two-thirds) **ROOFER** \$ 26.50 10.32

SHEE0010-045 05/01/2009 **ST. LOUIS** (southern one-third) **SHEET METAL WORKER** (including HVAC Duct Installation) Rates Fringe
 \$ 31.61 16.52

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SUMN2009-050 07/27/2009 Rates Fringe
LABORER: Landscape \$ 12.88 4.61
TRUCK DRIVER: Dump Truck \$ 19.15 5.70

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers: An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example. Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rate.

Non-Union Identifiers: Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be: * an existing published wage determination, *a survey underlying a wage determination, *a Wage and Hour Division letter setting forth a position on a wage determination matter, *a conformance (additional classification and rate) ruling.

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to: Branch of Construction Wage Determinations, Wage and Hour Division, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to: Wage and Hour Administrator, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, DC 20210.

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to: Administrative Review Board, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

General Decision Number: **MN120001 01/06/2012** MN1

Superseded General Decision Number: MN20100007

State: Minnesota

Construction Type: **Highway**Counties: Carlton, Cook, Itasca, Koochiching, Lake, Pine, & **St Louis** Cos in Minnesota.**HIGHWAY CONSTRUCTION PROJECTS**Mod Nbr Pub Date
0 01/06/2012

* SUMN2010-001 10/31/2011

	<u>Rate</u>	<u>Fringe</u>
BRICKLAYER	\$ 28.58	20.66

CARPENTER	\$ 29.72	17.15
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	<u>Rate</u>	<u>Fringe</u>
CEMENT MASON/CONCRETE FINISHER	\$ 31.83	16.25

	<u>Rate</u>	<u>Fringe</u>
ELECTRICIAN		
Electrician	\$ 30.51	22.49
Ground Person	\$ 23.33	14.83
Lineman	\$ 34.82	14.82
Wiring System Installer	\$ 22.46	10.61
Wiring System Technician	\$ 32.09	12.39

IRONWORKER	\$ 29.66	19.90
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	<u>Rate</u>	<u>Fringe</u>
LABORER :		
Blaster	\$ 29.14	15.08
Common or General	\$ 26.14	15.08
Flag Person	\$ 26.14	15.08
Landscape	\$ 17.19	11.59
Skilled	\$ 26.14	15.08
Underground & Open Ditch (8 ft below grade)	\$ 26.84	15.08

MILLWRIGHT	\$ 30.12	14.65
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	<u>Rate</u>	<u>Fringe</u>		<u>Rate</u>	<u>Fringe</u>		<u>Rate</u>	<u>Fringe</u>		<u>Rate</u>	<u>Fringe</u>
OPERATOR:											
GRP 2	\$ 31.82	16.60	GRP 3	\$ 31.27	16.60	GRP 4	\$ 30.97	16.60	GRP 5	\$ 27.93	16.60
Specialty Equipment Articulated Hauler	\$ 30.97	16.60									
Boom Truck	\$ 30.97	16.60									
Off-Road Truck	\$ 30.97	16.60									

OPERATING ENGINEER CLASSIFICATIONS:

GRP 2: Helicopter Pilot; Concrete Pump; Cranes over 135 ft boom excluding jib; Dragline, Crawler, Hydraulic Backhoe and other similar equipment with shovel-type controls including attachments 3 cu yd & over; Grader or Motor Patrol; Pile Driving

GRP 3: Asphalt Bituminous Stabilizer Plant; Cableway; Concrete Mixer, Stationary Plant; Derrick (guy or stiff leg)(power)(skids or stationary); Dragline, Crawler, Hydraulic Backhoe and other similar equipment with shovel-type controls including attachments up to 3 cu yd; Dredge or Engineers Dredge (Power); Front end loader 5 cu yd & over including attachments; Locomotive Crane Operator; Mixer (paving) concrete paving, Road Mole including Mucking operations, Conway or similar type; Mechanic, Welder; Tractor, Boom type. Tandem Scraper; Truck Crane, Crawler Crane; Tugboat 100 H.P. & over.

GRP 4: Air Track Rock Drill; Automatic Road Machine CMI or similar; Backfiller; Concrete Batch Plant; Bituminous Roller Rubber Tire or Steel Drum 8 tons & over; \ bituminous Spreader & Finishing Machine (power), including pavers, Macro Surfacing & Micro Surfacing or similar types (Operator & Screed person); Brokk or RTC remote control or similar type with attachments; Cat Challenger Tractor or similar types pulling Rock Wagons; Bulldozer & Scraper; Chip Harvester & Tree Cutter; Concrete Distributor & Spreader Finishing Machine, Longitudinal Float, Joint Machine, Spray Machine; Concrete Mixer on jobsite; Concrete Mixer; Crushing Plant (gravel, stone) or Gravel Washing, Crushing & Screening Plant; Curb Machine; Directional Boring Machine; Drill Rigs, Heavy Rotary or Churn or Cable Drill; Dual Tractor; Elevating Grader; Fork Lift; Front End, Skid Steer 1 to 5 cu yd; GPS Remote Operating of equipment; Hoist Engineer (power); Hydraulic Tree Planter; Locomotive; Milling, Grinding, Planing, Fine Grade, or Trimmer Machine; Multiple Machines such as Air Compressors, Welding Machines, Generators, Pumps; Pavement Breaker or Tamping Machine, Mighty Mite or similar type; Pickup Sweeper 1 cu yd & over hopper capacity; Horizontal Boring Machine power actuated over 6 inches; Pugmill; Pumpcrete; Rubber Tired Farm Tractor with Backhoe attachment; Scraper; Self-Propelled Soil Stabilizer; Slip Form (power driven) paving; Tractor, Bulldozer; Wheel type Tractor over 50 hp with PTO; Trenching Machine excludes walk behind Trencher; Tub Grinder, Morbark or similar type; Well Point installation or Dismantling.

GRP 5: Air Compressor 600 cfm or over; Bituminous Roller under 8 tons; Concrete Saw multiple blade; Form Trench Digger (power); Front End Skid Steer up to 1 cu yd; Gunite, Gunall; Hydraulic Log Splitter; Loader, Barber Greene or similar; Post Hole Driving Machine/Post Hole Auger; Power Actuated Auger & Boring Machine; Power Actuated Jack; Pump; Self-Propelled Chip Spreader (Flaherty or similar); Sheep Foot Compactor with blade 200 hp & over; Shouldering Machine (Power) APSCO or similar type including self-propelled Sand and Chip Spreader; Stump Chipper and Tree Chipper; Tree Farmer (Machine).

GRP 6: Cat, Challenger or similar tractor when pulling Disk or Roller; Conveyor; Dredge Deck Hand; Fire Person or Tank Car Heater; Gravel Screening Plant (portable, not crushing or washing); Greaser (tractor); Lever Person; Oiler (Power Shovel, Truck Crane, Dragline, Crusher and Milling Machine; Power Sweeper; Sheep Foot Roller & Rollers on Gravel Compaction including vibrating rollers; Wheel type Tractor over 50 hp.

	<u>Rate</u>	<u>Fringe</u>
PAINTER (including Pavement Marking)	\$ 27.31	14.59

PILEDRIVERMAN	\$ 29.72	17.15
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	<u>Rate</u>	<u>Fringe</u>		<u>Rate</u>	<u>Fringe</u>		<u>Rate</u>	<u>Fringe</u>		<u>Rate</u>	<u>Fringe</u>
TRUCK DRIVER:											
GRP 1	\$ 26.70	13.65	GRP 2	\$ 26.15	13.65	GRP 3	\$ 26.05	13.65	GRP 4	\$ 25.80	13.65

TRUCK DRIVER CLASSIFICATIONS:

GRP 1: Mechanic, Welder; Tractor Trailer; Truck hauling machinery including operation of hand and power operated winches.

GRP 2: Four or more axle unit straight body truck.

GRP 3: Bituminous Distributor driver; Bituminous Distributor (one person operation); Three Axle units.

GRP 4: Bituminous Distributor Spray operator (rear and oiler); Dump Person; Greaser; Pilot Car; Rubber Tire self-propelled Packer under 8 tons; Two Axle unit; Slurry Operator; Tank Truck Tender (gas, road oil, water); Tractor under 50 hp.

	<u>Rate</u>	<u>Fringe</u>
Tunnel Miner	\$ 26.34	14.58

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers: An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing

the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example. Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rate. Non-Union Identifiers: Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date. Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be: * an existing published wage determination; * a survey underlying a wage determination; * a Wage and Hour Division letter setting forth a position on a wage determination matter; * a conformance (additional classification and rate) ruling. On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to: Branch of Construction Wage Determinations, Wage and Hour Division, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to: Wage and Hour Administrator, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, DC 20210 The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to: Administrative Review Board, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

===== END OF GENERAL DECISION

Construction Type: **Heavy**

County: St Louis County in Minnesota.

HEAVY CONSTRUCTION PROJECTSMod Nbr Pub Date
0 01/06/2012

	<u>Rate</u>	<u>Fringe</u>
BOIL0647-004 07/01/2009 BOILERMAKER	\$ 33.84	18.53

	<u>Rate</u>	<u>Fringe</u>
* CARP0361-020 07/11/2011 ST LOUIS Co (southern 1/3 including Cotton, Floodwood, Fond Du Lac, and Proctor) CARPENTER (including Form Work	\$ 31.07	15.80

	<u>Rate</u>	<u>Fringe</u>
* CARP0361-021 07/11/2011 ST LOUIS (Duluth) CARPENTER (including Form Work	\$ 31.47	15.80

CARP0606-010 05/01/2009 ST LOUIS Co (northeast 2/3 including Cook, Cusson, Ely; and western part including Chisholm, Greaney, and Orr)
CARPENTER (including Form Work) \$ 30.12 14.65

	<u>Rate</u>	<u>Fringe</u>
ELEC0242-012 05/29/2011 ST LOUIS (south part bounded on the north by the north line of Kelsey Township extended east & west) ELECTRICIAN	\$ 30.39	22.90

	<u>Rate</u>	<u>Fringe</u>
ELEC0294-006 05/29/2011 ST LOUIS (north part bounded on the south by the south line of Ellsburg Township, extended east & west) ELECTRICIAN	\$ 33.38	73.6%

ENGI0049-064 05/01/2011
OPERATOR: Power Equipment

Grp 2 \$ 31.82 16.60 Grp 3 \$ 31.27 16.60 Grp 4 \$ 30.97 16.60 Grp 5 \$ 27.93 16.60 Grp 6 \$ 26.72 16.60

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GRP 2: Crane with over 135' Boom, excluding jib; Dragline & Hydraulic Backhoe with shovel-type controls, 3 cubic yards and over; Grader/Blade finishing earthwork and bituminous.

GRP 3: Dragline & Hydraulic Backhoe with shovel-type controls up to 3 cubic yards; Loader 5 cu yd and over; Mechanic; Tandem Scraper; Truck Crane; Crawler Crane

GRP 4: Bituminous Roller 8 tons & over; Crusher/Crushing Plant; Drill Rig; Elevating Grader; Loader over 1 cu yd; Grader; Pump; Scraper up; to 32 cu yd; Farm Tractor with Backhoe attachment; Skid Steer Loader over 1 cu yd with Backhoe attachment; Bulldozer over 50 hp.

GRP 5: Bituminous Roller under 8 tons; Bituminous Rubber Tire Roller; Loader up to 1 cu yd; Bulldozer 50 hp or less.

GRP 6: Oilier; Self-Propelled Vibrating Packer 35 hp and over.

CRANE OVER 135' BOOM, EXCLUDING JIB - \$.25 PREMIUM; CRANE OVER 200' BOOM, EXCLUDING JIB - \$.50 PREMIUM

UNDERGROUND WORK: TUNNELS, SHAFTS, ETC. - \$.25 PREMIUM UNDER AIR PRESSURE - \$.50 PREMIUM

HAZARDOUS WASTE PROJECTS (PPE Required): LEVEL A - \$1.25 PREMIUM LEVEL B - \$.90 PREMIUM LEVEL C - \$.60 PREMIUM

	<u>Rate</u>	<u>Fringe</u>
IRON0512-028 10/01/2011 IRONWORKER, STRUCTURAL & REINFORCING	\$ 29.14	20.37

	<u>Rate</u>	<u>Fringe</u>
LABO0132-038 05/01/2009 LABORER Common or General (Natural Gas Pipeline only)	\$ 16.70	10.49

	<u>Rate</u>	<u>Fringe</u>	<u>Rate</u>	<u>Fringe</u>
LABO0563-034 05/01/2011 ST LOUIS Co (south of T. 55 N)				
LABORERS: (1) Common or General	\$ 27.64	12.94	(2) Mason Tender Cement/Concrete	\$ 27.84 12.94
			(6) Pipe Layer	\$ 29.64 12.94

LABO0563-035 05/01/2011 ST LOUIS (north of T. 55 N)

LABORERS: (1) Common or General \$ 26.64 13.94 (2) Mason Tender Cement/Concrete \$ 26.84 13.94 (6) Pipe Layer \$ 28.64 13.94

	<u>Rate</u>	<u>Fringe</u>
PLAS0633-036 05/01/2008 ST LOUIS Co (north of T 55N) CEMENT MASON/CONCRETE FINISHER	\$ 25.40	12.45

	<u>Rate</u>	<u>Fringe</u>
PLAS0633-039 05/01/2011 ST LOUIS Co (south of T 55N) CEMENT MASON/CONCRETE FINISHER	\$ 31.83	16.25

	<u>Rate</u>	<u>Fringe</u>
SUMN2009-072 09/28/2009 LABORER: Landscape	\$ 12.88	4.61

TEAM0160-018 05/01/2010

TRUCK DRIVER (DUMP)

	<u>Rate</u>	<u>Fringe</u>
(1) Articulated Dump Truck	\$ 26.60	13.15
(2) 3 Axles/4 Axles; 5 Axles receive \$0.30 add'l per hr	\$ 26.05	13.15
(3) Tandem Axles; & Single Axles	\$ 25.95	13.15

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers: An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable; i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example. Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rate.

Non-Union Identifiers: Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date. Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be: * an existing published wage determination; * a survey underlying a wage determination; * a Wage and Hour Division letter setting forth a position on a wage determination matter; * a conformance (additional classification and rate) ruling. On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to: Branch of Construction Wage Determinations, Wage and Hour Division, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to: Wage and Hour Administrator, U.S. Department of Labor, 200 Constitution Avenue, N.W.,

Washington, DC 20210 The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to: Administrative Review Board, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

===== END OF GENERAL DECISION

**MINNESOTA DEPARTMENT OF LABOR AND INDUSTRY PREVAILING WAGES FOR STATE
FUNDED CONSTRUCTION PROJECTS**



THIS NOTICE MUST BE POSTED ON THE JOBSITE IN A CONSPICUOUS PLACE

Construction Type: Highway and Heavy

Region Number: 01

Counties within region:

- CARLTON-09
- COOK-16
- ITASCA-31
- KOOCHICHING-36
- LAKE-38
- PINE-58
- ST. LOUIS-69

Effective: 2011-10-31

This project is covered by Minnesota prevailing wage statutes. Wage rates listed below are the minimum hourly rates to be paid on this project.

All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at a rate of one and one half (1 1/2) times the basic hourly rate.

Violations should be reported to:

Department of Transportation
Office of Construction
Transportation Building MS650
John Ireland Blvd
St. Paul, MN 55155
(651) 366-4209

Refer questions concerning the prevailing wage rates to:

Department of Labor and Industry
Prevailing Wage Section
443 Lafayette Road N
St Paul, MN 55155
(651) 284-5091
DLI.PrevWage@state.mn.us

LABOR CODE AND CLASS

	EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
101 LABORER, COMMON (GENERAL LABOR WORK)	2011-10-31	26.14	15.08	41.22
	2012-05-01	26.14	15.33	41.47
102 LABORER, SKILLED (ASSISTING SKILLED CRAFT JOURNEYMAN)	2011-10-31	26.14	15.08	41.22
	2012-05-01	26.14	15.33	41.47
103 LABORER, LANDSCAPING (GARDENER, SOD LAYER AND NURSERY OPERATOR)	2011-10-31	17.19	11.59	28.78
	2012-05-01	17.44	12.09	29.53
104 FLAG PERSON	2011-10-31	26.14	15.08	41.22
	2012-05-01	26.14	15.33	41.47
105 WATCH PERSON	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PREVWAGE@STATE.MN.US</u>			
106 BLASTER	2011-10-31	29.14	15.08	44.22
	2012-05-01	29.14	15.33	44.47
107 PIPELAYER (WATER, SEWER AND GAS)	2011-10-31	28.14	15.08	43.22
	2012-05-01	28.14	15.33	43.47
108 TUNNEL MINER	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PREVWAGE@STATE.MN.US</u>			
109 UNDERGROUND AND OPEN DITCH LABORER (EIGHT FEET BELOW STARTING GRADE LEVEL)	2011-10-31	26.84	15.08	41.92
	2012-05-01	26.84	15.33	42.17
110 SURVEY FIELD TECHNICIAN (OPERATE TOTAL STATION, GPS RECEIVER, LEVEL, ROD OR RANGE POLES, STEEL TAPE MEASUREMENT; MARK AND DRIVE STAKES; HAND OR POWER DIGGING FOR AND IDENTIFICATION OF MARKERS OR MONUMENTS;	2011-10-31	26.14	15.08	41.22

PERFORM AND CHECK CALCULATIONS; REVIEW AND UNDERSTAND CONSTRUCTION PLANS AND LAND SURVEY MATERIALS). THIS CLASSIFICATION DOES NOT APPLY TO THE WORK PERFORMED ON A PREVAILING WAGE PROJECT BY A LAND SURVEYOR WHO IS LICENSED PURSUANT TO MINNESOTA STATUTES, SECTIONS 326.02 TO 326.15.

		2012-05-01	26.14	15.33	41.47
111	TRAFFIC CONTROL PERSON (TEMPORARY SIGNAGE)	2011-10-31	26.14	15.08	41.22
		2012-05-01	26.14	15.33	41.47
112	QUALITY CONTROL TESTER (FIELD AND COVERED OFF-SITE FACILITIES; TESTING OF AGGREGATE, ASPHALT, AND CONCRETE MATERIALS); LIMITED TO MN DOT HIGHWAY AND HEAVY CONSTRUCTION PROJECTS WHERE THE MN DOT HAS RETAINED QUALITY ASSURANCE PROFESSIONALS TO REVIEW AND INTERPRET THE RESULTS OF QUALITY CONTROL TESTERS. SERVICES PROVIDED BY THE CONTRACTOR.	2011-10-31	21.40	13.51	34.91
201	ARTICULATED HAULER	2011-10-31	30.97	16.60	47.57
		2012-05-01	31.12	16.70	47.82
202	BOOM TRUCK	2011-10-31	30.97	16.60	47.57
		2012-05-01	31.12	16.70	47.82
203	LANDSCAPING EQUIPMENT, INCLUDES HYDRO SEEDER OR MULCHER, SOD ROLLER, FARM TRACTOR WITH ATTACHMENT SPECIFICALLY SEEDING, SODDING, OR PLANT, AND TWO-FRAMED FORKLIFT (EXCLUDING FRONT, POSIT-TRACK, AND SKID STEER LOADERS), NO EARTHWORK OR GRADING FOR ELEVATIONS	2011-10-31	17.19	11.59	28.78
		2012-05-01	17.44	12.09	29.53
204	OFF-ROAD TRUCK	2011-10-31	30.97	16.60	47.57
		2012-05-01	31.12	16.70	47.82
GROUP 2		2011-10-31	31.82	16.60	48.42

	2012-05-01	31.97	16.70	48.67
302	HELICOPTER PILOT (HIGHWAY AND HEAVY ONLY)			
303	CONCRETE PUMP (HIGHWAY AND HEAVY ONLY)			
304	ALL CRANES WITH OVER 135-FOOT BOOM, EXCLUDING JIB (HIGHWAY AND HEAVY ONLY)			
305	DRAGLINE, CRAWLER, HYDRAULIC BACKHOE (TRACK OR WHEEL MOUNTED) AND/OR OTHER SIMILAR EQUIPMENT WITH SHOVEL-TYPE CONTROLS THREE CUBIC YARDS AND OVER MANUFACTURER.S RATED CAPACITY INCLUDING ALL ATTACHMENTS. (HIGHWAY AND HEAVY ONLY)			
306	GRADER OR MOTOR PATROL			
307	PILE DRIVING (HIGHWAY AND HEAVY ONLY)			
308	TUGBOAT 100 H.P. AND OVER WHEN LICENSE REQUIRED (HIGHWAY AND HEAVY ONLY)			
GROUP 3	2011-10-31	31.27	16.60	47.87
	2012-05-01	31.42	16.70	48.12
309	ASPHALT BITUMINOUS STABILIZER PLANT			
310	CABLEWAY			
311	CONCRETE MIXER, STATIONARY PLANT (HIGHWAY AND HEAVY ONLY)			
312	DERRICK (GUY OR STIFFLEG)(POWER)(SKIDS OR STATIONARY) (HIGHWAY AND HEAVY ONLY)			
313	DRAGLINE, CRAWLER, HYDRAULIC BACKHOE (TRACK OR WHEEL MOUNTED) AND/OR SIMILAR EQUIPMENT WITH SHOVEL-TYPE CONTROLS, UP TO THREE CUBIC YARDS MANUFACTURER.S RATED CAPACITY INCLUDING ALL ATTACHMENTS (HIGHWAY AND HEAVY ONLY)			
314	DREDGE OR ENGINEERS, DREDGE (POWER) AND ENGINEER			
315	FRONT END LOADER, FIVE CUBIC YARDS AND OVER INCLUDING ATTACHMENTS. (HIGHWAY AND HEAVY ONLY)			
316	LOCOMOTIVE CRANE OPERATOR			
317	MIXER (PAVING) CONCRETE PAVING, ROAD MOLE, INCLUDING MUCKING OPERATIONS, CONWAY OR SIMILAR TYPE			
318	MECHANIC . WELDER ON POWER EQUIPMENT (HIGHWAY AND HEAVY ONLY)			
319	TRACTOR . BOOM TYPE (HIGHWAY AND HEAVY ONLY)			
320	TANDEM SCRAPER			
321	TRUCK CRANE . CRAWLER CRANE (HIGHWAY AND HEAVY ONLY)			
322	TUGBOAT 100 H.P AND OVER (HIGHWAY AND HEAVY ONLY)			
GROUP 4	2011-10-31	30.97	16.60	47.57
	2012-05-01	31.12	16.70	47.82
323	AIR TRACK ROCK DRILL			
324	AUTOMATIC ROAD MACHINE (CMI OR SIMILAR) (HIGHWAY AND HEAVY ONLY)			

- 325 BACKFILLER OPERATOR
- 326 CONCRETE BATCH PLANT OPERATOR (HIGHWAY AND HEAVY ONLY)
- 327 BITUMINOUS ROLLERS, RUBBER TIRED OR STEEL DRUMMED (EIGHT TONS AND OVER)
- 328 BITUMINOUS SPREADER AND FINISHING MACHINES (POWER), INCLUDING PAVERS, MACRO SURFACING AND MICRO SURFACING, OR SIMILAR TYPES (OPERATOR AND SCREED PERSON)
- 329 BROKK OR R.T.C. REMOTE CONTROL OR SIMILAR TYPE WITH ALL ATTACHMENTS
- 330 CAT CHALLENGER TRACTORS OR SIMILAR TYPES PULLING ROCK WAGONS, BULLDOZERS AND SCRAPERS
- 331 CHIP HARVESTER AND TREE CUTTER
- 332 CONCRETE DISTRIBUTOR AND SPREADER FINISHING MACHINE, LONGITUDINAL FLOAT, JOINT MACHINE, AND SPRAY MACHINE
- 333 CONCRETE MIXER ON JOBSITE (HIGHWAY AND HEAVY ONLY)
- 334 CONCRETE MOBIL (HIGHWAY AND HEAVY ONLY)
- 335 CRUSHING PLANT (GRAVEL AND STONE) OR GRAVEL WASHING, CRUSHING AND SCREENING PLANT
- 336 CURB MACHINE
- 337 DIRECTIONAL BORING MACHINE
- 338 DOPE MACHINE (PIPELINE)
- 339 DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL (HIGHWAY AND HEAVY ONLY)
- 340 DUAL TRACTOR
- 341 ELEVATING GRADER
- 342 FORK LIFT OR STRADDLE CARRIER (HIGHWAY AND HEAVY ONLY)
- 343 FORK LIFT OR LUMBER STACKER (HIGHWAY AND HEAVY ONLY)
- 344 FRONT END, SKID STEER OVER 1 TO 5 C YD
- 345 GPS REMOTE OPERATING OF EQUIPMENT
- 346 HOIST ENGINEER (POWER) (HIGHWAY AND HEAVY ONLY)
- 347 HYDRAULIC TREE PLANTER
- 348 LAUNCHER PERSON (TANKER PERSON OR PILOT LICENSE)
- 349 LOCOMOTIVE (HIGHWAY AND HEAVY ONLY)
- 350 MILLING, GRINDING, PLANNING, FINE GRADE, OR TRIMMER MACHINE
- 351 MULTIPLE MACHINES, SUCH AS AIR COMPRESSORS, WELDING MACHINES, GENERATORS, PUMPS (HIGHWAY AND HEAVY ONLY)
- 352 PAVEMENT BREAKER OR TAMPING MACHINE (POWER DRIVEN) MIGHTY MITE OR SIMILAR TYPE
- 353 PICKUP SWEEPER, ONE CUBIC YARD AND OVER HOPPER CAPACITY(HIGHWAY AND HEAVY ONLY)
- 354 PIPELINE WRAPPING, CLEANING OR BENDING MACHINE
- 355 POWER PLANT ENGINEER, 100 KWH AND OVER (HIGHWAY AND HEAVY ONLY)

356 POWER ACTUATED HORIZONTAL BORING MACHINE, OVER SIX INCHES
 357 PUGMILL
 358 PUMPCRETE (HIGHWAY AND HEAVY ONLY)
 359 RUBBER-TIRED FARM TRACTOR WITH BACKHOE INCLUDING ATTACHMENTS (HIGHWAY AND HEAVY ONLY)
 360 SCRAPER
 361 SELF-PROPELLED SOIL STABILIZER
 362 SLIP FORM (POWER DRIVEN) (PAVING)
 363 TIE TAMPER AND BALLAST MACHINE
 364 TRACTOR, BULLDOZER (HIGHWAY AND HEAVY ONLY)
 365 TRACTOR, WHEEL TYPE, OVER 50 H.P. WITH PTO UNRELATED TO LANDSCAPING (HIGHWAY AND HEAVY ONLY)
 366 TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER (HIGHWAY AND HEAVY ONLY)
 367 TUB GRINDER, MORBARK, OR SIMILAR TYPE
 368 WELL POINT DISMANTLING OR INSTALLATION (HIGHWAY AND HEAVY ONLY)

GROUP 5	2011-10-31	27.93	16.60	44.53
	2012-05-01	28.08	16.70	44.78

369 AIR COMPRESSOR, 600 CFM OR OVER (HIGHWAY AND HEAVY ONLY)
 370 BITUMINOUS ROLLER (UNDER EIGHT TONS)
 371 CONCRETE SAW (MULTIPLE BLADE) (POWER OPERATED)
 372 FORM TRENCH DIGGER (POWER)
 373 FRONT END, SKID STEER UP TO 1C YD
 374 GUNITE GUNALL (HIGHWAY AND HEAVY ONLY)
 375 HYDRAULIC LOG SPLITTER
 376 LOADER (BARBER GREENE OR SIMILAR TYPE)
 377 POST HOLE DRIVING MACHINE/POST HOLE AUGER
 378 POWER ACTUATED AUGER AND BORING MACHINE
 379 POWER ACTUATED JACK
 380 PUMP (HIGHWAY AND HEAVY ONLY)
 381 SELF-PROPELLED CHIP SPREADER (FLAHERTY OR SIMILAR)
 382 SHEEP FOOT COMPACTOR WITH BLADE . 200 H.P. AND OVER
 383 SHOULDERING MACHINE (POWER) APSCO OR SIMILAR TYPE INCLUDING SELF-PROPELLED SAND AND CHIP SPREADER
 384 STUMP CHIPPER AND TREE CHIPPER
 385 TREE FARMER (MACHINE)

GROUP 6	2011-10-31	26.72	16.60	43.32
	2012-05-01	26.87	16.70	43.57
387	CAT, CHALLENGER, OR SIMILAR TYPE OF TRACTORS, WHEN PULLING DISK OR ROLLER			
388	CONVEYOR (HIGHWAY AND HEAVY ONLY)			
389	DREDGE DECK HAND			
390	FIRE PERSON OR TANK CAR HEATER (HIGHWAY AND HEAVY ONLY)			
391	GRAVEL SCREENING PLANT (PORTABLE NOT CRUSHING OR WASHING)			
392	GREASER (TRACTOR) (HIGHWAY AND HEAVY ONLY)			
393	LEVER PERSON			
394	OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS, AND MILLING MACHINES, OR OTHER SIMILAR HEAVY EQUIPMENT) (HIGHWAY AND HEAVY ONLY)			
395	POWER SWEEPER			
396	SHEEP FOOT ROLLER AND ROLLERS ON GRAVEL COMPACTION, INCLUDING VIBRATING ROLLERS			
397	TRACTOR, WHEEL TYPE, OVER 50 H.P., UNRELATED TO LANDSCAPING			

GROUP 1	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVIEWWAGE@STATE.MN.US			
501	HELICOPTER PILOT (COMMERCIAL CONSTRUCTION ONLY)			
502	TOWER CRANE 250 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)			
503	TRUCK CRAWLER CRANE WITH 200 FEET OF BOOM AND OVER, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)			

GROUP 2	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVIEWWAGE@STATE.MN.US			
504	CONCRETE PUMP WITH 50 METERS/164 FEET OF BOOM AND OVER (COMMERCIAL CONSTRUCTION ONLY)			
505	PILE DRIVING WHEN THREE DRUMS IN USE (COMMERCIAL CONSTRUCTION ONLY)			
506	TOWER CRANE 200 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)			
507	TRUCK OR CRAWLER CRANE WITH 150 FEET OF BOOM UP TO AND NOT INCLUDING 200 FEET, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)			

GROUP 3	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVIEWWAGE@STATE.MN.US			
508	ALL-TERRAIN VEHICLE CRANES (COMMERCIAL CONSTRUCTION ONLY)			

- 509 CONCRETE PUMP 32-49 METERS/102-164 FEET (COMMERCIAL CONSTRUCTION ONLY)
- 510 DERRICK (GUY & STIFFLEG) (COMMERCIAL CONSTRUCTION ONLY)
- 511 STATIONARY TOWER CRANE 200 FEET AND OVER MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)
- 512 SELF-ERECTING TOWER CRANE 100 FEET AND OVER MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)
- 513 TRAVELING TOWER CRANE (COMMERCIAL CONSTRUCTION ONLY)
- 514 TRUCK OR CRAWLER CRANE UP TO AND NOT INCLUDING 150 FEET OF BOOM, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)

GROUP 4

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVIEW@STATE.MN.US

- 515 CRAWLER BACKHOE INCLUDING ATTACHMENTS (COMMERCIAL CONSTRUCTION ONLY)
- 516 FIREPERSON, CHIEF BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)
- 517 HOIST ENGINEER (THREE DRUMS OR MORE) (COMMERCIAL CONSTRUCTION ONLY)
- 518 LOCOMOTIVE (COMMERCIAL CONSTRUCTION ONLY)
- 519 OVERHEAD CRANE (INSIDE BUILDING PERIMETER) (COMMERCIAL CONSTRUCTION ONLY)
- 520 TRACTOR . BOOM TYPE (COMMERCIAL CONSTRUCTION ONLY)

GROUP 5

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVIEW@STATE.MN.US

- 521 AIR COMPRESSOR 450 CFM OR OVER (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)
- 522 CONCRETE MIXER (COMMERCIAL CONSTRUCTION ONLY)
- 523 CONCRETE PUMP UP TO 31 METERS/101 FEET OF BOOM
- 524 DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL WHEN USED FOR CAISSON FOR ELEVATOR OR BUILDING CONSTRUCTION (COMMERCIAL CONSTRUCTION ONLY)
- 525 FORKLIFT (COMMERCIAL CONSTRUCTION ONLY)
- 526 FRONT END, SKID STEER 1 C YD AND OVER
- 527 HOIST ENGINEER (ONE OR TWO DRUMS) (COMMERCIAL CONSTRUCTION ONLY)
- 528 MECHANIC-WELDER (ON POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)
- 529 POWER PLANT (100 KW AND OVER OR MULTIPLES EQUAL TO 100KW AND OVER) (COMMERCIAL CONSTRUCTION ONLY)
- 530 PUMP OPERATOR AND/OR CONVEYOR (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)
- 531 SELF-ERECTING TOWER CRANE UNDER 100 FEET MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)
- 532 STRADDLE CARRIER (COMMERCIAL CONSTRUCTION ONLY)

533 TRACTOR OVER D2 (COMMERCIAL CONSTRUCTION ONLY)

534 WELL POINT PUMP (COMMERCIAL CONSTRUCTION ONLY)

GROUP 6

FOR RATE CALL 651-284-5091 OR
EMAIL

DLI.PREVWAGE@STATE.MN.US

535 CONCRETE BATCH PLANT (COMMERCIAL CONSTRUCTION ONLY)

536 FIREPERSON, FIRST CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)

537 FRONT END, SKID STEER UP TO 1 C YD

538 GUNITE MACHINE (COMMERCIAL CONSTRUCTION ONLY)

539 TRACTOR OPERATOR D2 OR SIMILAR SIZE (COMMERCIAL CONSTRUCTION ONLY)

540 TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER

GROUP 7

FOR RATE CALL 651-284-5091 OR
EMAIL

DLI.PREVWAGE@STATE.MN.US

541 AIR COMPRESSOR 600 CFM OR OVER (COMMERCIAL CONSTRUCTION ONLY)

542 BRAKEPERSON (COMMERCIAL CONSTRUCTION ONLY)

543 CONCRETE PUMP/PUMPCRETE OR COMPLACO TYPE (COMMERCIAL CONSTRUCTION ONLY)

544 FIREPERSON, TEMPORARY HEAT SECOND CLASS BOILER LICENSE (COMMERCIAL
CONSTRUCTION ONLY)

545 OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS AND MILLING
MACHINES, OR OTHER SIMILAR POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)

546 PICK UP SWEEPER (ONE CUBIC YARD HOPPER CAPACITY) (COMMERCIAL CONSTRUCTION
ONLY)

547 PUMP AND/OR CONVEYOR (COMMERCIAL CONSTRUCTION ONLY)

GROUP 8

FOR RATE CALL 651-284-5091 OR
EMAIL

DLI.PREVWAGE@STATE.MN.US

548 ELEVATOR OPERATOR (COMMERCIAL CONSTRUCTION ONLY)

549 GREASER (COMMERCIAL CONSTRUCTION ONLY)

550 MECHANICAL SPACE HEATER (TEMPORARY HEAT NO BOILER LICENSE REQUIRED)
(COMMERCIAL CONSTRUCTION ONLY)

GROUP 1

2011-10-31 26.70 13.65 40.35

2012-05-01 27.10 13.65 40.75

601 MECHANIC . WELDER

602 TRACTOR TRAILER DRIVER

603 TRUCK DRIVER (HAULING MACHINERY INCLUDING OPERATION OF HAND AND POWER OPERATED WINCHES)

GROUP 2	2011-10-31	26.15	13.65	39.80
	2012-05-01	26.55	13.65	40.20

604 FOUR OR MORE AXLE UNIT, STRAIGHT BODY TRUCK

GROUP 3	2011-10-31	26.05	13.65	39.70
	2012-05-01	26.45	13.65	40.10

605 BITUMINOUS DISTRIBUTOR DRIVER

606 BITUMINOUS DISTRIBUTOR (ONE PERSON OPERATION)

607 THREE AXLE UNITS

GROUP 4	2011-10-31	25.80	13.65	39.45
	2012-05-01	26.20	13.65	39.85

608 BITUMINOUS DISTRIBUTOR SPRAY OPERATOR (REAR AND OILER)

609 DUMP PERSON

610 GREASER

611 PILOT CAR DRIVER

612 RUBBER-TIRED, SELF-PROPELLED PACKER UNDER 8 TONS

613 TWO AXLE UNIT

614 SLURRY OPERATOR

615 TANK TRUCK HELPER (GAS, OIL, ROAD OIL, AND WATER)

616 TRACTOR OPERATOR, UNDER 50 H.P.

701 HEATING AND FROST INSULATORS

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVIEW@STATE.MN.US

702 BOILERMAKERS

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVIEW@STATE.MN.US

703 BRICKLAYERS	2011-10-31	28.58	20.66	49.24
	2011-10-31	29.00	21.24	50.24

704 CARPENTERS	2011-10-31	29.72	17.15	46.87
	2012-05-01	30.22	17.15	47.37

705 CARPET LAYERS (LINOLEUM)	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
706 CEMENT MASONS	2011-10-31	31.83	16.25	48.08
	2012-05-01	33.33	16.25	49.58
707 ELECTRICIANS	2011-10-31	30.51	22.49	53.00
708 ELEVATOR CONSTRUCTORS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
709 GLAZIERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
710 LATHERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
711 GROUND PERSON	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
712 IRONWORKERS	2011-10-31	29.66	19.90	49.56
	2011-10-31	29.14	20.37	49.51
713 LINEMAN	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
714 MILLWRIGHT	2011-10-31	30.12	14.65	44.77
715 PAINTERS (INCLUDING HAND BRUSHED, HAND SPRAYED, AND THE TAPING OF PAVEMENT MARKINGS)	2011-10-31	27.31	14.59	41.90
	2012-05-01	27.91	14.59	42.50

716 PILEDRIVER (INCLUDING VIBRATORY DRIVER OR EXTRACTOR FOR PILING AND SHEETING OPERATIONS)	2011-10-31	29.72	17.15	46.87
717 PIPEFITTERS . STEAMFITTERS	2011-10-31	35.86	16.05	51.91
	2012-05-01	36.61	16.05	52.66
718 PLASTERERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
719 PLUMBERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
720 ROOFER	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
721 SHEET METAL WORKERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
722 SPRINKLER FITTERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
723 TERRAZZO WORKERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
724 TILE SETTERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
725 TILE FINISHERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			
726 DRYWALL TAPER	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PRE VWAGE@STATE.MN.US			

727 WIRING SYSTEM TECHNICIAN	2011-10-31	32.09	12.39	44.48
728 WIRING SYSTEMS INSTALLER	2011-10-31	22.46	10.61	33.07
729 ASBESTOS ABATEMENT WORKER	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			
730 SIGN ERECTOR	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			

**MINNESOTA DEPARTMENT OF LABOR AND INDUSTRY PREVAILING WAGES FOR STATE
FUNDED CONSTRUCTION PROJECTS**



THIS NOTICE MUST BE POSTED ON THE JOBSITE IN A CONSPICUOUS PLACE

Construction Type: Commercial

County Number: 69

County Name: ST. LOUIS

Effective: 2011-12-12

This project is covered by Minnesota prevailing wage statutes. Wage rates listed below are the minimum hourly rates to be paid on this project.

All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at a rate of one and one half (1 1/2) times the basic hourly rate.

Violations should be reported to:

Department of Labor and Industry
Prevailing Wage Section
443 Lafayette Road N
St Paul, MN 55155
(651) 284-5091
DLI.PrevWage@state.mn.us

* Indicates that adjacent county rates were used for the labor class listed.

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
101	LABORER, COMMON (GENERAL LABOR WORK)	2011-12-12	20.62	15.55	36.17
		2012-05-01	20.82	16.05	36.87
102	LABORER, SKILLED (ASSISTING SKILLED CRAFT JOURNEYMAN)	2011-12-12	20.62	15.55	36.17
		2012-05-01	20.82	16.05	36.87
103	LABORER, LANDSCAPING (GARDENER, SOD LAYER AND NURSERY OPERATOR)	2011-12-12	17.19	11.59	28.78

		2012-05-01	17.44	12.09	29.53
104*	FLAG PERSON	2011-12-12	22.00	11.10	33.10
105*	WATCH PERSON	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			
106	BLASTER	2011-12-12	21.32	15.55	36.87
		2012-05-01	21.52	16.05	37.57
107	PIPELAYER (WATER, SEWER AND GAS)	2011-12-12	21.31	12.93	34.24
		2012-05-01	21.31	13.18	34.49
108	TUNNEL MINER	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			
109	UNDERGROUND AND OPEN DITCH LABORER (EIGHT FEET BELOW STARTING GRADE LEVEL)	2011-12-12	20.01	12.93	32.94
		2012-05-01	20.01	13.18	33.19
110	SURVEY FIELD TECHNICIAN (OPERATE TOTAL STATION, GPS RECEIVER, LEVEL, ROD OR RANGE POLES, STEEL TAPE MEASUREMENT; MARK AND DRIVE STAKES; HAND OR POWER DIGGING FOR AND IDENTIFICATION OF MARKERS OR MONUMENTS; PERFORM AND CHECK CALCULATIONS; REVIEW AND UNDERSTAND CONSTRUCTION PLANS AND LAND SURVEY MATERIALS). THIS CLASSIFICATION DOES NOT APPLY TO THE WORK PERFORMED ON A PREVAILING WAGE PROJECT BY A LAND SURVEYOR WHO IS LICENSED PURSUANT TO MINNESOTA STATUTES, SECTIONS 326.02 TO 326.15.	2011-12-12	20.62	15.55	36.17
		2012-05-01	20.82	16.05	36.87
111	TRAFFIC CONTROL PERSON (TEMPORARY SIGNAGE)	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			
112	QUALITY CONTROL TESTER (FIELD AND COVERED OFF-SITE FACILITIES; TESTING OF AGGREGATE,	FOR RATE CALL 651-284-5091 OR EMAIL			

ASPHALT, AND CONCRETE MATERIALS); LIMITED TO MN DOT HIGHWAY AND HEAVY CONSTRUCTION PROJECTS WHERE THE MN DOT HAS RETAINED QUALITY ASSURANCE PROFESSIONALS TO REVIEW AND INTERPRET THE RESULTS OF QUALITY CONTROL TESTERS. SERVICES PROVIDED BY THE CONTRACTOR.

DLI.PRE VWAGE@STATE.MN.US

201*	ARTICULATED HAULER	2011-12-12	30.97	16.60	47.57
		2012-05-01	31.12	16.70	47.82
202	BOOM TRUCK	2011-12-12	32.38	15.85	48.23
		2012-05-01	32.93	15.95	48.88
203	LANDSCAPING EQUIPMENT, INCLUDES HYDRO SEEDER OR MULCHER, SOD ROLLER, FARM TRACTOR WITH ATTACHMENT SPECIFICALLY SEEDING, SODDING, OR PLANT, AND TWO-FRAMED FORKLIFT (EXCLUDING FRONT, POSIT-TRACK, AND SKID STEER LOADERS), NO EARTHWORK OR GRADING FOR ELEVATIONS	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			
204*	OFF-ROAD TRUCK	2011-12-12	27.35	16.26	43.61

GROUP 2

FOR RATE CALL 651-284-5091 OR EMAIL
DLI.PRE VWAGE@STATE.MN.US

302	HELICOPTER PILOT (HIGHWAY AND HEAVY ONLY)				
303	CONCRETE PUMP (HIGHWAY AND HEAVY ONLY)				
304	ALL CRANES WITH OVER 135-FOOT BOOM, EXCLUDING JIB (HIGHWAY AND HEAVY ONLY)				
305	DRAGLINE, CRAWLER, HYDRAULIC BACKHOE (TRACK OR WHEEL MOUNTED) AND/OR OTHER SIMILAR EQUIPMENT WITH SHOVEL-TYPE CONTROLS THREE CUBIC YARDS AND OVER MANUFACTURER.S RATED CAPACITY INCLUDING ALL ATTACHMENTS. (HIGHWAY AND HEAVY ONLY)				
306	GRADER OR MOTOR PATROL				
307	PILE DRIVING (HIGHWAY AND HEAVY ONLY)				
308	TUGBOAT 100 H.P. AND OVER WHEN LICENSE REQUIRED (HIGHWAY AND HEAVY ONLY)				

GROUP 3

FOR RATE CALL 651-284-5091 OR EMAIL
DLI.PRE VWAGE@STATE.MN.US

- 309 ASPHALT BITUMINOUS STABILIZER PLANT
- 310 CABLEWAY
- 311 CONCRETE MIXER, STATIONARY PLANT (HIGHWAY AND HEAVY ONLY)
- 312 DERRICK (GUY OR STIFFLEG)(POWER)(SKIDS OR STATIONARY) (HIGHWAY AND HEAVY ONLY)
- 313 DRAGLINE, CRAWLER, HYDRAULIC BACKHOE (TRACK OR WHEEL MOUNTED) AND/OR SIMILAR EQUIPMENT WITH SHOVEL-TYPE CONTROLS, UP TO THREE CUBIC YARDS MANUFACTURER.S RATED CAPACITY INCLUDING ALL ATTACHMENTS (HIGHWAY AND HEAVY ONLY)
- 314 DREDGE OR ENGINEERS, DREDGE (POWER) AND ENGINEER
- 315 FRONT END LOADER, FIVE CUBIC YARDS AND OVER INCLUDING ATTACHMENTS. (HIGHWAY AND HEAVY ONLY)
- 316 LOCOMOTIVE CRANE OPERATOR
- 317 MIXER (PAVING) CONCRETE PAVING, ROAD MOLE, INCLUDING MUCKING OPERATIONS, CONWAY OR SIMILAR TYPE
- 318 MECHANIC . WELDER ON POWER EQUIPMENT (HIGHWAY AND HEAVY ONLY)
- 319 TRACTOR . BOOM TYPE (HIGHWAY AND HEAVY ONLY)
- 320 TANDEM SCRAPER
- 321 TRUCK CRANE . CRAWLER CRANE (HIGHWAY AND HEAVY ONLY)
- 322 TUGBOAT 100 H.P AND OVER (HIGHWAY AND HEAVY ONLY)

GROUP 4	2011-12-12	30.97	16.60	47.57
	2012-05-01	31.12	16.70	47.82

- 323 AIR TRACK ROCK DRILL
- 324 AUTOMATIC ROAD MACHINE (CMI OR SIMILAR) (HIGHWAY AND HEAVY ONLY)
- 325 BACKFILLER OPERATOR
- 326 CONCRETE BATCH PLANT OPERATOR (HIGHWAY AND HEAVY ONLY)
- 327 BITUMINOUS ROLLERS, RUBBER TIRED OR STEEL DRUMMED (EIGHT TONS AND OVER)
- 328 BITUMINOUS SPREADER AND FINISHING MACHINES (POWER), INCLUDING PAVERS, MACRO SURFACING AND MICRO SURFACING, OR SIMILAR TYPES (OPERATOR AND SCREED PERSON)
- 329 BROKK OR R.T.C. REMOTE CONTROL OR SIMILAR TYPE WITH ALL ATTACHMENTS
- 330 CAT CHALLENGER TRACTORS OR SIMILAR TYPES PULLING ROCK WAGONS, BULLDOZERS AND SCRAPERS
- 331 CHIP HARVESTER AND TREE CUTTER
- 332 CONCRETE DISTRIBUTOR AND SPREADER FINISHING MACHINE, LONGITUDINAL FLOAT, JOINT MACHINE, AND SPRAY MACHINE
- 333 CONCRETE MIXER ON JOBSITE (HIGHWAY AND HEAVY ONLY)
- 334 CONCRETE MOBIL (HIGHWAY AND HEAVY ONLY)
- 335

CRUSHING PLANT (GRAVEL AND STONE) OR GRAVEL WASHING, CRUSHING AND
SCREENING PLANT

- 336 CURB MACHINE
- 337 DIRECTIONAL BORING MACHINE
- 338 DOPE MACHINE (PIPELINE)
- 339 DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL (HIGHWAY AND HEAVY ONLY)
- 340 DUAL TRACTOR
- 341 ELEVATING GRADER
- 342 FORK LIFT OR STRADDLE CARRIER (HIGHWAY AND HEAVY ONLY)
- 343 FORK LIFT OR LUMBER STACKER (HIGHWAY AND HEAVY ONLY)
- 344 FRONT END, SKID STEER OVER 1 TO 5 C YD
- 345 GPS REMOTE OPERATING OF EQUIPMENT
- 346 HOIST ENGINEER (POWER) (HIGHWAY AND HEAVY ONLY)
- 347 HYDRAULIC TREE PLANTER
- 348 LAUNCHER PERSON (TANKER PERSON OR PILOT LICENSE)
- 349 LOCOMOTIVE (HIGHWAY AND HEAVY ONLY)
- 350 MILLING, GRINDING, PLANING, FINE GRADE, OR TRIMMER MACHINE
- 351 MULTIPLE MACHINES, SUCH AS AIR COMPRESSORS, WELDING MACHINES, GENERATORS,
PUMPS (HIGHWAY AND HEAVY ONLY)
- 352 PAVEMENT BREAKER OR TAMPING MACHINE (POWER DRIVEN) MIGHTY MITE OR SIMILAR
TYPE
- 353 PICKUP SWEEPER, ONE CUBIC YARD AND OVER HOPPER CAPACITY(HIGHWAY AND HEAVY
ONLY)
- 354 PIPELINE WRAPPING, CLEANING OR BENDING MACHINE
- 355 POWER PLANT ENGINEER, 100 KWH AND OVER (HIGHWAY AND HEAVY ONLY)
- 356 POWER ACTUATED HORIZONTAL BORING MACHINE, OVER SIX INCHES
- 357 PUGMILL
- 358 PUMPCRETE (HIGHWAY AND HEAVY ONLY)
- 359 RUBBER-TIRED FARM TRACTOR WITH BACKHOE INCLUDING ATTACHMENTS (HIGHWAY
AND HEAVY ONLY)
- 360 SCRAPER
- 361 SELF-PROPELLED SOIL STABILIZER
- 362 SLIP FORM (POWER DRIVEN) (PAVING)
- 363 TIE TAMPER AND BALLAST MACHINE
- 364 TRACTOR, BULLDOZER (HIGHWAY AND HEAVY ONLY)
- 365 TRACTOR, WHEEL TYPE, OVER 50 H.P. WITH PTO UNRELATED TO LANDSCAPING (HIGHWAY
AND HEAVY ONLY)
- 366

TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER
(HIGHWAY AND HEAVY ONLY)

367 TUB GRINDER, MORBARK, OR SIMILAR TYPE

368 WELL POINT DISMANTLING OR INSTALLATION (HIGHWAY AND HEAVY ONLY)

GROUP 5 * 2011-12-12 18.77 8.18 26.95

369 AIR COMPRESSOR, 600 CFM OR OVER (HIGHWAY AND HEAVY ONLY)

370 BITUMINOUS ROLLER (UNDER EIGHT TONS)

371 CONCRETE SAW (MULTIPLE BLADE) (POWER OPERATED)

372 FORM TRENCH DIGGER (POWER)

373 FRONT END, SKID STEER UP TO 1C YD

374 GUNITE GUNALL (HIGHWAY AND HEAVY ONLY)

375 HYDRAULIC LOG SPLITTER

376 LOADER (BARBER GREENE OR SIMILAR TYPE)

377 POST HOLE DRIVING MACHINE/POST HOLE AUGER

378 POWER ACTUATED AUGER AND BORING MACHINE

379 POWER ACTUATED JACK

380 PUMP (HIGHWAY AND HEAVY ONLY)

381 SELF-PROPELLED CHIP SPREADER (FLAHERTY OR SIMILAR)

382 SHEEP FOOT COMPACTOR WITH BLADE . 200 H.P. AND OVER

383 SHOULDERING MACHINE (POWER) APS CO OR SIMILAR TYPE INCLUDING SELF-PROPELLED
SAND AND CHIP SPREADER

384 STUMP CHIPPER AND TREE CHIPPER

385 TREE FARMER (MACHINE)

GROUP 6 * FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVIEW@STATE.MN.US

387 CAT, CHALLENGER, OR SIMILAR TYPE OF TRACTORS, WHEN PULLING DISK OR ROLLER

388 CONVEYOR (HIGHWAY AND HEAVY ONLY)

389 DREDGE DECK HAND

390 FIRE PERSON OR TANK CAR HEATER (HIGHWAY AND HEAVY ONLY)

391 GRAVEL SCREENING PLANT (PORTABLE NOT CRUSHING OR WASHING)

392 GREASER (TRACTOR) (HIGHWAY AND HEAVY ONLY)

393 LEVER PERSON

394 OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS, AND MILLING
MACHINES, OR OTHER SIMILAR HEAVY EQUIPMENT) (HIGHWAY AND HEAVY ONLY)

395	POWER SWEEPER				
396	SHEEP FOOT ROLLER AND ROLLERS ON GRAVEL COMPACTION, INCLUDING VIBRATING ROLLERS				
397	TRACTOR, WHEEL TYPE, OVER 50 H.P., UNRELATED TO LANDSCAPING				
GROUP 1		2011-12-12	34.64	15.85	50.49
		2012-05-01	35.19	15.95	51.14
501	HELICOPTER PILOT (COMMERCIAL CONSTRUCTION ONLY)				
502	TOWER CRANE 250 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
503	TRUCK CRAWLER CRANE WITH 200 FEET OF BOOM AND OVER, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 2		2011-12-12	34.30	15.85	50.15
		2012-05-01	34.85	15.95	50.80
504	CONCRETE PUMP WITH 50 METERS/164 FEET OF BOOM AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
505	PILE DRIVING WHEN THREE DRUMS IN USE (COMMERCIAL CONSTRUCTION ONLY)				
506	TOWER CRANE 200 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
507	TRUCK OR CRAWLER CRANE WITH 150 FEET OF BOOM UP TO AND NOT INCLUDING 200 FEET, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 3		2011-12-12	32.89	15.85	48.74
		2012-05-01	33.44	15.95	49.39
508	ALL-TERRAIN VEHICLE CRANES (COMMERCIAL CONSTRUCTION ONLY)				
509	CONCRETE PUMP 32-49 METERS/102-164 FEET (COMMERCIAL CONSTRUCTION ONLY)				
510	DERRICK (GUY & STIFFLEG) (COMMERCIAL CONSTRUCTION ONLY)				
511	STATIONARY TOWER CRANE 200 FEET AND OVER MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)				
512	SELF-ERECTING TOWER CRANE 100 FEET AND OVER MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)				
513	TRAVELING TOWER CRANE (COMMERCIAL CONSTRUCTION ONLY)				
514	TRUCK OR CRAWLER CRANE UP TO AND NOT INCLUDING 150 FEET OF BOOM, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 4		2011-12-12	32.55	15.85	48.40
		2012-05-01	33.10	15.95	49.05
515	CRAWLER BACKHOE INCLUDING ATTACHMENTS (COMMERCIAL CONSTRUCTION ONLY)				
516	FIREPERSON, CHIEF BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)				

517	HOIST ENGINEER (THREE DRUMS OR MORE) (COMMERCIAL CONSTRUCTION ONLY)				
518	LOCOMOTIVE (COMMERCIAL CONSTRUCTION ONLY)				
519	OVERHEAD CRANE (INSIDE BUILDING PERIMETER) (COMMERCIAL CONSTRUCTION ONLY)				
520	TRACTOR . BOOM TYPE (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 5		2011-12-12	32.38	15.85	48.23
		2012-05-01	32.93	15.95	48.88
521	AIR COMPRESSOR 450 CFM OR OVER (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)				
522	CONCRETE MIXER (COMMERCIAL CONSTRUCTION ONLY)				
523	CONCRETE PUMP UP TO 31 METERS/101 FEET OF BOOM				
524	DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL WHEN USED FOR CAISSON FOR ELEVATOR OR BUILDING CONSTRUCTION (COMMERCIAL CONSTRUCTION ONLY)				
525	FORKLIFT (COMMERCIAL CONSTRUCTION ONLY)				
526	FRONT END, SKID STEER 1 C YD AND OVER				
527	HOIST ENGINEER (ONE OR TWO DRUMS) (COMMERCIAL CONSTRUCTION ONLY)				
528	MECHANIC-WELDER (ON POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)				
529	POWER PLANT (100 KW AND OVER OR MULTIPLES EQUAL TO 100KW AND OVER) (COMMERCIAL CONSTRUCTION ONLY)				
530	PUMP OPERATOR AND/OR CONVEYOR (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)				
531	SELF-ERECTING TOWER CRANE UNDER 100 FEET MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)				
532	STRADDLE CARRIER (COMMERCIAL CONSTRUCTION ONLY)				
533	TRACTOR OVER D2 (COMMERCIAL CONSTRUCTION ONLY)				
534	WELL POINT PUMP (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 6		2011-12-12	30.87	15.85	46.72
		2012-05-01	31.42	15.95	47.37
535	CONCRETE BATCH PLANT (COMMERCIAL CONSTRUCTION ONLY)				
536	FIREPERSON, FIRST CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)				
537	FRONT END, SKID STEER UP TO 1 C YD				
538	GUNITE MACHINE (COMMERCIAL CONSTRUCTION ONLY)				
539	TRACTOR OPERATOR D2 OR SIMILAR SIZE (COMMERCIAL CONSTRUCTION ONLY)				
540	TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER				
GROUP 7		2011-12-12	29.75	15.85	45.60

2012-05-01	30.30	15.95	46.25
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- 541 AIR COMPRESSOR 600 CFM OR OVER (COMMERCIAL CONSTRUCTION ONLY)
- 542 BRAKEPERSON (COMMERCIAL CONSTRUCTION ONLY)
- 543 CONCRETE PUMP/PUMPCRETE OR COMPLACO TYPE (COMMERCIAL CONSTRUCTION ONLY)
- 544 FIREPERSON, TEMPORARY HEAT SECOND CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)
- 545 OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS AND MILLING MACHINES, OR OTHER SIMILAR POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)
- 546 PICK UP SWEEPER (ONE CUBIC YARD HOPPER CAPACITY) (COMMERCIAL CONSTRUCTION ONLY)
- 547 PUMP AND/OR CONVEYOR (COMMERCIAL CONSTRUCTION ONLY)

GROUP 8 *

FOR RATE CALL 651-284-5091 OR
EMAIL
DLI.PREVWAGE@STATE.MN.US

- 548 ELEVATOR OPERATOR (COMMERCIAL CONSTRUCTION ONLY)
- 549 GREASER (COMMERCIAL CONSTRUCTION ONLY)
- 550 MECHANICAL SPACE HEATER (TEMPORARY HEAT NO BOILER LICENSE REQUIRED) (COMMERCIAL CONSTRUCTION ONLY)

GROUP 1

2011-12-12	26.70	13.65	40.35
2012-05-01	27.10	13.65	40.75

- 601 MECHANIC . WELDER
- 602 TRACTOR TRAILER DRIVER
- 603 TRUCK DRIVER (HAULING MACHINERY INCLUDING OPERATION OF HAND AND POWER OPERATED WINCHES)

GROUP 2

2011-12-12	26.15	13.65	39.80
2012-05-01	26.55	13.65	40.20

- 604 FOUR OR MORE AXLE UNIT, STRAIGHT BODY TRUCK

GROUP 3

2011-12-12	26.05	13.65	39.70
2012-05-01	26.45	13.65	40.10

- 605 BITUMINOUS DISTRIBUTOR DRIVER
- 606 BITUMINOUS DISTRIBUTOR (ONE PERSON OPERATION)
- 607 THREE AXLE UNITS

GROUP 4 *

2011-12-12	25.80	13.65	39.45
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		2012-05-01	26.20	13.65	39.85
608	BITUMINOUS DISTRIBUTOR SPRAY OPERATOR (REAR AND OILER)				
609	DUMP PERSON				
610	GREASER				
611	PILOT CAR DRIVER				
612	RUBBER-TIRED, SELF-PROPELLED PACKER UNDER 8 TONS				
613	TWO AXLE UNIT				
614	SLURRY OPERATOR				
615	TANK TRUCK HELPER (GAS, OIL, ROAD OIL, AND WATER)				
616	TRACTOR OPERATOR, UNDER 50 H.P.				
701	HEATING AND FROST INSULATORS	2011-12-12	36.76	14.90	51.66
702	BOILERMAKERS	2011-12-12	32.29	22.33	54.62
		2012-01-01	34.04	22.33	56.37
703	BRICKLAYERS	2011-12-12	29.58	20.66	50.24
704	CARPENTERS	2011-12-12	27.20	14.75	41.95
705	CARPET LAYERS (LINOLEUM)	2011-12-12	30.68	11.55	42.23
		2012-06-01	31.68	11.55	43.23
706	CEMENT MASONS	2011-12-12	29.24	16.25	45.49
707	ELECTRICIANS	2011-12-12	30.51	22.49	53.00
708	ELEVATOR CONSTRUCTORS	2011-12-12	42.06	26.45	68.51
		2012-01-01	43.56	27.95	71.51
709	GLAZIERS	2011-12-12	24.85	14.60	39.45
710	LATHERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
711	GROUND PERSON	FOR RATE CALL 651-284-5091 OR EMAIL			

712	IRONWORKERS	2011-12-12	29.14	20.37	49.51
713	LINEMAN	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLI.PRE VWAGE@STATE.MN.US</u>			
714	MILLWRIGHT	2011-12-12	27.49	16.06	43.55
		2012-05-01	28.19	16.06	44.25
715	PAINTERS (INCLUDING HAND BRUSHED, HAND SPRAYED, AND THE TAPING OF PAVEMENT MARKINGS)	2011-12-12	27.31	14.59	41.90
		2012-05-01	27.91	14.59	42.50
716	PILED RIVER (INCLUDING VIBRATORY DRIVER OR EXTRACTOR FOR PILING AND SHEETING OPERATIONS)	2011-12-12	29.72	17.15	46.87
717	PIPEFITTERS . STEAMFITTERS	2011-12-12	35.86	16.05	51.91
		2012-05-01	36.61	16.05	52.66
718	PLASTERERS	2011-12-12	30.12	16.75	46.87
719	PLUMBERS	2011-12-12	35.11	16.38	51.49
		2012-05-07	35.61	16.38	51.99
720	ROOFER	2011-12-12	29.70	13.92	43.62
		2012-07-02	30.50	13.92	44.42
721	SHEET METAL WORKERS	2011-12-12	30.30	20.01	50.31
		2012-04-30	30.80	20.01	50.81
722	SPRINKLER FITTERS	2011-12-12	31.26	16.25	47.51
		2012-04-01	32.20	16.25	48.45
723	TERRAZZO WORKERS	2011-12-12	31.83	17.28	49.11

724	TILE SETTERS	2011-12-12	23.20	19.21	42.41
725	TILE FINISHERS	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
726	DRYWALL TAPER	2011-12-12	27.91	14.59	42.50
		2012-05-01	28.51	14.59	43.10
727	WIRING SYSTEM TECHNICIAN	2011-12-12	32.09	12.39	44.48
728	WIRING SYSTEMS INSTALLER	2011-12-12	22.46	10.61	33.07
729	ASBESTOS ABATEMENT WORKER	2011-12-12	27.12	15.28	42.40
730*	SIGN ERECTOR	2011-12-12	24.89	10.78	35.67
		2012-05-01	25.39	10.78	36.17

DIVISION 1
GENERAL REQUIREMENTS

01014 - WORK SCOPE DESCRIPTIONS

1. GENERAL
 - A. This section is intended to clarify the scope of work in each Work Scope.
 - B. The Owner will award Multiple Prime Contracts for the construction of the project.
2. BID PACKAGING
 - A. Work Scopes referenced in this section are for work to be performed at Duluth International Airport, New Passenger Terminal, Bid Package 2C, Duluth, MN.
3. SCOPE OF WORK
 - A. The Work Scope categories are constructed to follow as close as possible the CSI format of the contract documents, but also FAA, MNDOT, and City of Duluth Specification Sections. However, Work Scopes may contain work described in more than one specification section and/or parts thereof.
 - B. Local custom and trade-union jurisdictional settlements do not control the scope of work included in each Prime Contract. When a potential jurisdictional dispute or similar interruption of construction activities is first identified or threatened, the affected Contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and its delays.
 - C. This section is intended to clarify the scope of work in each Work Scope. Each Work Scope includes all provisions of Division 01 Specifications.
 - D. Unless noted otherwise, each Work Scope shall include the complete labor and materials, equipment, applicable permits and applicable taxes required for the performance of the described work in accordance with the plans and specifications.

DIVISION 1
GENERAL REQUIREMENTS

01014 - WORK SCOPE DESCRIPTIONS

WORK SCOPE DESCRIPTION INDEX

Work Scope	2.21C:	Civil, Apron and Building Demolition
	2.22C:	Landscaping
	3.21C:	Concrete & Excavation
	5.21C:	Struct. Steel & Misc. Metal Fabrication
	6.22C:	General Construction (Concessions Buildout)
	7.22C:	Metal Wall Panels & Furring
	8.23C:	Overhead Fabric Doors
	9.25C:	Painting
	10.22C:	Exterior Signage
	11.20C:	Food Service Equipment
	11.21C:	X-Ray Inspection Equipment
	12.21C:	Window Treatments
	12.22C:	Public, Office & Concessions Furniture
	13.21C:	Fire Protection System
	13.22C:	Breach Control
	13.23C:	Prefabricated Control Booth
	14.21C:	Passenger Boarding Bridges
	15.21C:	Mechanical Systems
	16.22C:	Electrical, Computer Controlled Access & Flight Display Systems

Duluth International Airport New Passenger Terminal **BP-2C**

1014 Work Scope Index

Note: All work described is furnish and install unless noted otherwise.

		PC (Work by Prime Contractors)			February 15, 2012
Work Scope No.	Work Scope Description	Work By	Spec Sections Included		Remarks
			Spec #	Spec Section	
2.21C	Civil, Apron and Building Demolition	PC	01732	Selective Demolition	Phase One (CBP Area) - Phase 2 (Terminal Area)
			02221	Building Demolition	In Its Entirety Including Contents Not Salvaged By Owner
			Part 8	Technical Specifications	Complete
			Part 9	Special Provisions	Complete
2.22C	Landscaping	PC	02781	Site Furnishings	Complete
			02783	Concrete Unit Pavers	Complete
			02826	Steel Fencing	Complete
			02920	Meadow and Sod	Complete
			02930	Plants	Complete
			10350	Flagpoles	Including Below Grade Foundation Installation
3.21C	Concrete & Excavation	PC	02220	Building Earthwork	Work Related To Tug Tunnels, Revenue Control Booth and Canopy Foundations, Passenger Boarding Bridge Foundations
			03100	Concrete Formwork	Tug Tunnels, Control Booth, Control Canopy, Passenger Boarding Bridges
			03200	Concrete Reinforcement	Tug Tunnels, Control Booth, Control Canopy, Passenger Boarding Bridges
			03300	Cast-In-Place Concrete	Tug Tunnels, Control Booth, Control Canopy, Passenger Boarding Bridges
			07131	Self-Adhering Sheet Waterproofing	As It Applies To This Work Scope
			07920	Joint Sealants	As It Applies To This Work Scope
5.21C	Struct. Steel & Misc. Metal Fabrication	PC	05120	Structural Steel Framing	Complete
			05310	Steel Roof Deck	Complete
			05500	Metal Fabrications	Complete
			05521	Pipe and Tube Railings	Complete
			05530	Metal Gratings	Complete
			09960	High-Performance Coatings	Complete
6.22C	General Construction (Concessions Buildout)	PC	06100	Rough Carpentry	Responsible For All of BP-2C Rough Carpentry Items Complete. Including But Not Limited To Concessions Bldt
			05700	Ornamental Metals	As It Relates To Concessions Buildout
			06220	Interior Prefinished Wall Surfacing	As It Relates To Concessions Buildout
			06402	Interior Architectural Woodwork	As It Relates To Concessions Buildout
			06422	Flush Wood Paneling	As It Relates To Concessions Buildout
			06611	Solid Polymer Fabrications	As It Relates To Concessions Buildout
			07920	Joint Sealants	As It Relates To Concessions Buildout
			08110	Steel Doors and Frames	As It Relates To Concessions Buildout
			08710	Finish Hardware	As It Relates To Concessions Buildout
			09111	Non-Structural Steel Framing	As It Relates To Concessions Buildout
			09130	Acoustical Suspended System	As It Relates To Concessions Buildout
			09250	Gypsum Board	As It Relates To Concessions Buildout
			09310	Tile	As It Relates To Concessions Buildout
			09511	Acoustical Panel Ceiling	As It Relates To Concessions Buildout
			09524	Wood Linear Panel Ceilings	As It Relates To Concessions Buildout
			09650	Resilient Tile Flooring	As It Relates To Concessions Buildout
			09678	Resilient Base and Accessories	As It Relates To Concessions Buildout
			09720	Wall Coverings	As It Relates To Concessions Buildout
			09770	Special Wall Surfacing	As It Relates To Concessions Buildout
			09900	Painting	As It Relates To Concessions Buildout
			10262	Wall Protection	As It Relates To Concessions Buildout
			12360	Quartz Surfacing Countertops	As It Relates To Concessions Buildout
7.22C	Metal Wall Panels & Furring		07412	Metal Wall Panels	Complete
			07620	Flashing and Trim	As It Applies To This Work Scope
			07710	Roof Specialties	Complete
			07920	Joint Sealants	As It Applies To This Work Scope
			05400	Cold Formed Metal Framing	As It Applies To This Work Scope
			10530	Walkway Covers	Complete
8.23C	Overhead Fabric Doors	PC	08385	High-Speed Overhead Doors	Complete

Duluth International Airport New Passenger Terminal **BP-2C**

1014 Work Scope Index

Note: All work described is furnish and install unless noted otherwise.

		PC (Work by Prime Contractors)			February 15, 2012
Work Scope No.	Work Scope Description	Work By	Spec #	Spec Sections Included	Remarks
9.25C	Painting	PC	09900	Painting	All Required Exterior Painting
10.22C	Exterior Signage	PC	02466 10435	Drilled Concrete Piers Exterior Signage	Complete Furnish and Install
11.20C	Food Service Equipment	PC	11400	Food Service Equipment	Complete
11.21C	X-Ray Inspection Equipment	PC	11911	X-Ray Inspection Equipment	Furnish and Install
12.21C	Window Treatments	PC	12491 12493 12494	Horizontal Louver Blinds Blackout Shades Motorized Roller Shades Alternates - Motorized Roller Shades	Complete Complete Complete See Alternate No. 2
12.22C	Public, Office & Concessions Furniture	PC	12500 12501 12502	Public Area Furniture Office Furniture Concessions Furniture	Furnish and Install Furnish and Install Furnish and Install
13.21C	Fire Protection System	PC	13050 13053 13060 13075 13915 13916 07841	Fire Protection General Requirements Fire Protection General Materials and Methods Fire Protection Hangers and Supports Fire Protection Identification Fire Protection Suppression Piping Fire Suppression Sprinklers Through-Penetration Firestop Systems	As It Relates to Concessions Buildout As It Relates to Concessions Buildout As It Relates to Concessions Buildout As It Relates to Concessions Buildout As It Relates to Concessions Buildout As It Relates to Concessions Buildout For This Work Scope Only
13.22C	Breach Control	PC	08411 08460 08801 13700 13755 16050 16060 16075 16080 16120 16714 16715 07841	Aluminum-Framed Storefronts & Entrances Automatic Entrance Doors Interior Glazing Part 1542 Computer Controlled Access System (CCAS) Integrated Exit Lane Breach Control System Basic Electrical Materials & Methods Grounding & Bonding Electrical Identification Electrical Testing Conductors and Cables Communications Equipment Room Fittings Communications General Network Equipment Through-Penetration Firestop Systems	As It Applies To This Work Scope As It Applies To This Work Scope As It Applies To This Work Scope As It Applies To This Work Scope As It Applies To 13755 As It Applies To This Work Scope As It Applies To This Work Scope As It Applies To This Work Scope As It Applies To This Work Scope As It Applies To This Work Scope As It Applies To This Work Scope As It Applies To This Work Scope As It Applies To This Work Scope
13.23C	Prefabricated Control Booth	PC	13129	Prefabricated Control Booths	Furnish and Install
14.21C	Passenger Boarding Bridges	PC	14950 14951 14955	Aircraft Passenger Boarding Bridges Passenger Boarding Bridge Refurbishment Baggage Lifts	Coordinate Work With Existing & New Foundations Complete Complete
15.21C	Mechanical Systems	PC	Division 15 07841 07920	Mechanical Through-Penetration Firestop Systems Joint Sealants	Entire Division 15 Complete As It Applies To This Work Scope As It Applies To This Work Scope
16.22C	Electrical , Computer Controlled Access & Flight Display Systems	PC	Division 16 07841 07920 13700 13743	Electrical Through-Penetration Firestop Systems Joint Sealants Part 1542 Computer Controlled Access System (CCAS) Video Displays	Entire Division 16 Complete As It Applies To This Work Scope As It Applies To This Work Scope BP-2A, Work Scope 16.20A Includes Rough-In For This Work Scope BP-2A, Work Scope 16.20A Includes Rough-In For This Work Scope

Work Scope 2.21C – Civil, Apron and Building Demolition

KA SPECIAL REQUIREMENTS

1.01 CIVIL, APRON AND BUILDING DEMOLITION

- A. **Scope of Work:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements.

1. Include and conform to the necessary specifications Bid Items 1 -146 must conform to:
 - a. MNDOT Standard Specification 2005 Edition
 - b. City of Duluth Standard Specification 2010 Edition
 - c. FAA Standard Specifications

2. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 8	Technical Specifications	Complete
Part 9	Special Provisions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
01732	Selective Demolition	Phase One (CBP Area) – Phase 2 (Terminal Area)
02221	Building Demolition	In Its Entirety Including Contents Not Salvaged By Owner

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.
- B. **Scope:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, receiving / off-loading / storing of materials, freight and delivery charges, and sales and use taxes.
- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Schedule:** The enclosed construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
 1. Also review Civil Phasing Plans for additional information.
 2. Liquidated Damages will be accessed per contract documents.
- E. **Winter Conditions:** Include temporary enclosures, shelters, blankets, heat equipment, fuel or any other temporary heat provisions necessary to perform your specific work in accordance with the project schedule.
- F. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.
- G. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- H. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA.
- I. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite.

Work Scope 2.21C – Civil, Apron and Building Demolition

KA SPECIAL REQUIREMENTS

- J. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- K. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- L. **Contract Duration:** See Civil Phasing Plans for total calendar days.
- M. **Tug Tunnel:** Work beyond building exterior wall side of Gridlines 1.3 and 11.7 in Work Scope 3.21C.
- N. **Building Demolition:** Provide miscellaneous site and building demolition indicated on the Drawings to be removed within the construction limits in accordance with Section 01732 and Section 02221 Building Demolition on existing building including, but not limited to:
 - 1. Selective demolition at existing terminal as it relates to the phasing of demolition of building.
 - 2. Building demolition at existing terminal building and contents not salvaged by owner.
- O. **Building Demolition:** Provide miscellaneous building demolition indicated on the Drawings to be removed within the construction limits in accordance with MNDOT specifications 2103 including, but not limited to:
 - 1. Existing terminal building.
 - 2. Trees and other landscape items for removal.
 - 3. Bituminous and concrete paving indicated for removal.
 - 4. Building contents not salvaged by owner.
- P. **Site Clearing:** Provide general site clearing and preparation work as indicated on the Drawings and including, but not limited to:
 - 1. General site clearing.
 - 2. Demolition and disposal of existing items indicated to be removed.
 - 3. Concrete and asphalt paving indicated to be removal.
 - 4. Curbs, gutters, sidewalks indicated to be removed.
 - 5. Tree removal, including root ball indicated to be removed.
 - 6. Contaminated soils removal and building backfill as per soils engineering report recommendations.
- Q. **Building Earthwork:** This work is included in Work Scope 3.21C. All back fill required north of tug tunnels and terminal is under Work Scope 2.21C.
- R. **Dewatering Requirements:** Provide all necessary labor and equipment to perform the work of this Work Scope including daily pumping to keep excavated areas dry.
 - 1. Special coordination with concrete trade contractor during footing and foundation work is required.
 - 2. Coordinate extent and duration of dewatering activities with Kraus-Anderson Construction Company.
- S. **Excavation Support Systems:** Provide (engineer, construct, maintain, and monitor) excavation support systems as required:
 - 1. Delegated Design Requirements: Provide professional engineering services as required by this specification Section including engineering analysis, calculations, certified shop and erection drawings for excavation support systems.
 - a. System designed by professional engineer with relevant project experience, and complying with requirements of the Specifications.
 - b. Refer to Kraus-Anderson Subcontract for additional requirements for professional liability coverage.
 - 2. There is NO area for spoils storage on site; spoils are to be removed on a daily basis unless approved by Construction Manager.
- T. **Subdrainage System (Drain Tile):** Provide sub grade drainage system in accordance with Division 15 including, but not limited to:
 - 1. Foundation drainage system complete including final connections within storm drainage structures as required.
 - 2. Subdrainage piping systems.
 - 3. Under slab drainage system.
 - 4. See Plumbing plans and specifications for scope.
 - 5. Roof drain work by Work Scope 15.21C.
- U. **Construction Grading:** Provide and maintain suitable OSHA grades around site and localized excavated areas to accommodate construction activities and equipment access.
 - 1. Coordinate requirements with Kraus-Anderson Construction Company and Architect/Engineer.
- V. **Storm Water Pollution Prevention Plan (SWPPP):** Provide labor and materials to install, maintain, monitor, and remove upon completion all elements and process required to administer the storm water compliance requirements for this Project as outlined within the documents and required by the State.

Work Scope 2.21C – Civil, Apron and Building Demolition

KA SPECIAL REQUIREMENTS

1. Construction entrances and exit areas
 2. Perimeter control around construction site
 3. Erosion control procedures
 4. Sediment control procedures
 5. Dewatering and drain basin procedures
- W. **Traffic Control:** Provide traffic control spotters/flag personal and have them present at all times during concrete deliveries and pours.
1. Provide traffic and street barrier as required.
 2. Include Allowance as stipulated in Special Provisions Sections.
- X. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
1. Debris tracked or carried off site into traffic lanes must be cleaned up immediately. If tracking continues, this Work Scope shall provide continuously cleaning operations during activities of this Work Scope.
 2. Hard surface areas shall be broom cleaned upon completion.
- Y. **Restoration of Adjacent Turf Areas Damaged by Construction:** This Work Scope is responsible to restore disturbed turf areas with sod (seeding is not acceptable) in accordance with requirements of MNDOT Specifications - Landscaping.
- Z. **Asphalt Paving:** Provide general site clearing and preparation work in accordance with MNDOT Specifications, and as indicated on the Drawings.
- AA. **Concrete Paving:** Provide general site clearing and preparation work in accordance with MNDOT Specifications, and as indicated on the Drawings.
- BB. **Site Utilities:** Provide and install all site utilities per MNDOT Specifications.
1. Private laterals stubbed into building - by others (domestic water, fire suppression water, sanitary sewer and storm).
 2. Coordinate with Work Scope 15.21C for scope interface.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Soil Borings:** See Geotechnical Reports, Part 10 - Appendix of the Specifications.
- B. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1-11 of the Specifications for all Work Scopes.
1. This Work Scope is responsible for all remaining layout required for this Work Scope.
 2. Layout and engineering for shoring and temporary supports shall be included.
 3. Layout and saw cutting, wall removals, shoring, installation of necessary support steel headers shall be included and as required.
- C. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptance of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
1. This Work Scope is responsible to coordinate and provide services of firm specialized in locating and documenting underground services and utilities similar to Gopher One.
- D. **Multiple Mobilizations, Off Peak Shifts and Minimum Work Force:** To comply with the Project Schedule and phasing requirements, multiple mobilizations may be required. Refer to Project Schedule for additional requirements.
1. Coordinate requirements with Kraus-Anderson Construction Company.
- E. **Coordination with Others:** Include coordination with other trades, including but not limited to the following:
1. Utility and foundation work.
- F. **Deep Utility Excavations:**
1. Soil retention system will require 3rd Party Engineering.
 2. Coordination of temporary utility work within building footprint will be required with other work scopes.
- G. **Excavations for Other Work Scopes:**
1. Must be OSHA approved.
 2. Excavation widths and grades must be acceptable for other trades to work efficiently.
- H. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
1. This trade contractor will be required to participate in this effort.

1.04 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

Work Scope 2.21C – Civil, Apron and Building Demolition

KA SPECIAL REQUIREMENTS

1.05 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work.

1.06 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, subcontractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents.
 - 1. Shop Drawings: Indicating the pile locations, pile numbers and installation sequence along with your expected construction procedures.
 - 2. As-Built Piling Logs: Maintain daily detailed piling logs indicating layout, number and length piles installed, comments regarding installation.
 - a. Submit record copy to Kraus-Anderson upon request and at completion of deep foundations.
- B. **Requirements for Delegated Design – Third Party Engineering.**
 - 1. Qualification of Design Engineer:
 - 2. Certificate of Insurance for Errors and Omissions per Contract requirements.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. This Work Scope bidder must fill-out the complete Bid Form Packet including unit cost, total cost, and carry Total forward to Item 1. Base Bid for Work Scope 2.21C Civil, Apron and Building Demolition on Page 2 of the Bid Form.

1.08 ALTERNATES

- A. Alternate No. 1: Construct east apron and taxiway "A" widening and shoulders.
Add (deduct) the sum of: _____ Dollars (\$_____).
- B. Alternate No. 2: Construct perimeter road extension and snowmelt pavement.
Add (deduct) the sum of: _____ Dollars (\$_____).
- C. Alternate No. 3: Apron deicing containment system.
Add (deduct) the sum of: _____ Dollars (\$_____).
- D. Alternate No. 4: Construct west apron pavement.
Add (deduct) the sum of: _____ Dollars (\$_____).

-- End --

Work Scope 2.22C – Landscaping KA SPECIAL REQUIREMENTS

1.01 LANDSCAPING

- A. **Scope of Work:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements.

1. Include and conform to the necessary specifications Bid Items 1 -146 must conform to:
 - a. MNDOT Standard Specification 2005 Edition
 - b. City of Duluth Standard Specification 2010 Edition
 - c. FAA Standard Specifications

2. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
02781	Site Furnishings	Complete
02783	Concrete Unit Pavers	Complete
02826	Steel Fencing	Complete
02920	Meadow and Sod	Complete
02930	Plants	Complete
10350	Flagpoles	Including Below Grade Foundation Installation

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1–7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.
- B. **Scope:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, receiving / off-loading / storing of materials, freight and delivery charges, and sales and use taxes.
- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Schedule:** The enclosed construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
 1. Also review Civil Phasing Plans for additional information.
 2. Liquidated Damages will be accessed per contract documents.
- E. **Winter Conditions:** Include temporary enclosures, shelters, blankets, heat equipment, fuel or any other temporary heat provisions necessary to perform your specific work in accordance with the project schedule.
- F. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.
- G. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- H. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA.
- I. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite.
- J. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.

Work Scope 2.22C – Landscaping

KA SPECIAL REQUIREMENTS

- K. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- L. **Contract Duration:** This Work Scope will have 87 calendar days to complete their work.
- M. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
 - 1. Debris tracked or carried off site into traffic lanes must be cleaned up immediately. If tracking continues, this Work Scope shall provide continuously cleaning operations during activities of this Work Scope.
 - 2. Hard surface areas shall be broom cleaned upon completion.
- N. **Restoration of Adjacent Turf Areas Damaged by Construction:** This Work Scope is responsible to restore disturbed turf areas with sod (seeding is not acceptable) in accordance with requirements of MNDOT Specifications - Landscaping.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Soil Borings:** See Geotechnical Reports, Part 10 - Appendix of the Specifications.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
 - 1. This Work Scope is responsible to coordinate and provide services of firm specialized in locating and documenting underground services and utilities similar to Gopher One.
- C. **Multiple Mobilizations, Off Peak Shifts and Minimum Work Force:** To comply with the Project Schedule and phasing requirements, multiple mobilizations may be required. Refer to Project Schedule for additional requirements.
 - 1. Coordinate requirements with Kraus-Anderson Construction Company.
- D. **Coordination with Others:** Include coordination with other trades, including but not limited to the following:
 - 1. Utility and foundation work.
- E. **Excavations for Other Work Scopes:**
 - 1. Must be OSHA approved.
 - 2. Excavation widths and grades must be acceptable for other trades to work efficiently.
- F. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort.

1.04 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.05 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work.

1.06 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, subcontractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents.
 - 1. Shop Drawings: Indicating the pile locations, pile numbers and installation sequence along with your expected construction procedures.
 - 2. As-Built Piling Logs: Maintain daily detailed piling logs indicating layout, number and length piles installed, comments regarding installation.
 - a. Submit record copy to Kraus-Anderson upon request and at completion of deep foundations.
- B. **Requirements for Delegated Design – Third Party Engineering.**
 - 1. Qualification of Design Engineer:
 - 2. Certificate of Insurance for Errors and Omissions per Contract requirements.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

Work Scope 2.22C – Landscaping
KA SPECIAL REQUIREMENTS

1.08 ALTERNATES

A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 3.21C – Concrete & Excavation

KA SPECIAL REQUIREMENTS

1.01 CONCRETE & EXCAVATION

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
02220	Building Earthwork	Work Related To Tug Tunnels, Revenue Control Booth and Canopy Foundations, Passenger Boarding Bridge Foundations
03100	Concrete Formwork	Tug Tunnels, Control Booth, Control Canopy, Passenger Boarding Bridges
03200	Concrete Reinforcement	Tug Tunnels, Control Booth, Control Canopy, Passenger Boarding Bridges
03300	Cast-In-Place Concrete	Tug Tunnels, Control Booth, Control Canopy, Passenger Boarding Bridges
07131	Self-Adhering Sheet Waterproofing	As It Applies to This Work Scope
07920	Joint Sealants	As It Applies to This Work Scope

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1–7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.
- B. **Scope:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, receiving / off-loading / storing of materials, freight and delivery charges, and sales and use taxes.
- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Schedule:** The enclosed construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Also review Civil Phasing Plans for additional information.

Work Scope 3.21C – Concrete & Excavation

KA SPECIAL REQUIREMENTS

2. Liquidated Damages will be assessed per contract documents.
- E. **Winter Conditions:** Include temporary enclosures, shelters, blankets, heat equipment, fuel or any other temporary heat provisions necessary to perform your specific work in accordance with the project schedule.
- F. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.
- G. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- H. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA.
- I. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite.
- J. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- K. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- L. **Contract Duration:** This Work Scope will have 90 working days to complete their work.
- M. **Tug Tunnel:** All remaining tug tunnel Phase II construction is included in this Work Scope. Refer to plans and specifications for extent. Coordinate with previous Bid Packages for information that is related. All back filling north of tug tunnel and new terminal building is under Work Scope 2.21C.
- N. Provide all equipment for this contractor's work, including cranes, conveyors and/or concrete pumps as may be necessary.
- O. All grouting operations, including column base plates, other plates and sills as shown or required, all concrete additives, hardeners, curing, sealing and dust proofing compounds.
- P. Provide layout of lines and elevations as required for this contractor's work.
- Q. **Subgrade Preparation:** Provide hand excavation and fine grading associated with concrete work, including bottom of footings and slab-on-grade conditions in accordance with Division 03 including, but not limited to:
1. Fine grading and hand excavations of subgrade are the responsibility of this Work Scope.
- R. **Concrete Formwork:** Provide (engineer, furnish and install) concrete formwork in accordance with Section 03100 including, but not limited to:
1. Includes temporary shoring or bracing as required, including form shoring, decking, and re-shoring required for pan and joist construction.
 2. Underslab vapor retarders.
 3. Rigid insulation directly under, or within floor assembly used as forming material.
- S. **Concrete Reinforcing Steel:** Provide (furnish and install) reinforcing steel as shown and indicated in the contract documents, and in accordance with Section 03200.
- T. **Cast-In-Place Concrete:** Provide cast-in-place concrete work in accordance with Section 03300 including, but not limited to:
1. Footings, foundations, poured beams, columns and other structural members.
 2. Slab on grade and elevated slabs, structural concrete only.
 3. Vapor barriers and waterstop material and systems specified.
 4. Layout and forming of opening shown.
 5. Placement and finishing operations to achieve specified results, including special screeds to achieve elevations, flatness, and levelness requirements specified.
 6. Pointing, patching, rubbing, grinding, and filling of concrete surfaces scheduled to receive final finish.
 7. Interior pipe bollards: excavation, setting, placement and filling of pipe bollards. Provided by Work Scope 5.21C. No paint or covers in the Bid Package.
 8. Non-slip additives, hardeners, and special coatings as indicated.
 9. Structural and infill grouting as indicated.
 10. Curing methods specified.
 11. Sill plates, bearing plates, expansion joints and joist pockets.
- U. **Building Earthwork:** Provide earthwork as indicated, but not limited to:
1. All excavation and backfill necessary for the completion of this Work Scope.
 2. Mass excavation.

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KA SPECIAL REQUIREMENTS

3. Removal and disposal of abandoned utilities occurring within the excavation, and as indicated.
4. Earth stripping and stockpiling.
 - a. Coordinate area available for onsite stockpiling with Kraus-Anderson Construction Company.
 - b. Contaminated soils removal.
5. Grading including rough and fine grading.
 - a. Finish grading and turf establishment.
6. Dewatering as defined herein, and as may become necessary during the construction operations.
7. Special requirements:
 - a. Erosion and sedimentation control as defined herein.
 - b. Soil treatment requirements.
 - c. Soil stabilization requirements including incidental.
 - d. Engineered retention systems to complete your scope.
8. All necessary permits.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1–7 and 10-11 of the specifications.
 1. This Work Scope is responsible for all remaining layout required for this Work Scope.
 2. Detailed surveying and layout of footings, foundations, and slab work are the responsibility of this Work Scope.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Winter/Cold Weather Conditions:** Include costs for winter conditions, i.e., blankets for during times requiring protection and including, but not limited to:
 1. Concrete heating and cover as required.
 2. Cost of fuel and related heating equipment, unless specifically indicated otherwise.
 3. Snow removal.
- D. **Special Scheduling Requirements:** Multiple crews as required to maintain project schedule.
- E. **Coordination with Other Contractors:** Notify Kraus-Anderson Construction Company when foundations are ready for waterproofing and backfill.
- F. **Embeds Within Cast-In-Place Concrete:** Include layout and installation of embeds within cast-in-place concrete, including but not limited to the following:
 1. Responsibility to receive, unload, and transport to install, erect or setting location, and to ensure alignment, connection to reinforcement where required, and protection during placement of concrete.
 - a. Detailed layout and installation drawings of embeds will be provided by Work Scope which requires embed.
 2. Anchor bolts, metal nosings, and miscellaneous metals cast into concrete.
 3. Embeds and channel inserts shall be furnished by Work Scope which requires the embed.
 4. Provide sleeves for hand rails and guard rails where railings are indicated on concrete substrate.
 5. Embeds and blockouts for curtain walls anchors.
 6. Passenger Boarding Bridge embeds (supplied by others).
- G. **Coordination of Embeds Set by Others:** Include coordination for embeds set by other Work Scopes, including but not limited to the following:
 1. Passenger Boarding Bridge Work Scope will provide embeds and sleeves for their work.
 2. Mechanical Work Scope will install sleeves and embeds for their work.
 3. Electrical Work Scope will install sleeves, embeds, conduit, and boxes required to be poured within the concrete for their work.
 4. This Work Scope is responsible for layout and forming of blockouts indicated, and to ensure alignment, connection to reinforcement where required, and protection during placement of concrete.
- H. **Protection of Embeds and Reinforcing:** Properly protect reinforcing, anchor bolts, embeds, etc. protruding beyond the surface in accordance with OSHA standards. This includes trip hazards.
- I. **Spalling Caused by Embeds:** Anchors and embeds shall be "non-spalling" design. Spalling, which occurs, will require patching in accordance with direction from the Architect and Contractor.
- J. **Grouting Required by This Work Scope:** This Work Scope shall include the following:
 1. Grouting of all base plates.

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KA SPECIAL REQUIREMENTS

- K. **Exposed Surfaces:** Refer to Specifications for specific requirements, but not less than:
 - 1. Include pointing, patching, rubbing and grinding, removal of form ridges, coating of concrete surfaces to receive final finish in accordance with contract documents.
 - 2. Outside Corners: Include champhered edges on outside corners, unless specifically detailed otherwise.
 - 3. Surfaces in tug tunnel must have surfaces finished to receive paint.
- L. **Surfaces to Receive Waterproofing:** Refer to specifications for specific requirements, plus include champhered edges on outside corners of foundation walls scheduled to receive dampproofing or waterproofing.
- M. **Special Safety Requirements:** This Work Scope is responsible for the installation and maintenance of temporary handrails, guardrails, toe boards, cable rails, and supports for the same at perimeter of the structure, leading edges, elevator openings, stair openings, stair handrails, mechanical openings, and other openings required to be protected by OSHA regulations.
 - 1. This Work Scope will provide (furnish and install) the cable and clamps required materials.
 - 2. Removal protection, other than at leading edges, will be by subcontractor requiring access.
 - 3. Leading edge protection will be removed by this Work Scope.
 - 4. Reinforcing bars, anchor bolts, embeds, etc., protruding beyond the surface shall be properly protected per OSHA Standards, including trip hazards.
- N. **Dewatering:** Minor dewatering during concrete forming, placement, and initial curing operations of this Work Scope to keep excavation area free of water. Coordinate requirements and procedures with Civil Work Scope 2.21C.
- O. **Concrete Pumping:** Included by this Work Scope.
 - 1. If trade contractor elects to use a central concrete placement system, location shall be coordinated and approved by Kraus-Anderson Construction Company.
- P. **Concrete Wash-Down:** Excess and wash up concrete distributed within construction limits will be removed and disposed of on a DAILY basis. In addition to the concrete pour clean up, non-usable material will be cleaned up daily and disposed of in accordance with the SWPPP plan.
- Q. **Quality Control:** Flatness conditions should be maintained per the contract documents.
- R. **Special Inspections:** Special and structural inspections will be done in accordance with the Contract Documents prior to placement of concrete. Special Inspector or Structural Engineer reserve right to inspect at both the truck location and hose discharge location.
- S. **Traffic Control:** Provide traffic control spotters/flag personal and have them present at all times during concrete deliveries and pours as necessary.
- T. **Site Cleaning:** Debris tracked or carried of site into traffic lanes must be cleaned up immediately. If tracking continues, this Work Scope shall provide continuously cleaning operations during activities of this Work Scope.
- U. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, subcontractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents.
- B. **Quality Control Submittals:** In accordance with specification sections, submit mill reports and concrete trip tickets to Kraus-Anderson's Superintendent with each delivery.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

Work Scope 3.21C – Concrete & Excavation
KA SPECIAL REQUIREMENTS

1.07 UNIT PRICES, EQUIPEMENT RENTAL, AND LABOR RATES

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 5.21C – Struct. Steel & Misc. Metal Fabrication

KA SPECIAL REQUIREMENTS

1.01 STRUCT. STEEL & MISC. METAL FABRICATION

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements. In the event of a conflict between the General Provisions and Special Provisions, the Special Provisions will prevail.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 - General Requirements	Complete
05120	Structural Steel Framing	Complete
05310	Steel Roof Deck	Complete
05500	Metal Fabrications	Complete
05521	Pipe and Tube Railings	Complete
05530	Metal Gratings	Complete
09960	High-Performance Coatings	Complete

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1-7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.
- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope. This work scope includes both the fabrication and installation of steel for the project. Provide all labor, material and equipment (to include cranes/material handling) for installation of all structural steel for this Work Scope. Work includes, but is not limited to: the Tug Tunnel (Phase II) columns/roof, Pedestrian Ramps Grating and Railings and Revenue Control Booth Canopy. Includes all anchors, bolts, fasteners, lintels, frames, plates, etc as detailed for this Work Scope.
- Excluding:** Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.
- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Liquidated damages will be assessed per the Contract Documents.

Work Scope 5.21C – Struct. Steel & Misc. Metal Fabrication

KA SPECIAL REQUIREMENTS

- F. **Contract Duration:** This Work Scope will have 60 working days to complete their work.
- G. **Winter Conditions:** Include temporary enclosures, shelters, blankets, snow removal as required specific to the work/storage of materials and any other winter conditions costs specific to the work in accordance with the specifications and project schedule. Winter heat, fuel and equipment is provided by others.
- H. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.
- I. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- J. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA, FAA, TSA, CBP and DAA requirements, **AISC certification fabricator and erector.**
- K. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the Work Scope, and provided at no additional cost.
- L. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- M. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- N. **Tug Tunnel Work in this Work Scope –** Work to be completed is Phase II Tug Tunnel. West Tug Tunnel work from 77' – 6" west of Gridline 1.3 to a point 242' – 6" west of Gridline 1.3. East Tug Tunnel work from 62' – 6" east of Gridline 11.7 to a point 212' – 6" east of Gridline 11.7.
- O. **Tug Tunnel Work in Previous Work Scope – Work Scope 5.20A:** This work described herein this paragraph is part of a previous bid package. Work completed from the building exterior wall at Gridline 1.3 to a point 77'-6" west and Gridline 11.7 to a point 62'-6" east. Includes the bulkhead forming to provide two Phase 1 concrete openings (one on each side of the building/each tunnel) for temporary access to the tunnel.
- P. **WORK SCOPE 5.21C WILL BE REQUIRED TO CONFORM TO THE 09960 SPEC FOR ALL STRUCTURAL STEEL (NOT JUST THE PUBLIC VIEW STEEL).** Also, the scope of High Performance Coatings includes the complete High Performance Coating system for the steel elements included in BP-2C.
- Q. **Structural Steel Framing:** Provide structural steel framing including but not limited to:
 - 1. Shop drawings and connection detailing.
 - 2. Fabrication.
 - 3. Shop priming and painting where specified.
 - 4. Members and profiles indicated and sized on Structural Drawings.
 - 5. Delivery.
 - 6. Erection:
 - a. Provide and install all steel required as indicated on drawings and specifications.
 - b. Coordinate connection of tug tunnel steel with previously awarded Work Scope 5.20A.
- R. **Metal Decking:**
 - 1. Shop drawings and connection detailing.
 - 2. Fabricate deck to type and profiles indicated.
 - a. Provide complete with necessary accessories, sheet metal closures, concrete stops, joint tapes, and other materials required for a complete installation.
 - b. Clarification – Deck fabricator shall warrant that deck, when properly installed, requires no shoring to prevent deflection of metal deck during or after concrete placement.
 - 3. Shop priming and painting where specified.
 - a. This Work Scope is responsible to ensure compatibility of shop primer with finish coats.
 - 4. Delivery.
 - 5. Erection:
 - a. Provide (furnish and install) sheer studs at composite deck if indicated.
 - b. Field cutting and shaping of steel deck as may be required.
- S. **Interior Pipe Bollards:** Provide 8 total bollards as indicated on drawings, 4ea at Tug Tunnel entrances. Installed by WS 3.21C.
- T. **Connection, Subcomponent Engineering, and Special Erection Sequencing Requirements:** Where required by Contract Documents, or where connection detailing is requirement of fabricator for design members and connections not indicated on the Contract Documents.

Work Scope 5.21C – Struct. Steel & Misc. Metal Fabrication

KA SPECIAL REQUIREMENTS

1. Where Project Schedule requires special erection sequencing not specifically addressed by the structural design, provide engineering services to accommodate special sequencing, temporary bracing, and erection loads.
 2. Delegated Design Requirements: For those specific portions of the Work requiring professional engineering services by Section 05120 including engineering analysis, calculations, connection details, shop and fabrication drawings, embed placement drawings, and erection drawings.
- U. **Coordination of Embeds Set By Others:** Include coordination for embeds set by others, including but not limited to the following:
1. Anchor bolts.
 2. Embed plates and brackets (shown or not).
 3. Channel inserts used to secure work of this Section.
 4. Trade contractor requiring embeds will provide embeds and setting drawings to locate and specify anchorage requirements.
- V. **Anchors and Embeds:** Comply with the following.
1. Anchors used in concrete slabs or walls must be of a "non-spalling" type anchor.
 2. Detailed layout drawings of embeds are to be provided by this Work Scope for use by setting contractor.
 3. Concrete Work Scope will place embeds within concrete work, unless specifically note otherwise in this Work Scope Description or required by your quality control procedures.
 4. Include all angle embeds and grating required for trench drains.
 5. Include leveling nuts for ALL embeds.
 6. All embeds for elevators, including floor angles at door openings.
- W. **On-Site Handling of Embeds and Items for Installation:** Installation, erection and setting requirement includes the obligation for proper receiving, unloading and transport to install, erect or setting location.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1-7 and 10-11 of the specifications.
1. The CM will provide the standard surveying for the building, including staking all of the gridlines and offsets. (One initial set, one set of offsets, and a benchmark per floor). This Work Scope will be required to take the offsets and transfer as required. The CM may double check random elevations and locations at no cost to this Work Scope. This Work Scope is responsible for all remaining layout.
 2. Layout and engineering for shoring and temporary supports shall be included.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Winter/Cold Weather Conditions:** Include costs for winter conditions, i.e. enclosures, blankets, etc. as required to protect the work for a proper installation to meet the project schedule. These costs include, but not limited to:
1. Snow removal off stored materials.
 2. Ice removal on bearing points.
 3. Delays in erection due to high winds, snow storms or severe cold (schedule must be maintained).
- D. **Special Protection:** Take special care while working above other trades and to provide protection necessary to protect trades below from falling objects and sparks.
- E. **Special Inspections:** Special and structural inspections will be done in accordance with the Contract Documents.
- F. **Perimeter and Slab Edge Protection:** This Work Scope is responsible to furnish, install, and maintain perimeter barricades and interior opening barricades at supported decks in accordance with OSHA requirements and as directed by Kraus-Anderson until exterior enclosure meets protection requirements or otherwise directed by Kraus-Anderson Construction Company.
1. Remove barricades when directed by Kraus-Anderson.
- G. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
- H. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.

Work Scope 5.21C – Struct. Steel & Misc. Metal Fabrication

KA SPECIAL REQUIREMENTS

- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.
- B. **Quality Control Submittals:** All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 6.22C – General Construction (Concessions Buildout)

KA SPECIAL REQUIREMENTS

1.01 GENERAL CONSTRUCTION (CONCESSIONS BUILDOUT)

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements. In the event of a conflict between the General Provisions and Special Provisions, the Special Provisions will prevail.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
06100	Rough Carpentry	Responsible For All of BP-2C Rough Carpentry Items Complete. Including But Not Limited to Concessions Buildout
05700	Ornamental Metals	As It Relates To Concessions Buildout
06220	Interior Prefinished Wall Surfacing	As It Relates To Concessions Buildout
06402	Interior Architectural Woodwork	As It Relates To Concessions Buildout
06422	Flush Wood Paneling	As It Relates To Concessions Buildout
06611	Solid Polymer Fabrications	As It Relates To Concessions Buildout
07920	Joint Sealants	As It Relates To Concessions Buildout
08110	Steel Doors and Frames	As It Relates To Concessions Buildout
08710	Finish Hardware	As It Relates To Concessions Buildout
09111	Non-Structural Steel Framing	As It Relates To Concessions Buildout
09130	Acoustical Suspended System	As It Relates To Concessions Buildout
09250	Gypsum Board	As It Relates To Concessions Buildout
09310	Tile	As It Relates To Concessions Buildout
09511	Acoustical Panel Ceiling	As It Relates To Concessions Buildout
09524	Wood Linear Panel Ceilings	As It Relates To Concessions Buildout
09650	Resilient Tile Flooring	As It Relates To Concessions Buildout
09678	Resilient Base and Accessories	As It Relates To Concessions Buildout
09720	Wall Coverings	As It Relates To Concessions Buildout
09770	Special Wall Surfacing	As It Relates To Concessions Buildout

Work Scope 6.22C – General Construction (Concessions Buildout)

KA SPECIAL REQUIREMENTS

09900	Painting	As It Relates To Concessions Buildout
10262	Wall Protection	As It Relates To Concessions Buildout
12360	Quartz Surfacing Countertops	As It Relates To Concessions Buildout

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1-7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1 and Bid Package 2A Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.

Scope: Including but not limited to: Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope.

This Work Scope includes all general construction work associated with the concession area buildout for all specification sections identified at the beginning of this Work Scope.

Provide and install all specification sections included in this Work Scope description but not limited to: rough carpentry, ornamental metals, interior prefinished wall surfacing, architectural woodwork, flush wood paneling, solid polymer fabrications, joint sealants, steel doors and frames, finish hardware, metal studs, acoustical suspended system, gypsum board, tile, acoustical panel ceilings, linear panel ceilings, resilient flooring's base, wall coverings, wall surfacing, painting, wall protection and quartz countertops. Coordination with other Work Scopes is required. Receiving, unloading, uncrating, locating, and storage of materials is the sole responsibility of this Work Scope. Also see Section M below for further instructions.

Excluding: Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel, snow plowing of parking lots and roads to access site will be provided by others.

- B. **Work Hours:** A typical work week will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- C. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- D. **Schedule:** The enclosed draft construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Liquidated damages will be assessed per the Contract Documents.
- E. **Contract Duration:** This Work Scope will have 90 working days to complete their work onsite.
- F. **Protection of Your Work:** Until final acceptance by the Owner team, any necessary protection of in progress or completed scope is incidental to this Work Scope.
- G. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.
- H. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- I. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA, FAA, TSA, CBP and DAA requirements.

Work Scope 6.22C – General Construction (Concessions Buildout)

KA SPECIAL REQUIREMENTS

- J. **Clean-Up:** Provide continuous and on-going housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the Work Scope, and provided at no additional cost. At a minimum, one (1) day per week will be designated as the Clean-Up Day. Each contractor must anticipate several hours of clean-up each week on this day, which will vary by the level of cleaning required. During this clean-up time – All trades/contractors on site will be required to participate or be back charged for their portion of this clean-up. This will be enforced.
- K. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- L. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- M. **Installation of Materials and Components Specified Under other Work Scopes:** Provide labor and miscellaneous mounting hardware/fasteners required for a complete installation, including but not limited to the following:
 - 1. Responsible to receive, unload, store, and maintain material to be installed under this Work Scope.
- N. **Complete Assembly:** Provide fasteners, sealant, trim, and miscellaneous components for a complete installation.
 - 1. This contractor recognizes the contract documents do not reflect every detail necessary to provide a complete working system, and therefore has included additional materials and related labor to provide a complete assembly as per the intent of the documents.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1-7 and 10-11 of the specifications (previously awarded work).
 - 1. This Work Scope is responsible for all relevant layout regarding scope necessary to complete required work.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Surface Preparation for Masonry to Receive Final Finishes:** Provide shimming, grinding of new or existing surfaces necessary to achieve acceptable substrate for final finishes specified in accordance with Contract Documents.
- D. **Special Safety Requirements:** This Work Scope is responsible for the maintenance of temporary handrails, guardrails, toe boards, cable rails, and supports for the same at leading edges, stair handrails, and other openings required to be protected by OSHA regulations for your required work areas.
- E. Reinforcing bars, anchor bolts, embeds, etc., protruding beyond the surface shall be properly protected per OSHA Standards, including trip hazards.
- F. **Special Coordination:** Special coordination and detailing will be required at the conditions indicated below, including cutting, fitting, and sealants around penetrations and accessories.
 - 1. Some floor systems have shallow ducting system underneath and have maximum floor loads to consider regarding lift/scaffold/storage of material locations. Consideration must be taken not damage this system.
- G. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
 - 1. Materials to be removed and disposed in appropriate Kraus-Anderson dumpster.
- H. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work. Per OSHA regulations.
- C. **Onsite Storage:** Storing materials onsite and possible relocating materials will be necessary. Coordinate with Construction Manager.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.

Work Scope 6.22C – General Construction (Concessions Buildout)

KA SPECIAL REQUIREMENTS

- B. Quality Control Submittals: All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 7.22C – Metal Wall Panels & Furring

KA SPECIAL REQUIREMENTS

1.01 METAL WALL PANELS & FURRING

- A. **Scope of Work:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 - General Requirements	Complete
07412	Metal Wall Panels	Complete
07620	Flashing and Trim	As It Applies To This Work Scope
07710	Roof Specialties	Complete
07920	Joint Sealants	As It Applies To This Work Scope
05400	Cold Formed Metal Framing	As It Applies To This Work Scope
10530	Walkway Covers	Complete

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1-7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.

- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope. Provide all labor, material and equipment (to include cranes/material handling) for installation of Phase I and II Corrugated Metal Panel Wall System, Louvers, Coping Cap, Roof Edge Flashing, Walkway Covers, and Roof-Edge Drainage System for both Tug Tunnels (East and West).

Excluding: Structural steel and metal decking, not required for metal wall panel system, will be provided and installed by WS 5.20A (Phase I) and WS 5.21C (Phase II). Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.

- C. **Work Hours:** A typical work week will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Schedule:** The enclosed construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.

Work Scope 7.22C – Metal Wall Panels & Furring

KA SPECIAL REQUIREMENTS

1. Liquidated Damages will be assessed per the Contract Documents.
 2. The work for the Tug Tunnels will be phased – Bid/Plan Accordingly.
- E. **Winter Conditions:** Include temporary enclosures, shelters, blankets, heat equipment, fuel or any other temporary heat provisions necessary to perform your specific work in accordance with the project schedule.
- F. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.
- G. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- H. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA.
- I. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite.
- J. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- K. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- L. **Contract Duration:** This Work Scope will have 40 working days to complete their work.
- M. **Tug Tunnel:** Work to be completed from the building exterior wall at Gridline 1.3 to **THE WEST END POINT OF THE TUNNEL** and Gridline 11.7 to **THE EAST POINT OF THE TUNNEL**. **THIS WORK SCOPE INCLUDES THE ENTIRE TUG TUNNEL AREA.**
- N. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- O. **Rough Carpentry:** Provided by Work Scope 6.22C.
- P. **Corrugated Metal Wall System:** Provide and install metal wall panel system in accordance with section 05400 & 07412 including, but not limited to:
1. Special warranty as specified in specifications.
 2. Cold formed metal framing, subgirts and secondary framing behind panels as indicated or required to maintain deflection requirements from primary steel indicated.
 - a. Provide Delegated Design requirements as per specifications.
 3. Provide complete assembly – reference Par. R “Complete Assembly.”
 4. Louvers for intake and exhaust as indicated on drawings and specifications.
 5. Coordination with Bid Package 2A and Work Scopes 5.20A and 5.21C will be required.
- Q. **Coping Cap, Roof Edge Flashing, and Drainage System:** Provide and install coping caps, roof edge flashing, and Roof-Edge Drainage System in accordance with section 07620 and 07710 including, but not limited to:
1. Special warranty as specified in specifications.
 2. Provide complete assembly – reference Par. R “Complete Assembly.”
 3. Coordination with Bid Package 2A and Work Scopes 5.20A and 5.21C will be required.
- R. **Complete Assembly:** Provide fasteners, sealant, trim, flashing and counter flashings for a complete system, including but not limited to, flashings, counter flashing, sheet metal, and sealants necessary within your systems and adjacent to other dissimilar materials.
- S. **System Engineering:** Provide complete design, supply and installation of required anchorage/support systems necessary for the complete installation of your work (including engineered calculations) above and beyond what is depicted on the drawings and specifications.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Special Coordination at Exterior Envelope (Vapor Barriers / Thermal Enclosure):** Construction exterior enclosure to ensure continuous thermal insulation and vapor barrier as indicated or required (walls, soffits, parapets, and insulated canopies).
- B. **Special Safety Requirements:** This Work Scope is responsible for the installation and maintenance of temporary handrails, guardrails, toe boards, cable rails, and supports for the same at perimeter of the structure, leading edges, stair handrails, and other openings required to be protected by OSHA regulations for your required work areas.
- C. **Sealants:** Provide sealants for this work scope within and around metal panel, roof edge flashing, coping caps, and roof-edge drainage system assemblies in accordance with requirements of Section 07920.

Work Scope 7.22C – Metal Wall Panels & Furring

KA SPECIAL REQUIREMENTS

- D. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1-7 and 10-11 of the Specifications for All Work Scopes.
 - 1. This Work Scope is responsible for all remaining layout required for this Work Scope.
 - 2. Layout and engineering for shoring and temporary supports shall be included.
 - 3. Layout and saw cutting, wall removals, shoring, installation of necessary support steel headers shall be included and as required.
- D. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort.

1.04 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.05 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work.

1.06 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, subcontractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents.

1.07 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 8.23C – Overhead Fabric Doors

KA SPECIAL REQUIREMENTS

1.01 OVERHEAD FABRIC DOORS

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
08385	High-Speed Overhead Doors	Complete

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1-7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.

- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope.

Excluding: Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.

- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Liquidated Damages will be accessed per contract documents.
- F. **Winter Conditions:** Include temporary enclosures, shelters, blankets, snow removal as required specific to the work/storage of materials and any other winter conditions costs specific to the work in accordance with the specifications and project schedule. Winter heat is provided by others.
- G. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.
- H. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- I. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA.

Work Scope 8.23C – Overhead Fabric Doors

KA SPECIAL REQUIREMENTS

- J. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the Work Scope, and provided at no additional cost.
- K. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- L. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- M. **Contract Duration:** This Work Scope will have 15 working days to complete their work.
- N. **Tug Tunnel:** Provide and install overhead fabric doors 178B and 179B.
- O. **Complete and Functional Assembly:** Provide miscellaneous accessories, fasteners, and trim for a complete system, including but not limited to:
 - 1. Items not shown but necessary to provide a properly functioning system shall be included in this Work Scope.
 - 2. Coordinate power requirements with Work Scope 16.20A.
 - 3. This Work Scope is responsible for all Work (control wiring, switches, and conduit) from power supply junction box provided under Electrical.
 - 4. Miscellaneous metal framing members required to provide overhead support, vertical jambs and side track, unless specifically indicated to be provided by another Work Scope.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1 - 6, 9, 10 and 11 of the specifications.
 - 1. This Work Scope is responsible for all remaining layout.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Winter/Cold Weather Conditions:** Include costs for winter conditions, i.e. enclosures, blankets, etc. as required to protect the work for a proper installation to meet the project schedule. These costs include, but not limited to:
 - 1.
- D. **Surface Preparation for Concrete to Receive Final Finishes:** Provide concrete, patching, filling, grinding of new or existing concrete surfaces necessary to achieve acceptable substrate for final finishes specified in accordance with Contract Documents.
- E. **Special Safety Requirements:** This Work Scope is responsible for the installation and maintenance of temporary handrails, guardrails, toe boards, cable rails, and supports for the same at perimeter of the structure, leading edges, stair handrails, and other openings required to be protected by OSHA regulations for your required work areas.
- F. Reinforcing bars, anchor bolts, embeds, etc., protruding beyond the surface shall be properly protected per OSHA Standards, including trip hazards.
- G. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
 - 1. Materials to be removed and disposed in Kraus-Anderson dumpster.
- H. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.

Work Scope 8.23C – Overhead Fabric Doors

KA SPECIAL REQUIREMENTS

- B. Quality Control Submittals: All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 9.25C – Painting

KA SPECIAL REQUIREMENTS

1.01 PAINTING

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements. In the event of a conflict between the General Provisions and Special Provisions, the Special Provisions will prevail.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
09900	Painting	All Required Exterior Painting

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1–7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.

- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope.

All painting and minor touch-up required per specifications required in 1.01 above.

Excluding: Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.

- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed draft construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Liquidated damages will be assessed per the Contract Documents.
- F. **Contract Duration:** This Work Scope will have 30 working days to complete their work.
- G. **Protection of Your Work:** Until final acceptance by the Owner team, any necessary protection of in progress or completed scope is incidental to this Work Scope.
- H. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.
- I. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.

Work Scope 9.25C – Painting

KA SPECIAL REQUIREMENTS

- J. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA, FAA, TSA, CBP and DAA requirements.
- K. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the work scope, and provided at no additional cost. At a minimum, 1-day per week will be designated as the Clean-Up Day. Each contractor must anticipate several hours of clean-up each week on this day, which will vary by the level of cleaning required. During this clean-up time – All trades/contractors on site will be required to participate or be back charged for their portion of this clean-up. This will be enforced.
- L. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- M. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1–7 and 10-11 of the specifications (previously awarded work).
 - 1. This Work Scope is responsible for all remaining layout.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Miscellaneous Metals:** Provided, installed, and finish painted under previous contracts. Include refinishing work prior to building occupancy. Stair railings and treads/risers.
- D. **Special Safety Requirements:** This Work Scope is responsible for the maintenance of temporary handrails, guardrails, toe boards, cable rails, and supports for the same at leading edges, stair handrails, and other openings required to be protected by OSHA regulations for your required work areas.
- E. **Special Coordination:** Special coordination and detailing will be required at the conditions indicated below, including cutting, fitting, and sealants around penetrations and accessories.
 - 1. Some floor systems have shallow ducting system underneath and have maximum floor loads to consider regarding lift/scaffold/storage of material locations. Consideration must be taken to not damage this system.
- F. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
 - 1. Materials to be removed and disposed in appropriate Kraus-Anderson dumpster.
- H. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work. Per OSHA regulations.
- C. **Onsite Storage:** Storing materials onsite and possible relocating materials will be necessary. Coordinate with Construction Manager.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.
- B. **Quality Control Submittals:** All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

Work Scope 9.25C – Painting
KA SPECIAL REQUIREMENTS

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 10.22C – Exterior Signage

KA SPECIAL REQUIREMENTS

1.01 EXTERIOR SIGNAGE

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements. In the event of a conflict between the General Provisions and Special Provisions, the Special Provisions will prevail.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
02466	Drilled Concrete Piers	Complete
10435	Exterior Signage	Furnish and Install

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1–7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.

- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction Manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope.

Provide and install complete functioning systems required in 1.01 above. Work scope includes all hardware, anchors, etc.

Excluding: Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.

- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed draft construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Liquidated damages will be assessed per the Contract Documents.
- F. **Contract Duration:** This Work Scope will have 20 working days to complete their work onsite.
- G. **Protection of Your Work:** Until final acceptance by the Owner team, any necessary protection of in progress or completed scope is incidental to this Work Scope.
- H. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.

Work Scope 10.22C – Exterior Signage

KA SPECIAL REQUIREMENTS

- I. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- J. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA, FAA, TSA, CBP and DAA requirements.
- K. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the Work Scope, and provided at no additional cost. At a minimum, 1-day per week will be designated as the Clean-Up Day. Each contractor must anticipate several hours of clean-up each week on this day, which will vary by the level of cleaning required. During this clean-up time – All trades/contractors on site will be required to participate or be back charged for their portion of this clean-up. This will be enforced.
- L. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- M. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- N. Specifications supersede Plan details regarding finish type.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1–7 and 10-11 of the specifications (previously awarded work).
 - 1. This Work Scope is responsible for all relevant layout regarding scope necessary to complete required work.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Special Protection:** Take special care while working above other trades and to provide protection necessary to protect trades below from falling objects and sparks.
- D. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
- E. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work. Per OSHA regulations.
- C. **Onsite Storage:** Storing materials onsite and possible relocating materials will be necessary. Coordinate with Construction Manager.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, “Buy American” submittals and the final red-lines “As Built” drawings as required, are considered part of this Work Scope.
- B. **Quality Control Submittals:** All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

Work Scope 10.22C – Exterior Signage
KA SPECIAL REQUIREMENTS

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates..

-- End --

Work Scope 11.20C – Food Service Equipment

KA SPECIAL REQUIREMENTS

1.01 FOOD SERVICE EQUIPMENT

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements. In the event of a conflict between the General Provisions and Special Provisions, the Special Provisions will prevail.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
11400	Food Service Equipment	Complete

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1–7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.

- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction Manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope.

Provide and install all food service equipment as shown on itemized Bid Form provided by Robert Rippe & Associates. Please submit a copy of this itemized Bid Form with the project Bid Form provided in the specifications. This Work Scope is solely responsible for the receiving, uncrating, off-loading, locating, storing and protection of all food service equipment prior to Owner/Architect and Construction Manager acceptance.

Excluding: Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel, snow plowing of parking lots and roads to access site will be provided by others.

- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed draft construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Liquidated damages will be assessed per the Contract Documents.
- F. **Contract Duration:** This Work Scope will have 60 working days to complete their work onsite.
- G. **Protection of Your Work:** Until final acceptance by the Owner team, any necessary protection of in progress or completed scope is incidental to this Work Scope.
- H. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.

Work Scope 11.20C – Food Service Equipment

KA SPECIAL REQUIREMENTS

- I. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- J. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA, FAA, TSA, CBP and DAA requirements.
- K. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the work scope, and provided at no additional cost. At a minimum, 1-day per week will be designated as the Clean-Up Day. Each contractor must anticipate several hours of clean-up each week on this day, which will vary by the level of cleaning required. During this clean-up time – All trades/contractors on site will be required to participate or be back charged for their portion of this clean-up. This will be enforced.
- L. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- M. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- N. Specifications super cede Plan details regarding finish type.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1–7 and 10-11 of the specifications (previously awarded work).
 - 1. This Work Scope is responsible for all relevant layout regarding scope necessary to complete required work.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Special Protection:** Take special care while working above other trades and to provide protection necessary to protect trades below from falling objects and sparks.
- D. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
- E. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work. Per OSHA regulations.
- C. **Onsite Storage:** Storing materials onsite and possible relocating materials will be necessary. Coordinate with Construction Manager.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.
- B. **Quality Control Submittals:** All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 11.21C – X-Ray Inspection Equipment

KA SPECIAL REQUIREMENTS

1.01 X-RAY INSPECTION EQUIPMENT

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements. In the event of a conflict between the General Provisions and Special Provisions, the Special Provisions will prevail.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
11911	X-Ray Inspection Equipment	Furnish and Install

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1–7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.

- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction Manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope.

Provide and install complete functioning systems required in 1.01 above. Work scope includes all hardware, anchors, etc.

Excluding: Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.

- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed draft construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Liquidated damages will be assessed per the Contract Documents.
- F. **Contract Duration:** This Work Scope will have 20 working days to complete their work onsite.
- G. **Protection of Your Work:** Until final acceptance by the Owner team, any necessary protection of in progress or completed scope is incidental to this Work Scope.
- H. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work. Close coordination with Bid Package 2A and Work Scope 16.20A will be required for power requirements.

Work Scope 11.21C – X-Ray Inspection Equipment

KA SPECIAL REQUIREMENTS

- I. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- J. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA, FAA, TSA, CBP and DAA requirements.
- K. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the Work Scope, and provided at no additional cost. At a minimum, 1-day per week will be designated as the Clean-Up Day. Each contractor must anticipate several hours of clean-up each week on this day, which will vary by the level of cleaning required. During this clean-up time – All trades/contractors on site will be required to participate or be back charged for their portion of this clean-up. This will be enforced.
- L. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- M. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1–7 and 10-11 of the specifications (previously awarded work).
 - 1. This Work Scope is responsible for all relevant layout regarding scope necessary to complete required work.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Special Protection:** Take special care while working above other trades and to provide protection necessary to protect trades below from falling objects and sparks.
- D. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
- E. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work. Per OSHA regulations.
- C. **Onsite Storage:** Storing materials onsite and possible relocating materials will be necessary. Coordinate with Construction Manager.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.
- B. **Quality Control Submittals:** All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 12.21C – Window Treatments

KA SPECIAL REQUIREMENTS

1.01 WINDOW TREATMENTS

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements. In the event of a conflict between the General Provisions and Special Provisions, the Special Provisions will prevail.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
12491	Horizontal Louver Blinds	Complete
12493	Blackout Shades	Complete
12494	Motorized Roller Shades	Complete
	Alternates – Motorized Roller Shades	See Alternate No. 2

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1–7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.
- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope.
- Provide and install complete functioning systems for items listed in 1.01 above. This includes final electrical connections if/as required. Work scope includes all hardware, anchors, etc.
- Excluding:** Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.
- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed draft construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Liquidated damages will be assessed per the Contract Documents.
- F. **Contract Duration:** This Work Scope will have 20 working days to complete their work.
- G. **Protection of Your Work:** Until final acceptance by the Owner team, any necessary protection of in progress or completed scope is incidental to this Work Scope.
- H. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.

Work Scope 12.21C – Window Treatments

KA SPECIAL REQUIREMENTS

- I. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- J. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA, FAA, TSA, CBP and DAA requirements.
- K. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the Work Scope, and provided at no additional cost. At a minimum, 1-day per week will be designated as the Clean-Up Day. Each contractor must anticipate several hours of clean-up each week on this day, which will vary by the level of cleaning required. During this clean-up time – All trades/contractors on site will be required to participate or be back charged for their portion of this clean-up. This will be enforced.
- L. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- M. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- N. Specifications supersede Plan details regarding finish type.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1–7 and 10-11 of the specifications (previously awarded work).
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Special Protection:** Take special care while working above other trades and to provide protection necessary to protect trades below from falling objects and sparks.
- D. **Special Safety Requirements:** This Work Scope is responsible for the maintenance of temporary handrails, guardrails, toe boards, cable rails, and supports for the same at leading edges, stair handrails, and other openings required to be protected by OSHA regulations for your required work areas.
- E. **Special Coordination:** Special coordination and detailing will be required at the conditions indicated below, including cutting, fitting, and sealants around penetrations and accessories.
 - 1. Some floor systems have shallow ducting system underneath and have maximum floor loads to consider regarding lift/scaffold/storage of material locations. Consideration must be taken to not damage this system.
- F. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
 - 1. Materials to be removed and disposed in appropriate Kraus-Anderson dumpster.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work. Per OSHA regulations.
- C. **Onsite Storage:** Storing materials onsite and possible relocating materials will be necessary. Coordinate with Construction Manager.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.
- B. **Quality Control Submittals:** All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

Work Scope 12.21C – Window Treatments

KA SPECIAL REQUIREMENTS

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 12.22C – Public, Office & Concessions Furniture

KA SPECIAL REQUIREMENTS

1.01 PUBLIC, OFFICE & CONCESSIONS FURNITURE

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements. In the event of a conflict between the General Provisions and Special Provisions, the Special Provisions will prevail.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
12500	Public Area Furniture	Furnish and Install
12501	Office Furniture	Furnish and Install
12502	Concessions Furniture	Furnish and Install

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1–7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.
- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope.
- Provide and install complete functioning public, office, and concessions furniture per specifications required in 1.01 above. Work scope includes all hardware, anchors, etc.

Excluding: Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.

- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed draft construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Liquidated damages will be assessed per the Contract Documents.
- F. **Contract Duration:** This Work Scope will have 30 working days to complete their work onsite.
- G. **Protection of Your Work:** Until final acceptance by the Owner team, any necessary protection of in progress or completed scope is incidental to this Work Scope.
- H. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.

Work Scope 12.22C – Public, Office & Concessions Furniture

KA SPECIAL REQUIREMENTS

- I. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- J. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA, FAA, TSA, CBP and DAA requirements.
- K. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the Work Scope, and provided at no additional cost. At a minimum, 1-day per week will be designated as the Clean-Up Day. Each contractor must anticipate several hours of clean-up each week on this day, which will vary by the level of cleaning required. During this clean-up time – All trades/contractors on site will be required to participate or be back charged for their portion of this clean-up. This will be enforced.
- L. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- M. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- N. Specifications supersede Plan details regarding finish type.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1–7 and 10-11 of the specifications (previously awarded work).
 - 1. This Work Scope is responsible for all relevant layout regarding scope necessary to complete required work.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Special Protection:** Take special care while working above other trades and to provide protection necessary to protect trades below from falling objects and sparks.
- D. **Special Safety Requirements:** This Work Scope is responsible for the maintenance of temporary handrails, guardrails, toe boards, cable rails, and supports for the same at leading edges, stair handrails, and other openings required to be protected by OSHA regulations for your required work areas.
- E. **Special Coordination:** Special coordination and detailing will be required at the conditions indicated below, including cutting, fitting, and sealants around penetrations and accessories.
 - 1. Some floor systems have shallow ducting system underneath and have maximum floor loads to consider regarding lift/scaffold/storage of material locations. Consideration must be taken to not damage this system.
- F. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
 - 1. Materials to be removed and disposed in appropriate Kraus-Anderson dumpster.
- G. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work. Per OSHA regulations.
- C. **Onsite Storage:** Storing materials onsite and possible relocating materials will be necessary. Coordinate with Construction Manager.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, “Buy American” submittals and the final red-lines “As Built” drawings as required, are considered part of this Work Scope.
- B. **Quality Control Submittals:** All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

Work Scope 12.22C – Public, Office & Concessions Furniture
KA SPECIAL REQUIREMENTS

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 13.21C – Fire Protection System

KA SPECIAL REQUIREMENTS

1.01 FIRE PROTECTION SYSTEM

- A. **Scope of Work:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
13050	Fire Protection General Requirements	As It Relates to Concessions Buildout
13053	Fire Protection General Materials and Methods	As It Relates to Concessions Buildout
13060	Fire Protection Hangers and Supports	As It Relates to Concessions Buildout
13075	Fire Protection Identification	As It Relates to Concessions Buildout
13915	Fire Protection Suppression Piping	As It Relates to Concessions Buildout
13916	Fire Suppression Sprinklers	As It Relates to Concessions Buildout
07841	Through-Penetration Firestop Systems	For This Work Scope Only

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1-7 and 10-11 for additional requirements affecting this Work Scope.
- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope.
- Excluding:** Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.
- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.

Work Scope 13.21C – Fire Protection System

KA SPECIAL REQUIREMENTS

- E. **Schedule:** The enclosed construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
 - 1. Liquidated Damages will be assessed per contract documents.
- F. **Winter Conditions:** Include temporary enclosures, shelters, blankets, snow removal as required specific to the work/storage of materials and any other winter conditions costs specific to the work in accordance with the specifications and project schedule. Winter heat is provided by others.
- G. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.
- H. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- I. **Compliance:** Comply with all Federal, State and Local building codes and regulations, OSHA, AISC certification fabricator and erector.
- J. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the work scope, and provided at no additional cost.
- K. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- L. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- M. **Contract Duration:** This Work Scope will have 20 working days to complete their work.
- N. **Functional System:** Provide complete functional system consistent with the design intent of the specifications sections identified above and other project documents, including but not limited to:
 - 1. Items not shown but necessary to provide a properly functioning system shall be included in this Work Scope.
 - 2. Compliance with applicable Building Codes related to fire protection requirements, including accommodation for project specific hazardous, responsible to satisfy concerns from the city fire marshal or building inspector.
 - 3. Required permits and inspections fees.
- O. **Water Pressure:** This has been established by previous Bid Package 2A contractor.
- P. **Standpipes During Construction:** Coordinate with city fire marshal to clarify scope and requirements for standpipes during construction phase. Refer to Section 01 5010 for additional requirements.
- Q. **Housekeeping and Equipment Pads:** Provide concrete housekeeping pads for your work. Most pads have been provided under Bid Package 2A contractors.
- R. **Sleeve:** Layout, cutting openings, and setting sleeves and embeds required by this Work Scope.
- S. **Fire-Stopping Assemblies Occurring Within and Around Drywall Assemblies:** Provide firestopping for penetrations required by this Work Scope through fire rated assemblies and where indicated in accordance with requirements of Section 07841.
 - 1. Special Note: Project will select a single fire-stopping manufacturer for use throughout the Project. Coordinate requirements with Kraus-Anderson Construction Company.
- T. **System Start-Up:** Start, test and adjust systems prior to completion.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1-7 and 10-11 of the specifications.
 - 1. The CM will provide the standard surveying for the building, including staking all of the gridlines and offsets. (One initial set, one set of offsets, and a benchmark per floor). This Work Scope will be required to take the offsets and transfer as required. The CM may double check random elevations and locations at no cost to this Work Scope. This Work Scope is responsible for all remaining layout.
 - 2. Layout and engineering for shoring and temporary supports shall be included.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Winter/Cold Weather Conditions:** Include costs for winter conditions, i.e. enclosures, blankets, etc. as required to protect the work for a proper installation to meet the project schedule.

Work Scope 13.21C – Fire Protection System

KA SPECIAL REQUIREMENTS

- D. **Special Protection:** Take special care while working above other trades and to provide protection necessary to protect trades below from falling objects and sparks.
- E. **Special Inspections:** Special and structural inspections will be done in accordance with the Contract Documents.
- F. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
- G. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.
- B. **Quality Control Submittals:** All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 13.22C – Breach Control KA SPECIAL REQUIREMENTS

1.01 BREACH CONTROL

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements. In the event of a conflict between the General Provisions and Special Provisions, the Special Provisions will prevail.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
08411	Aluminum-Framed Storefronts & Entrances	As It Applies To This Work Scope
08460	Automatic Entrance Doors	As It Applies To This Work Scope
08801	Interior Glazing	As It Applies To This Work Scope
13700	Part 1542 Computer Controlled Access System (CCAS)	As It Applies To This Work Scope
13755	Integrated Exit Lane Breach Control System	As It Applies to 13755
16050	Basic Electrical Materials & Methods	As It Applies To This Work Scope
16060	Grounding & Bonding	As It Applies To This Work Scope
16075	Electrical Identification	As It Applies To This Work Scope
16080	Electrical Testing	As It Applies To This Work Scope
16120	Conductors and Cables	As It Applies To This Work Scope
16714	Communications Equipment Room Fittings	As It Applies To This Work Scope
16715	Communications General Network Equipment	As It Applies To This Work Scope
07841	Through-Penetration Firestop Systems	As It Applies To This Work Scope

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1–7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.
- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and

Work Scope 13.22C – Breach Control

KA SPECIAL REQUIREMENTS

the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope.

Furnish and install a complete fully operating and Owner accepted Breach Control system per the specifications and contract documents. Contractors are responsible to provide a base bid on one out of the three options. Each different type of system has a corresponding Option. See Section 13755 and Section 1.08 of this Work Scope for descriptions of the three options. This Work Scope includes all fire stopping of penetrations resulting from this Work Scope.

Excluding: Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.

- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed draft construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
 - 1. Liquidated Damages will be assessed per contract documents.
- F. **Contract Duration:** This Work Scope will have 30 working days to complete their work onsite.
- G. **Protection of Your Work:** Until final acceptance by the Owner team, any necessary protection of in progress or completed scope is incidental to this Work Scope.
- H. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work. Special coordination with Mechanical, Electrical Work, and all low voltage Scopes is required.
- I. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- J. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA, FAA, TSA, CBP and DAA requirements. This Work Scope is ultimately a Design-Build project, and must conform to all governing agencies and requirements.
- K. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the Work Scope, and provided at no additional cost. At a minimum, 1-day per week will be designated as the Clean-Up Day. Each contractor must anticipate several hours of clean-up each week on this day, which will vary by the level of cleaning required. During this clean-up time – All trades/contractors on site will be required to participate or be back charged for their portion of this clean-up. This will be enforced.
- L. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- M. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- N. **Functional System:** Provide complete functional system consistent with the design intent of the specifications sections identified above and other project documents, including but not limited to:
 - 1. Items not shown but necessary to provide a properly functioning system shall be included in this Work Scope.
 - 2. Compliance with applicable Building Codes related to installation and wiring.
 - 3. Required permits and inspections fees.
- O. **Fire-Stopping Assemblies Occurring Within and Around Drywall Assemblies:** Provide firestopping for penetrations required by this Work Scope through fire rated assemblies and where indicated in accordance with requirements of Section 07841.
 - 1. Special Note: Project will select a single fire-stopping manufacturer for use throughout the Project. Coordinate requirements with Kraus-Anderson Construction Company.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1–7 and 10-11 of the specifications (previously awarded work).
 - 1. This Work Scope is responsible for all relevant layout regarding scope necessary to complete required work.

Work Scope 13.22C – Breach Control

KA SPECIAL REQUIREMENTS

- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Special Protection:** Take special care while working above other trades and to provide protection necessary to protect trades below from falling objects and sparks.
- D. **Special Safety Requirements:** This Work Scope is responsible for the maintenance of temporary handrails, guardrails, toe boards, cable rails, and supports for the same at leading edges, stair handrails, and other openings required to be protected by OSHA regulations for your required work areas.
- E. **Special Coordination:** Special coordination and detailing will be required at the conditions indicated below, including cutting, fitting, and sealants around penetrations and accessories.
 - 1. Some floor systems have shallow ducting system underneath and have maximum floor loads to consider regarding lift/scaffold/storage of material locations. Consideration must be taken to not damage this system.
- F. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
 - 1. Materials to be removed and disposed in appropriate Kraus-Anderson dumpster.
- G. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work. Per OSHA regulations.
- C. **Onsite Storage:** Storing materials onsite and possible relocating materials will be necessary. Coordinate with Construction Manager.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.
- B. **Quality Control Submittals:** All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 OPTIONS

- A. This Work Scope is only required to bid one of the three below options:
 - 1. Option A: Self-Contained Breach Control System Units. See Section 13755.
 - 2. Option B: Motion Detection System combined with two sets of automatic entrances at the ends of the Deplaning Corridor. See Section 13755.
 - 3. Option C: Motion Detecting Optical Turnstiles combined with one automatic entrance at the secure end of the Deplaning Corridor. See Section 13755.

1.09 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 13.23C – Prefabricated Control Booth

KA SPECIAL REQUIREMENTS

1.01 PREFABRICATED CONTROL BOOTH

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements. In the event of a conflict between the General Provisions and Special Provisions, the Special Provisions will prevail.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
13129	Prefabricated Control Booths	Furnish and Install

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1–7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.

- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction Manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope.

Provide and install complete functioning systems required in 1.01 above. Work scope includes all hardware, anchors, etc.

Excluding: Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.

- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed draft construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Liquidated damages will be assessed per the Contract Documents.
- F. **Contract Duration:** This Work Scope will have 20 working days to complete their work onsite.
- G. **Protection of Your Work:** Until final acceptance by the Owner team, any necessary protection of in progress or completed scope is incidental to this Work Scope.
- H. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.
- I. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.

Work Scope 13.23C – Prefabricated Control Booth

KA SPECIAL REQUIREMENTS

- J. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA, FAA, TSA, CBP and DAA requirements.
- K. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the work scope, and provided at no additional cost. At a minimum, 1-day per week will be designated as the Clean-Up Day. Each contractor must anticipate several hours of clean-up each week on this day, which will vary by the level of cleaning required. During this clean-up time – All trades/contractors on site will be required to participate or be back charged for their portion of this clean-up. This will be enforced.
- L. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- M. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- N. Specifications supersede Plan details regarding finish type.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1–7 and 10-11 of the specifications (previously awarded work).
 - 1. This Work Scope is responsible for all relevant layout regarding scope necessary to complete required work.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Special Protection:** Take special care while working above other trades and to provide protection necessary to protect trades below from falling objects and sparks.
- D. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
- E. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work. Per OSHA regulations.
- C. **Onsite Storage:** Storing materials onsite and possible relocating materials will be necessary. Coordinate with Construction Manager.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.
- B. **Quality Control Submittals:** All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 14.21C – Passenger Boarding Bridges

KA SPECIAL REQUIREMENTS

1.01 PASSENGER BOARDING BRIDGES

- A. **Specific Work Scope:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified as part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements. In the event of a conflict between the General Provisions and Special Provisions, the Special Provisions will prevail.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 - General Requirements	Complete
14950	Aircraft Passenger Boarding Bridges	Coordinate Work With Existing & New Foundations
14951	Passenger Boarding Bridge Refurbishment	Complete
14955	Baggage Lifts	Complete

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1-7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.
- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope. Phasing of work will need to be coordinated with Construction Manager.
- Excluding:** Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.
- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed draft construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Liquidated damages will be assessed per the Contract Documents.
- F. **Contract Duration:** This Work Scope will have 60 working days to complete their work onsite.
- G. **Protection of Your Work:** Until final acceptance by the Owner team, any necessary protection of in progress or completed scope is incidental to this Work Scope.
- H. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.

Work Scope 14.21C – Passenger Boarding Bridges

KA SPECIAL REQUIREMENTS

- I. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- J. **Compliance:** Comply with all Federal, State and Local building codes and regulations, include OSHA, FAA, TSA, CBP and DAA requirements.
- K. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the Work Scope, and provided at no additional cost. At a minimum, 1-day per week will be designated as the Clean-Up Day. Each contractor must anticipate several hours of clean-up each week on this day, which will vary by the level of cleaning required. During this clean-up time – All trades/contractors on site will be required to participate or be back charged for their portion of this clean-up. This will be enforced.
- L. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- M. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- N. **Functional System:** Provide complete functional system consistent with the design intent of the specifications sections identified above and other project documents.
 - 1. Items not shown but necessary to provide a properly functioning system shall be included in this Work Scope.
 - a. To include additional supports required, but not shown on drawings, to accept passenger boarding bridges.
- O. **Fire-Stopping Assemblies:** Provide fire-stopping for penetrations required by this Work Scope through fire rated assemblies in accordance with requirements of Section 07841 to maintain the integrity of the fire-rated assembly.
 - 1. Special Note: Project will select a single fire-stopping manufacturer for use throughout the Project.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1-7 and 10-11 of the specifications (previously awarded work).
 - 1. This Work Scope is responsible for all relevant layout regarding scope necessary to complete required work.
 - 2. This Work Scope is responsible for review of all in place and planned conditions to receive Passenger Boarding Bridges.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Special Protection:** Take special care while working above other trades and to provide protection necessary to protect trades below from falling objects and sparks.
- D. **Special Inspections:** Special and structural inspections will be done in accordance with the Contract Documents.
- E. **Special Safety Requirements:** This Work Scope is responsible for the maintenance of temporary handrails, guardrails, toe boards, cable rails, and supports for the same at leading edges, stair handrails, and other openings required to be protected by OSHA regulations for your required work areas.
- F. **Special Coordination:** Special coordination and detailing will be required at the conditions indicated below, including cutting, fitting, and sealants around penetrations and accessories.
 - 1. Some floor systems have shallow ducting system underneath and have maximum floor loads to consider regarding lift/scaffold/storage of material locations. Consideration must be taken to not damage this system.
- G. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
 - 1. Materials to be removed and disposed in appropriate Kraus-Anderson dumpster.
- H. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.
- I. **Equipment and System Start-Up:** Start, test and adjust equipment and systems prior to completion.
 - 1. Adjust motors to operate at proper nameplate amperage, tighten belts and adjust sheaves.
 - 2. Provide complete code required testing in accordance with project requirements, and as requested by Elevator Inspector.
- J. **Passenger Boarding Bridges Warranty:** Provide all warranties as indicated in specifications.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work.

Work Scope 14.21C – Passenger Boarding Bridges

KA SPECIAL REQUIREMENTS

- C. **Onsite Storage:** Storing materials onsite and possible relocating materials will be necessary. Coordinate with Construction Manager.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.
- B. Quality Control Submittals: All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 15.21C – Mechanical Systems

KA SPECIAL REQUIREMENTS

1.01 MECHANICAL SYSTEMS

- A. **Scope of Work:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 – General Requirements	Complete
Division 15	Mechanical	Entire Division 15 Complete
07841	Through-Penetration Firestop Systems	As It Applies to This Work Scope
07920	Joint Sealants	As It Applies to This Work Scope

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1-7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.
- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope.
- Excluding:** Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.
- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.
- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
1. Liquidated Damages will be accessed per contract documents.
- F. **Winter Conditions:** Winter building heat is provided by others.
- G. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work.
- H. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.

Work Scope 15.21C – Mechanical Systems

KA SPECIAL REQUIREMENTS

- I. **Compliance:** Comply with all Federal, State and Local building codes and regulations, OSHA, AISC certification fabricator and erector.
- J. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the work scope, and provided at no additional cost.
- K. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- L. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- M. **Contract Duration:** This Work Scope will have 90 working days to complete their work.
- N. **Tug Tunnel:** Work beyond building exterior wall side of Gridlines 1.3 and 11.7 in this Bid Package.
- O. **Functional System:** Provide complete functional system consistent with the design intent of the specifications sections identified above and other project documents, including but not limited to:
 - 1. Items not shown but necessary to provide a properly functioning system shall be included in this Work Scope.
 - 2. Extension to outside of building and connecting to site utilities shall be included in this Work Scope.
 - 3. Required permits and inspections fees.
- P. **Housekeeping and Equipment Pads:** Provide concrete housekeeping pads for your work, unless shown on architectural, civil, or structural drawings.
- Q. **Roof Curbs and Supports:** Provide roof curbs and supports required for your work, unless specifically indicated to be provided by another Work Scope.
- R. **Sleeve:** Layout, cutting openings, and setting sleeves and embeds required by this Work Scope.
- S. **Fire-Stopping Assemblies:** Provide firestopping for penetrations required by this Work Scope through fire rated assemblies in accordance with requirements of Section 07 8400 to maintain the integrity of the fire-rated assembly.
 - 1. Special Note: Project will select a single fire-stopping manufacturer for use throughout the Project.
 - 2. Coordinate with Kraus-Anderson to minimum the number of penetrations required.
- T. **Sealant Around Pipe Penetrations:** Provide sealant in accordance with Section 07 9200 around piping penetrations fixtures and accessories installed by this Work Scope.
- U. **Equipment and System Start-Up:** Start, test and adjust equipment and systems prior to completion.
 - 1. Adjust motors to operate at proper nameplate amperage, tighten belts and adjust sheaves.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1-7 and 10-11 of the specifications.
 - 1. The CM will provide the standard surveying for the building, including staking all of the gridlines and offsets. (One initial set, one set of offsets, and a benchmark per floor). This Work Scope will be required to take the offsets and transfer as required. The CM may double check random elevations and locations at no cost to this Work Scope. This Work Scope is responsible for all remaining layout.
 - 2. Layout and engineering for shoring and temporary supports shall be included.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Winter/Cold Weather Conditions:** Include costs for winter conditions, i.e. enclosures, blankets, etc. as required to protect the work for a proper installation to meet the project schedule. These costs include, but not limited to:
 - 1.
- D. **Special Protection:** Take special care while working above other trades and to provide protection necessary to protect trades below from falling objects and sparks.
- E. **Special Inspections:** Special and structural inspections will be done in accordance with the Contract Documents.
- F. **Perimeter and Slab Edge Protection:** This Work Scope is responsible to furnish, install, and maintain perimeter barricades and interior opening barricades at supported decks in accordance with OSHA requirements and as directed by Kraus-Anderson until exterior enclosure meets protection requirements or otherwise directed by Kraus-Anderson Construction Company.
 - 1. Remove barricades when directed by Kraus-Anderson.
- G. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
- H. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.

Work Scope 15.21C – Mechanical Systems

KA SPECIAL REQUIREMENTS

1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.
- I. **System Coordination:** Provide a qualified representative to coordinate other trades.
 1. Ensure interface between interrelated products are compatible with one another.
- J. **Utility Company Coordination:** Coordination with utility company to install required services and pay for costs associated with connections, unless specifically indicated otherwise.

1.04 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.
- B. **Quality Control Submittals:** All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.05 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

Work Scope 16.22C – Electrical, Computer Controlled Access & Flight Display Systems

KA SPECIAL REQUIREMENTS

1.01 ELECTRICAL, COMPUTER CONTROLLED ACCESS & FLIGHT DISPLAY SYSTEMS

- A. **Scope of Work:** This Work Scope consists of the Work directly and indirectly required by the specification sections listed below, plus all project drawings, addenda, and other documents identified part of this Work Scope package, regardless of design discipline, drawing sheet identification, or jurisdictional requirements.

1. Specific Specifications Sections that are the responsibility of the Work Scope:

Part 1	Title	Complete
Part 2	Bid Information and Proposal Forms	Complete
Part 3	Mandatory Contract Provisions	Complete
Part 4	General Provisions	Complete
Part 5	Supplementary General Conditions	Complete
Part 6	Safety & Security	Complete
Part 7	Special Conditions	Complete
Part 10	Appendix	Complete
Part 11	Division 01 - General Requirements	Complete
Division 16	Electrical	Entire Division 16 Complete
07841	Through-Penetration Firestop Systems	As It Applies To This Work Scope
07920	Joint Sealants	As It Applies To This Work Scope
13700	Part 1542 Computer Controlled Access System (CCAS)	BP-2A, Work Scope 16.20A Includes Rough-In For This Work Scope
13743	Video Displays	BP-2A, Work Scope 16.20A Includes Rough-In For This Work Scope

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

- A. **General Requirements for All Work Scope Categories:** Refer to Specifications Parts 1–7 and 10-11 for additional requirements affecting this Work Scope. Also review previously awarded work Bid Package 1, Bid Package 2A, VALE, and Bid Package 2B Work Scopes (available upon request) to understand scopes that may relate to this Work Scope.

- B. **Scope: Including but not limited to:** Furnish complete labor and materials (unless noted otherwise) for all work scope indicated on the contract documents, specifically the specification sections identified above. Include all necessary layout of lines and elevations, field measurements, equipment and tools, material handling/hoisting equipment, receiving / off-loading / storing of materials (as coordinated with the Construction Manager Superintendent), freight and delivery charges, and sales and use taxes. Direct coordination and cooperation with other Work Scope contractors, other trades, code enforcement officials, regulatory government personnel, owner representatives and the Construction manager are considered part of the Work Scope. Quality control and self inspections/corrections of completed work provided by this Work Scope is the responsibility of this scope. The establishment and enforcement of a safety program that complies with all applicable regulations (including OSHA) and the project specifications/contract documents is a part of the work scope. Any temporary lighting beyond the normal OSHA requirements to properly complete this work scope is to be included as a part of the scope. Work scope to include, but is not limited to: provide and install devices and cabling required for a complete and fully functioning computer controlled access system, CCTV system, TV monitors and work stations as shown on plans, and Flight Information Display infrastructure. Provide and install all associated electrical work related to Concessions Build Out and Revenue Control Booth. This work scope includes all fire stopping of penetrations resulting from this work scope.

Provide, install, and train owner on all specifications required in 1.01 above.

Excluding: Rough-in work completed by previous Work Scope 16.20A. All conduit and junction boxes are provided in previous bid package. Dumpsters, temporary toilets, temporary electrical power and lighting to OSHA standards, temporary heat/equipment/fuel (required enclosures by this Work Scope), snow plowing of parking lots and roads to access site (snow removal specific to this Work Scope is to be included in this scope) will be provided by others.

- C. **Work Hours:** A typical workweek will be (5) 8-hour shifts from 7:00 AM to 3:30 PM, Monday through Friday (subject to change). However, all trade contractors are required to furnish the appropriate manpower count and work the required number of hours and days per week to fulfill the contract and schedule obligations.

Work Scope 16.22C – Electrical, Computer Controlled Access & Flight Display Systems

KA SPECIAL REQUIREMENTS

- D. **Project Labor Agreement:** This project is governed by a Project Labor Agreement (PLA), requiring all labor to comply with the application contract documents.
- E. **Schedule:** The enclosed construction schedule prepared by the Construction Manager is a guideline of the approximate sequence of events that must occur to meet the targeted start and completion dates. Various milestone dates throughout the project will be fine-tuned with the assistance of the trade contractors and suppliers.
 - 1. Liquidated damages will be assessed per the Contract Documents
- F. **Winter Conditions:** Include temporary enclosures, shelters, blankets, snow removal as required specific to the work/storage of materials and any other winter conditions costs specific to the work in accordance with the specifications and project schedule. Winter heat is provided by others.
- G. **Coordination:** Coordinate all work with the Construction Manager and other trade contractors and suppliers that may interface with your work. Close coordination with WS 6.22C, 8.20A and 16.20A will be required.
- H. **Submissions:** Provide timely submission of insurance certificates, schedule of values, shop drawings, product data, sample and mockups.
- I. **Compliance:** Comply with all Federal, State and Local building codes and regulations, OSHA, AISC certification fabricator and erector.
- J. **Clean-Up:** Provide continuous and ongoing housekeeping and clean-up as required to maintain a clean and safe jobsite. Clean-up related to this Work Scope is considered a part of the Work Scope, and provided at no additional cost.
- K. **LEED Requirements:** Adhere to all LEED building requirements as defined in the Specifications.
- L. **Buy American Certification:** Contractors are required to adhere to all Buy American requirements in the Specifications.
- M. **Contract Duration:** This Work Scope will have 90 working days to complete their work.
- N. **Functional System:** Provide complete functional system consistent with the design intent of the specifications sections identified above and other project documents, including but not limited to:
 - 1. Items not shown but necessary to provide a properly functioning system shall be included in this Work Scope.
 - 2. Compliance with applicable Building Codes related to installation and wiring
 - 3. Required permits and inspections fees.
- O. **Sleeve:** Layout, cutting openings, and setting sleeves and embeds required by this Work Scope.
- P. **Fire-Stopping Assemblies:** Provide firestopping for penetrations required by this Work Scope through fire rated assemblies in accordance with requirements of Section 07841 to maintain the integrity of the fire-rated assembly.
 - 1. Special Note: Project will select a single fire-stopping manufacturer for use throughout the Project.
 - 2. Coordinate with Kraus-Anderson to minimum the number of penetrations required.
- Q. **Sealant Around Electrical Components:** Provide sealant in accordance with Section 07 9200 around electrical conduits and comments penetrating exterior walls, sound rated partitions, smoke-tight or vapor-tight assemblies.
- R. **Automatic and Electrified Doors:** Provide power supply and connection for automatic doors, grilles, and coiling doors.
- S. **Site Lighting:** Provide related digging, forming, and placement of exterior light fixtures and poles, including concrete bases.
- T. **System Start-Up:** Start, test and adjust systems prior to completion.
- U. **Utility Company Coordination:** Coordination with utility/electrical company to install required services and pay for costs associated with connections, unless specifically indicated otherwise.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

- A. **Field Engineering:** Kraus-Anderson will provide benchmarks and control line in accordance with requirements specified in Parts 1–7 and 10-11 of the specifications.
 - 1. The CM will provide the standard surveying for the building, including staking all of the gridlines and offsets. (One initial set, one set of offsets, and a benchmark per floor). This Work Scope will be required to take the offsets and transfer as required. The CM may double check random elevations and locations at no cost to this Work Scope. This Work Scope is responsible for all remaining layout.
 - 2. Layout and engineering for shoring and temporary supports shall be included.
- B. **Acceptance of Substrates and Existing Conditions:** Starting work constitutes acceptances of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.
- C. **Winter/Cold Weather Conditions:** Include costs for winter conditions, i.e. enclosures, blankets, etc. as required to protect the work for a proper installation to meet the project schedule.

Work Scope 16.22C – Electrical, Computer Controlled Access & Flight Display Systems

KA SPECIAL REQUIREMENTS

- D. **Special Protection:** Take special care while working above other trades and to provide protection necessary to protect trades below from falling objects and sparks.
- E. **Special Inspections:** Special and structural inspections will be done in accordance with the Contract Documents.
- F. **Construction Cleaning:** Perform daily construction cleaning operations for debris generated by this Work Scope.
- G. **Composite Clean-Up Crew:** Weekly composite clean-up crew will be utilized on this project.
 - 1. This trade contractor will be required to participate in this effort as part of this Work Scope at no additional cost.
- H. **Special Coordination:** Special coordination and detailing will be required at the conditions indicated below, including cutting, fitting, and sealants around penetrations and accessories.
 - 1. Some floor systems have shallow ducting system underneath and have maximum floor loads to consider regarding lift/scaffold/storage of material locations. Consideration must be taken to not damage this system.
- I. **System Coordination:** Provide a qualified representative to coordinate other trades.
 - 1. Ensure interface between interrelated products are compatible with one another.

1.04 MATERIAL HANDLING AND STORAGE

- A. **Delivery and Receiving of Materials:** Include necessary provisions as required.
- B. **Hoisting and Scaffolding:** Work Scope is the responsibility for your own working platforms, scaffolding, hoisting and equipment necessary to access and complete work.

1.05 SUBMITTAL REQUIREMENTS

- A. In accordance with individual specification section requiring Submittals and Division 01 requirements, contractor shall coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Contract Documents. Timely submission of insurance certificates, schedule of values, shop drawings, product data, samples, mock-ups, Disadvantaged Business DBE submittals, "Buy American" submittals and the final red-lines "As Built" drawings as required, are considered part of this Work Scope.
- B. **Quality Control Submittals:** All contractors are to provide their own quality control measures for their Work Scope, to include self inspections and correction of substandard work that does not meet the specification standards.

1.06 ALLOWANCES

- A. Include Allowance per Specifications Section 01210 - Allowances.

1.07 UNIT PRICES AND COST BREAK DOWNS

- A. Not applicable.

1.08 ALTERNATES

- A. Include Alternate(s) per Specifications Section 01230 - Alternates.

-- End --

**CERTIFICATION OF BIDDER REGARDING
EQUAL EMPLOYMENT OPPORTUNITY**

GENERAL

In accordance with Executive Order 11246 (30 F.R. 12319-25), the implementing rules and regulations thereof, and orders of the Secretary of Labor, a Certification regarding Equal Opportunity is required of bidders or prospective contractors and their proposed subcontractors prior to the award of contracts or subcontracts.

CERTIFICATION OF BIDDER

Bidder's Name _____

Address _____

1. Participation in a previously Federally assisted contract or subcontract.
 - a. The Bidder (Proposer) shall complete the following statement by checking the appropriate boxes.
 - (1) The Bidder (Proposer) has () has not () participated in a previous contract subject to the equal opportunity clause prescribed by Executive Order 10925, or Executive Order 11114, or Executive Order 11246, as amended.
 - (2) The Bidder (Proposer) has () has not () submitted all compliance reports in connection with any such contract due under the applicable filing requirements; and that representations indicating submission of required compliance reports signed by proposed subcontractors will be obtained to award of subcontractors.
 - b. If the Bidder (Proposer) has participated in a previous contract subject to the equal opportunity clause and has not submitted compliance reports due under applicable filing requirements, the Bidder (Proposer) shall submit a compliance report on Standard Form 100, "Employee Information Report EEO-1" prior to the award of contract.
 - c. When a determination has been made to award the contract to a specific contractor, such contractor may be required, prior to award, or after the award, or both, to furnish such other pertinent information regarding its own employment practice and policies as well as of its proposed subcontractors as the FAA, the Sponsor, or the Director of OFCC may require. (41 CFR Chapter 60; FAR 152.6(c).)

CERTIFICATION OF NONSEGREGATED FACILITIES

The federally assisted construction contractor certifies that he does not maintain or provide, for his employees, any segregated facilities at any of his establishments and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor certifies that he will not maintain or provide, for his employees, segregated facilities at any of his establishments and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor agrees that a breach of this certification is a violation of the equal opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work area, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directives or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The federally assisted construction contractor agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the equal opportunity clause and that he will retain such certifications in his files.

REMARKS:

Certification - The information above is true and complete to the best of my knowledge and belief.

Name and Title of Signer

(Please Type)

() Contractor

() Subcontractor

Signature

Date

Note: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Airport Name: Duluth International Airport

Location: Duluth, MN

Sponsor: Duluth Airport Authority

FAA AIP Number: 3-27-24-54-12

AFFIDAVIT AND INFORMATION REQUIRED OF BIDDERS

Affidavit of Non-Collusion:

I hereby swear (or affirm) under penalty of perjury:

1. That I am the bidder (if the bidder is an individual), a partner in the bidder (if the bidder is a partnership), or an officer or employee of the bidding corporation having authority to sign on its behalf (if the bidder is a corporation);
2. That the attached bid or bids have been arrived at by the bidder independently and have been submitted without collusion with and without agreement, understanding, or planned common course of action with any other vendor or materials, supplied, equipment or services described in the invitation to bid, designed to limit independent bidding or competition;
3. That the contents of the bid or bids have not been communicated by the bidder or its employees or agents to any person not an employee or agent of the bidder or its surety on any bond furnished with the bid or bids and will not be communicated to any such person prior to the official opening of the bid or bids; and
4. That I have fully informed myself regarding the accuracy of the statements made in this affidavit.

Signed: _____

Firm Name: _____

Subscribed and sworn to me before this ____ day of _____, _____

NOTARY PUBLIC _____

My commission expires: _____

Bidder's E.I. Number _____

(Number used on employer's quarterly Federal Tax return)

Airport Name: Duluth International Airport

Location: Duluth, MN

Sponsor: Duluth Airport Authority

FAA AIP Number: 3-27-24-54-12

CERTIFICATION FOR CONTRACTS, GRANTS, LOANS AND COOPERATIVE AGREEMENTS

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal Contract, grant, loan or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee or any agency, a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobby Activities," in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Contractor _____ Dated _____

Signed _____

Airport Name: Duluth International Airport

Location: Duluth, MN

Sponsor: Duluth Airport Authority

FAA AIP Number: 3-27-24-54-12

**CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY, AND
VOLUNTARY EXCLUSION - 49 CFR PART 29
(VERSION 1, 1/5/90)**

The bidder/offerer certifies, by submission of this proposal or acceptance of this contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. It further agrees by submitting this proposal that it will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the bidder/offerer/contractor or any lower tier participant is unable to certify to this statement, it shall attach an explanation to this solicitation/proposal.

Contractor _____ Dated _____

Signed _____

Airport Name: Duluth International Airport

Location: Duluth, MN

Sponsor: Duluth Airport Authority

FAA AIP Number: 3-27-24-54-12

RESTRICTIONS ON FEDERAL PUBLIC WORKS PROJECTS CERTIFICATION

The undersigned CONTRACTOR or SUBCONTRACTOR, hereby certifies that it:

- a. Is not owned or controlled by one or more citizens or nationals of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR):
- b. has not knowingly entered into any contract or subcontract for this project with a CONTRACTOR that is a citizen or national of a foreign country on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list.
- c. has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17 no contract shall be awarded to a CONTRACTOR or SUBCONTRACTOR who is unable to certify to the above. If the CONTRACTOR knowingly procures or subcontracts for the supply of any product or service of a foreign country on the said list for use on the project, the Federal Aviation Administration may direct, through the sponsor, cancellation of the contract at no cost to the Government.

Further, the CONTRACTOR agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The CONTRACTOR may rely upon the certification of a prospective SUBCONTRACTOR unless it has knowledge that the certification is erroneous.

The CONTRACTOR shall provide immediate written notice to the sponsor if the CONTRACTOR learns that its certification or that of a SUBCONTRACTOR was erroneous when submitted or has become erroneous by reason of changed circumstances. The SUBCONTRACTOR agrees to provide immediate written notice to the CONTRACTOR, if at any time it learns that its certification was erroneous by reason of changed circumstances.

This certification is a material representation of fact upon which reliance was placed when making the award. If it is later determined that the CONTRACTOR or SUBCONTRACTOR knowingly rendered an erroneous certification, the Federal Aviation Administration may direct, through the sponsor, cancellation of the contract or subcontract for default at no cost to the Government.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a CONTRACTOR is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code, Section 1001.

Contractor _____ Dated _____

Signed _____

Airport Name: Duluth International Airport

Location: Duluth, MN

Sponsor: Duluth Airport Authority

FAA AIP Number: 3-27-24-54-12

DBE ATTACHMENT

Each bidder shall submit with the proposal a written assurance of its ability to meet the prescribed DBE goal of **4.95 %** in its bid or of its "good faith efforts" to meet that goal. Bids received that do not contain this assurance or have not given acceptable evidence of "good faith efforts" to meet the DBE goal may be considered nonresponsive and may be ineligible for award of the contract at the discretion of the DAA.

Exclusive agreements between DBEs and Bidder/Proposers are forbidden. Bidders will submit, in writing, the names of the DBEs included in the bid, a description of the work the DBEs will perform and the dollar value of each DBE subcontract.

<u>DBE Firm</u>	<u>Description of Work</u>	<u>Dollar Value</u>
-----------------	----------------------------	---------------------

DAA DISADVANTAGED BUSINESS ENTERPRISE POLICY STATEMENT

The Duluth Airport Authority has established a Disadvantage Business Enterprise (DBE) program in accordance with regulations of the U.S. Department of Transportation (DOT), 49 CFR Part 26. The Duluth Airport Authority has received Federal financial assistance from the Department of Transportation, and as a condition of receiving this assistance, the Duluth Airport Authority has signed an assurance that it will comply with 49 CFR part 26.

It is the policy of the Duluth Airport Authority to ensure that DBEs, as defined in part 26, have an equal opportunity to receive and participate in DOT assisted contracts. It is also our policy to ensure nondiscrimination in the award and administration of DOT assisted contracts; to create a level playing field on which DBEs can compete fairly for DOT assisted contracts; to ensure that the DBE program is narrowly tailored in accordance with applicable law; to ensure that only firms that fully meet 49 CFR part 26 eligibility standards are permitted to participate as DBEs; to help remove barriers to the participation of DBEs in DOT assisted contracts; and to assist the development of firms that can compete successfully in the market place outside the DBE Program.

The Director of Operations has been delegated as the DBE Liaison Officer. In that capacity, the Director of Operations is responsible for implementing all aspects of the DBE program. Implementation of the DBE program is accorded the same priority as compliance with all other legal obligations incurred by the Duluth Airport Authority in its financial assistance agreements with the Department of Transportation.



Brian Grefe
DBE Liaison Officer
Duluth Airport Authority
4701 Grinden Drive
Duluth, MN 55811
(218) 727-2968
bgrefe@duluthairport.com

**DEPARTMENT OF TRANSPORTATION
DBE PROGRAM – 49 CFR PART 26
DULUTH AIRPORT AUTHORITY**

POLICY STATEMENT

Section 26.1, 26.23**Objectives/Policy Statement**

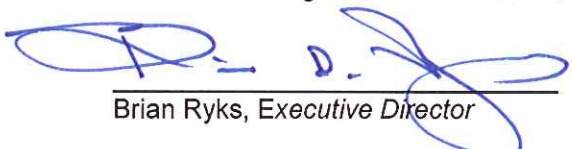
The Duluth Airport Authority has established a Disadvantaged Business Enterprise (DBE) program in accordance with regulations of the U.S. Department of Transportation (DOT), 49 CFR Part 26. The Duluth Airport Authority has received Federal financial assistance from the Department of Transportation, and as a condition of receiving this assistance, the Duluth Airport Authority has signed an assurance that it will comply with 49 CFR Part 26.

It is the policy of the Duluth Airport Authority to ensure that DBEs are defined in part 26, have an equal opportunity to receive and participate in DOT-assisted contracts. It is also our policy:

1. To ensure nondiscrimination in the award and administration of DOT – assisted contracts;
2. To create a level playing field on which DBEs can compete fairly for DOT-assisted contracts;
3. To ensure that the DBE Program is narrowly tailored in accordance with applicable law;
4. To ensure that only firms that fully meet 49 CFR Part 26 eligibility standards are permitted to participate as DBEs;
5. To help remove barriers to the participation of DBEs in DOT assisted contracts;
6. To assist the development of firms that can compete successfully in the market place outside the DBE Program.

The Director of Operations has been delegated as the DBE Liaison Officer. In that capacity, *the Director of Operations* is responsible for implementing all aspects of the DBE program. Implementation of the DBE program is accorded the same priority as compliance with all other legal obligations incurred by the Duluth Airport Authority in its financial assistance agreements with the Department of Transportation.

The Duluth Airport Authority has disseminated this policy statement to the Board of Directors and all of the components of our organization. We have distributed this statement to DBE and non-DBE business communities that perform work for us on DOT-assisted contracts by including this statement in our bid documents along with our advertisements in minority and majority publications.



Brian Ryks, Executive Director

Date

SUBPART A – GENERAL REQUIREMENTS

Section 26.1 Objectives

The objectives are found in the policy statement on the first page of this program.

Section 26.3 Applicability

The Duluth Airport Authority is the recipient of federal airport funds authorized by 49 U.S.C. 47101, *et seq.*

Section 26.5 Definitions

The Duluth Airport Authority will adopt the definitions contained in Section 26.5 for this program.

Section 26.7 Non-discrimination Requirements

The Duluth Airport Authority will never exclude any person from participation in, deny any person the benefits of, or otherwise discriminate against anyone in connection with the award and performance of any contract covered by 49 CFR part 26 on the basis of race, color, sex, or national origin.

In administering its DBE program, the Duluth Airport Authority will not, directly or through contractual or other arrangements, use criteria or methods of administration that have the effect of defeating or substantially impairing accomplishment of the objectives of the DBE program with respect to individuals of a particular race, color, sex, or national origin.

Section 26.11 Record Keeping Requirements

Reporting to DOT: 26.11(b)

The Duluth Airport Authority will report DBE participation to DOT as follows:

We will submit annually DOT Form 4630, as modified for use by FAA recipients.

Bidders List: 26.11(c)

The Duluth Airport Authority will create a bidders list, consisting of information about all DBE and non-DBE firms that bid or quote on DOT-assisted contracts. The purpose of this requirement is to allow use of the bidder's list approach to calculating overall goals. The bidder list will include the name, address, DBE / non-DBE status, age, and annual gross receipts of firms.

The Duluth Airport Authority will collect this information by obtaining the Minnesota DOT Certified DBE Directory, utilizing past record information maintained by the City of Duluth Purchasing Department and obtaining information provided by firms quoting on projects.

Section 26.13 Federal Financial Assistance Agreement

The Duluth Airport Authority has signed the following assurances, applicable to all DOT-assisted contracts and their administration:

Assurance: 26.13(a)

Duluth Airport Authority shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of any DOT assisted contract or in the administration of its DBE Program or the requirements of 49 CFR part 26. The recipient shall take all necessary and reasonable steps under 49 CFR part 26 to ensure nondiscrimination in the award and administration of DOT assisted contracts. The recipient's DBE Program, as required by 49 CFR part 26 and as approved by DOT, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the Duluth Airport Authority of its failure to carry out its approved program, the Department may impose sanction as provided for under part 26 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C. 3801 *et seq.*).

This language will appear in financial assistance agreements with sub-recipients.

Contract Assurance: 26.13b

The Duluth Airport Authority will ensure that the following clause is placed in every DOT-assisted contract and subcontract:

The contractor, sub-recipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the recipient deems appropriate.

SUBPART B - ADMINISTRATIVE REQUIREMENTS

Section 26.21 DBE Program Updates

Since the Duluth Airport Authority has received a grant of \$250,000 or more for airport planning or development, we will continue to carry out this program until all funds from DOT financial assistance have been expended. We will provide to DOT updates representing significant changes in the program.

Section 26.23 Policy Statement

The Policy Statement is elaborated on the first page of this program.

Section 26.25 DBE Liaison Officer (DBELO)

We have designated the following individual as our DBE Liaison Officer:

Brian Grefe, Director of Operations
Duluth Airport Authority
4701 Grinden Drive
(218) 727-2968
e-mail: bgrefe@duluthairport.com

In that capacity, the DBELO is responsible for implementing all aspects of the DBE program and ensuring that the Duluth Airport Authority complies with all provision of 49 CFR Part 26. The DBELO has direct, independent access to the *Executive Director Brian Ryks* concerning DBE program matters. An organization chart displaying the DBELO's position in the organization is found in *Attachment 1* to this program.

The DBELO is responsible for developing, implementing and monitoring the DBE program, in coordination with other appropriate officials. The DBELO will administer the program and has access to additional staff and legal council if needed to assist in the administration of the program. The duties and responsibilities include the following:

1. Gathers and reports statistical data and other information as required by DOT.
2. Reviews third party contracts and purchase requisitions for compliance with this program.
3. Works with all departments to set overall annual goals.
4. Ensures that bid notices and requests for proposals are available to DBEs in a timely manner.
5. Identifies contracts and procurements so that DBE goals are included in solicitations (both race-neutral methods and contract specific goals attainment and identifies ways to improve progress.
6. Analyzes Duluth Airport Authority's progress toward attainment and identifies ways to improve progress.
7. Participates in pre-bid meetings.
8. Advises the *Executive Director* on DBE matters and achievement.
9. Chairs the DBE Advisory Committee.
10. Participates in pre-bid meetings.
11. Provides DBEs with information and assistance in preparing bids, obtaining bonding and insurance.
12. Plans and participates in DBE training seminars.
13. Certifies DBEs according to the criteria set by DOT and acts as liaison to the Uniform Certification Process in Minnesota.
14. Provides outreach to DBEs and community organizations to advise them of opportunities.
15. Maintains the Duluth Airport Authority's updated directory on certified DBEs.

Section 26.27 DBE Financial Institutions

It is the policy of the Duluth Airport Authority to investigate the full extent of services offered by financial institutions owned and controlled by socially and economically disadvantaged individuals in the community, to make reasonable efforts to use these institutions, and to encourage prime contractors on DOT-assisted contract to make use of these institutions. The *Finance Director* of the Duluth Airport Authority has reviewed the list of lending institutions in our area of Minnesota and determined that no institutions exist that are owned or controlled by socially or economically disadvantaged individuals.

Section 26.29 Prompt Payment Mechanisms

The Duluth Airport Authority will include the following clause in each DOT-assisted prime contract:

The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 10 days from the receipt of each payment the prime contract receives from Duluth Airport Authority. The prime contractor agrees further to return retainage payments to each subcontractor within 30 days after the subcontractors work is satisfactorily completed.

Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Duluth Airport Authority. This clause applies to both DBE and non-DBE subcontracts.

Section 26.31 Directory

The Duluth Airport Authority maintains a directory identifying all firms eligible to participate as DBEs. The directory lists the firm's name, address, phone number, date of the most recent certification, and the type of work the firm has been certified to perform as a DBE. We revise the Directory annually. We make the Directory available as follows: *Duluth Airport Authority, 4701 Grinden Drive, Duluth, MN 55811; (218) 727-2968; e-mail: daa@duluthairport.com* The Directory may be found in *Attachment 2* to this program document.

Section 26.33 Overconcentration

Duluth Airport Authority has not identified that overconcentration exists in the types of work that DBEs perform.

Section 26.35 Business Development Programs

Duluth Airport Authority has not established a business development program.

Section 26.37 Monitoring and Enforcement Mechanisms

The Duluth Airport Authority will take the following monitoring and enforcement mechanisms to ensure compliance with 49 CFR Part 26.

1. We will bring to the attention of the Department of Transportation any false, fraudulent, or dishonest conduct in connection with the program, so that DOT can take the steps (e.g., referral to the Department of Justice for criminal prosecution, referral to the DOT Inspector General, action under suspension and debarment or Program Fraud and Civil Penalties rules) provided in 26.109.
2. We will consider similar action under our own legal authorities, including responsibility determinations in future contracts. *Attachment 3* lists the regulation, provisions, and contract remedies available to us in the events of non-compliance with the DBE regulation by a participant in our procurement activities.
3. We will also provide a monitoring and enforcement mechanism to verify that work committed to DBEs at contract award is actually performed by the DBEs. This will be accomplished by verifying payroll reports and verifying work performed.
4. We will keep a running tally of actual payments to DBE firms for work committed to them at the time of contract award.

SUBPART C – GOALS, GOOD FAITH EFFORTS, AND COUNTING

Section 26.43 Set-asides or Quotas

The Duluth Airport Authority does not use quotas in any way in the administration of this DBE program.

Section 26.45 Overall Goals

A description of the methodology to calculate the overall goal and the goal calculations can be found in *Attachment 4* to this program. This section of the program will be updated annually.

In accordance with Section 26.45(f) the Duluth Airport Authority will submit its overall goal to DOT on August 1 of each year. Before establishing the overall goal each year, Duluth Airport Authority will consult with the *compliance officer for the City of Duluth, along with the Builders Exchange officials of Northern Minnesota, Minnesota Small Business Development Cooperation, Minnesota Department of transportation, and the Local Office of Economic Security* to obtain information concerning the availability of disadvantaged and non-disadvantaged businesses, the effects of discrimination on opportunities for DBEs, and the Duluth Airport Authority's efforts to establish a level playing field for the participation of DBEs.

Following this consultation, we will publish a notice of the proposed overall goals, informing the public that the proposed goal and its rationale are available for inspection during normal business hours at your principal office for 30 days following the date of the notice, and informing the public that you and DOT will accept comments on the goals for 45 days from the date of the notice. This notice will be published in both local general circulation newspapers and a local minority publication. Normally, we will issue this notice by June 1 of each year. The notice must include addresses to which comments may be sent and addresses (including offices and websites) where the proposal may be reviewed.

Our overall goal submission to DOT will include a summary of information and comments received during this public participation process and our responses.

We will begin using our overall goal on October 1 of each year, unless we have received other instructions from DOT. If we establish a goal on a project basis, we will begin using our goal by the time of the first solicitation for a DOT-assisted contract for the project.

Section 26.51(a-c) Breakout of Estimated Race-Neutral & Race-Conscious Participation

The breakout of estimated race-neutral and race-conscious participation can be found in [Attachment 5](#) to this program. This section of the program will be updated annually when the goal calculation is updated.

Section 26.51(d-g) Contract Goals

The Duluth Airport Authority will use contract goals to meet any portion of the overall goal Duluth Airport Authority does not project being able to meet using race-neutral means. Contract goals are established so that, over the period to which the overall goal applies, they will cumulatively result in meeting any portion of our overall goal that is not projected to be met through the use of race-neutral means.

We will establish contract goals only on those DOT-assisted contracts that have subcontracting possibilities. We need not establish a contract goal on every such contract, and the size of contract goals will be adapted to the circumstances of each such contract (e.g., type and location of work, availability of DBEs to perform the particular type of work.)

We will express our contract goals as a percentage of the Federal share of a DOT-assisted contract.

Section 26.53 Good Faith Efforts Procedures**Demonstration of good faith efforts (26.53(a) & (c))**

The obligation of the bidder/offeror is to make good faith efforts. The bidder/offeror can demonstrate that it has done so either by meeting the contract goal or documenting good faith efforts. Examples of good faith efforts are found in Attachment 5

The following personnel are responsible for determining whether a bidder/offeror who has not met the contract goal has documented sufficient good faith efforts regarded as a responsive approach.

DBELO
City Attorney

We will ensure that all information is complete and accurate and adequately documents the bidder/offer's good faith efforts before we commit to the performance of the contract by the bidder/offeror.

Information to be submitted (26.53(b))

Duluth Airport Authority treats bidder/offers' compliance with good faith efforts' requirements as a matter of responsiveness.

Each solicitation for which a contract goal has been established will require the bidders/offerors to submit the following information:

1. The names and addresses of DBE firms that will participate in the contract;
2. A description of the work that each DBE will perform;
3. The dollar amount of the participation of each DBE firm participating;
4. Written and signed documentation of commitment to use a DBE subcontractor whose participation it submits to meet a contract goal;
5. Written and signed confirmation from the DBE that it is participating in the contract as provided in the prime contractors commitment and
6. If the contract goal is not met, evidence of good faith efforts.

Administrative reconsideration (26.53(d))

Within 10 days of being informed by Duluth Airport Authority that it is not responsive because it has not documented sufficient good faith efforts, a bidder/offeror may request administrative reconsideration. Bidder/offerors should make this request in writing to the following reconsideration official: *Mary Prescott-Acting Director, Office of EEO Contract Management, 395 John Ireland Boulevard, St. Paul, MN 55155 (651) 366-3150.*

As part of this reconsideration, the bidder/offeror will have the opportunity to provide written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so. The bidder/offeror will have the opportunity to meet in person with our reconsideration official to discuss the issue of whether it met the goal or made adequate good faith efforts to do. We will send the bidder/offeror a written decision on reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. The result of the reconsideration process is not administratively appealable to the Department of Transportation.

Good Faith Efforts when a DBE is replaced on a contract (26.53(f))

Duluth Airport Authority will require a contractor to make good faith efforts to replace a DBE that is terminated or has otherwise failed to complete its work on a contract with another certified DBE, to the extent needed to meet the contract goal. We will require the prime contractor to notify the DBE Liaison

officer immediately of the DBE's inability or unwillingness to perform and provide reasonable documentation.

In this situation, we will require the prime contractor to obtain our prior approval of the substitute DBE and to provide copies of new or amended subcontracts, or documentation of good faith efforts. If the contractor fails or refuses to comply in the time specified, our contracting office will issue an order stopping all or part of payment/work until satisfactory action has been taken. If the contractor still fails to comply, the contracting officer may issue a termination for default proceeding.

Sample Bid Specification:

The requirements of 49 CFR Part 26, Regulations of the U.S. Department of Transportation, apply to this contract. It is the policy of the Duluth Airport Authority to practice nondiscrimination based on race, color, sex, or national origin in the award or performance of this contract. All firms qualifying under this solicitation are encouraged to submit bids/proposals. Award of this contract will be conditioned upon satisfying the requirements of this bid specification. These requirements apply to all bidders/offerors, including those who qualify as a DBE. A DBE contract goal of 2.1% percent has been established for this contract. The bidder/offeror shall make good faith efforts, as defined in Appendix A, 49 CFR Part 26 (Attachment 1), to meet the contract goal for DBE participation in the performance of this contract.

The bidder/offeror will be required to submit the following information: (1) the names and addresses of DBE firms that will participate in the contract; (2) a description of the work that each DBE firm will perform; (3) the dollar amount of the participation of each DBE firm participating; (4) Written documentation of the bidder/offeror's commitment to use a DBE subcontractor whose participation it submits to meet the contract goal; (5) Written confirmation from the DBE that it is participating in the contract as provided in the commitment made under (4); and (5) if the contract goal is not met, evidence of good faith efforts.

Section 26.55 Counting DBE Participation

We will count DBE participation toward overall and contract goals as provided in 49 CFR 26.55.

SUBPART D – CERTIFICATION STANDARDS

Section 26.61 – 26.73 Certification Process

Duluth Airport Authority will use the certification standards of Subpart D of Part 26 to determine the eligibility of firms to participate as DBEs in DOT-assisted contracts. To be certified as a DBE, a firm must meet all certification eligibility standards. We will use the Minnesota Unified Certification Program (Mn/UCP) to certify firms under Part 26 requirements.

For information about the certification process or to apply for certification, firms should contact:

*Minnesota Department of Transportation
Office of EEO Contract Management
395 John Ireland Boulevard
St. Paul, MN 55155-1899
(651) 366-3073*

SUBPART E – CERTIFICATION PROCEDURES

Section 26.81 Unified Certification Programs

Duluth Airport Authority is the member of a Unified Certification Program (UCP) administered by *Minnesota Department of Transportation*. The UCP will meet all of the requirements of this section. The following is a description of the UCP:

The Minnesota Uniform Certification Program (Mn/UCP) has established a Disadvantaged Business Enterprise (DBE) program in accordance with regulations of the U.S. Department of Transportation (DOT), 49 CFR Part 26. Agencies that comprise the Mn/UCP have received Federal financial assistance from DOT and, as a condition of receiving this assistance, have signed an assurance that they will comply with 49 CFR Part 26. The Mn/UCP was submitted March 2002 and was approved.

Section 26.83 Procedures for Certification Decisions

Re-certifications 26.83(a) & (c)

We will for recertifications use the Mn/UCP certification process that has been updated to Part 26 requirements.

"No Change" Affidavits and Notices of Change (26.83(i))

We require all DBEs to inform us, in a written affidavit, of any change in its circumstances affecting its ability to meet size, disadvantaged status, ownership or control criteria of 49 CFR Part 26 or of any material changes in the information provided with DBE's application for certification.

We will use the Mn/UCP certification process that meets the Part 26 requirements.

Section 26.85 Denials of Initial Requests for Certification

We will use the Mn/UCP process for this requirement that meets the Part 26 requirements.

Section 26.87 Removal of a DBE's Eligibility

We will use the Mn/UCP process for this requirement that meets the Part 26 requirements.

Section 26.89 Certification Appeals

Any firm or complainant may appeal our decision in a certification matter to DOT. Such appeals may be sent to:

Department of Transportation
Office of Civil Rights Certification Appeals Branch
400 7th Street, SW
Room 2104
Washington, D.C. 20590

We will promptly implement any DOT certification appeal decisions affecting the eligibility of DBEs for our DOT-assisted contracting (e.g., certify a firm if DOT has determined that our denial of its application was erroneous).

SUBPART F – COMPLIANCE AND ENFORCEMENT

Section 26.109 Information, Confidentiality, Cooperation

We will safeguard from disclosure to third parties information that may reasonably be regarded as confidential business information, consistent with Federal, state, and local law. Notwithstanding any contrary provisions of state or local law, we will not release personal financial information submitted in response to the personal net worth requirement to a third party (other than DOT) without the written consent of the submitter.

Monitoring Payments to DBEs

We will require prime contractors to maintain records and documents of payments to DBEs for three years following the performance of the contract. These records will be made available for inspection upon request by any authorized representative of the Duluth Airport Authority, MnDOT or DOT. This reporting requirement also extends to any certified DBE subcontractor.

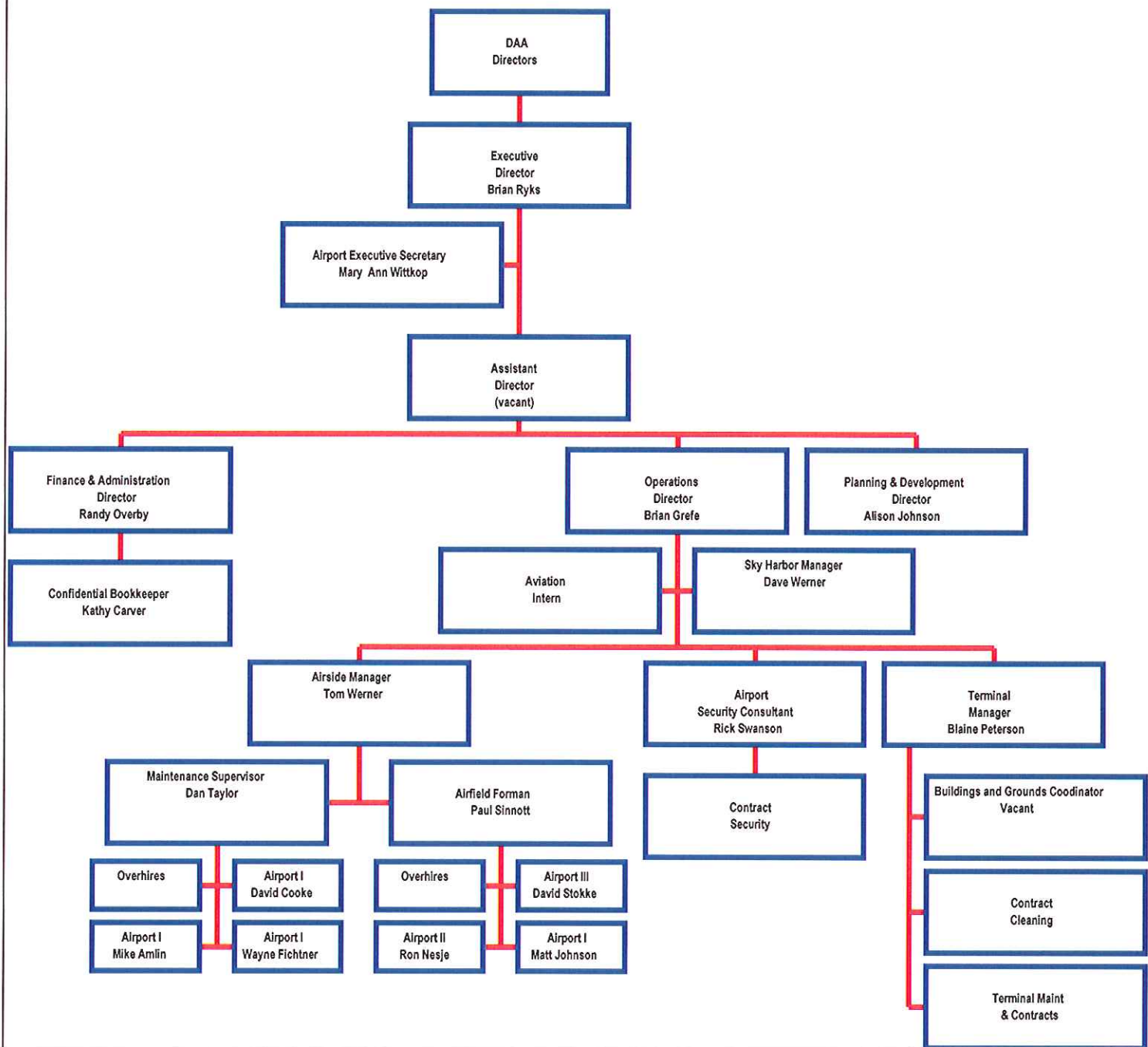
We will perform interim audits of contract payments to DBEs. The audit will review payments to DBE subcontractors to ensure that the actual amount paid to DBE subcontractors equals or exceeds the dollar amounts states in the schedule of DBE participation.

ATTACHMENTS

Attachment 1	Organizational Chart
Attachment 2	DBE Directory
Attachment 3	Monitoring and Enforcement Mechanisms
Attachment 4	Overall Goal Calculations
Attachment 5	Breakout of Estimated Race-Neutral & Race-Conscious Participation
Attachment 6	Form 1 & 2 for Demonstration of Good Faith Efforts

Attachment 1
Organizational Chart

**DULUTH AIRPORT AUTHORITY
ORGANIZATION CHART
February 22, 2008**



Attachment 2

DBE Directory

The Duluth Airport Authority utilizes the Minnesota Department of Transportation's Certified DBE Directory. This directory is maintained by the Mn DOT Office of EEO Contract Management and can be viewed or downloaded by visiting:

<http://www.dot.state.mn.us/eeocm/ucpdirectory.html>

Attachment 3

Monitoring and Enforcement Mechanisms

The Airport Authority has available several remedies to enforce the DBE requirements contained in its contracts, including, but not limited to, the following:

1. Breach of contract action, pursuant to the terms of the contract;
2. Breach of contract action, pursuant to State Codes and / or Local Laws.

In addition, the federal government has available several enforcement mechanisms that it may apply to firms participating in the DBE problem, including, but not limited to, the following:

1. Suspension or debarment proceedings pursuant to 49 CFR part 26
2. Enforcement action pursuant to 49 CFR part 31
3. Prosecution pursuant to 18 USC 1001.

Attachment 4**Section 26.45: Overall Goal Calculation****Amount of Goal**

The Duluth Airport Authority's overall goal for FY 2010-2011 is the following: 3.8% of the Federal Financial assistance we will expend in DOT-assisted contracts.

1. Snowmelter
2. Terminal Construction Phase 2

Although some of these projects are not guaranteed to occur in FY 2010-2011 depending on the availability of discretionary funding, DBE goals were set and factored into the overall DBE goal for FY 2010-2011.

Given the amount of DOT-assisted contracts the Authority could expect to let during this fiscal year, which is approximately \$42,906,845 (federal share only), the Duluth Airport Authority has set a goal of expending \$1,630,460 with DBEs during the fiscal year.

Methodology used to Calculate Overall Goal**Step 1: 26.45(c)**

The following is a summary of the method the Duluth Airport Authority utilized to calculate this year's goal.

Determine the base figure for the relative availability of DBEs. The base figure for the relative availability of DBE's was calculated as follows:

$$\text{Base figure} = \frac{\text{Ready, willing and able DBEs}}{\text{All firms ready, willing and able}}$$

The data source or demonstrable evidence used to derive the numerator was: Minnesota Certified DBE Directory <http://www.dot.state.mn.us/bidlet/misfiles/pdf/dbedirec.pdf>, and any known DBE contractor information and the United States Census Bureau Information <http://www.census.gov/epcd/cbp/view/cbpview.html>

The data source or demonstrable evidence used to derive the denominator was: Northern Minnesota Builder's Exchange Directory and the yellow pages of the telephone books from the area, the number of firms with these NAICS codes was determined 379.

The Duluth Airport Authority decided to weight the projects by utilizing an engineer's estimate to more accurately depict the DBE goal. Based on the engineer's estimate, the following three pages summarize the DBE goal calculation for each project

**DULUTH INTERNATIONAL AIRPORT
SNOW MELTER**

FY 2010 DBE GOAL

This project is expected to utilize \$1,335,000 in AIP funds for the Improvements

Weighted value based on Engineer's Estimate

	% of Project	**DBE *RWA	Non- DBE RWA	Anticipated DBE Participation
Snow Melter	82.5%	0	1	0.00%
Electrical	1.7%	9	74	0.21%
Storm Sewer	6.2%	3	13	1.43%
Gas Utility	2.7%	0	7	0.00%
Pavement Demolition	1.7%	10	6	2.86%
Pavement Repair	5.2%	12	74	0.84%
Total	100%	34	175	5.34%

Total Project Cost	\$ 1,455,000.00
Anticipated DBE Participation	5.34%
***DBE Adjustment Factor	0.50
DBE Project Goal	2.7%

*RWA = Ready Willing and Able

**DBE= Disadvantaged Business Enterprise

***DBE Adjustment Factor = Factor based on the following

Previous Years Participation
Current Bidding Climate
Project
Schedule
Project Size

Duluth International New Passenger Terminal Building							
NAICS Codes and Values for DBE Goals							
NAICS Code	Definition	-	Value	%	DBE RWA	Non-DBE	Anticipated DBE Participation
562910	Remediation Services			0.2%			0.02%
	1. Abestos Abatement		\$ 100,000.00		1	12	
238910	Site Preparation Contractors			8.7%	6	23	2.28%
	1. Demolition/Site Removals		\$ 990,100.00				
	2. Earthwork		\$ 2,635,477.00				
237110	Water and Sewer Line and Related Structures Construction			1.4%	3	14	0.29%
	1. Utilities		\$ 564,156.00				
237310	Highway, Street, Bridge Construction			12.8%	5	27	2.37%
	1. Asphalt Paving		\$ 496,656.00				
	2. Concrete Paving		\$ 4,730,000.00				
	3. Site Concrete		\$ 95,880.00				
561730	Landscape Services			0.3%	5	15	0.10%
	1. Landscaping		\$ 130,620.00				
238990	Other Specialty Trade Contractors			1.4%	0	4	0.00%
	1. Chain Link Fencing		\$ 106,362.00				
	2. Exterior Specialties		\$ 177,670.00				
	3. Signage/Awnings		\$ 310,000.00				
238110	Poured Concrete Foundation and Structure Contractors			6.4%	10	19	3.36%
	1. Concrete		\$ 2,650,600.00				
238120	Structural Steel and Precast			6.6%	2	8	1.66%

		<u>Contractors</u>					
		1. Structural Steel Fabrication	\$ 1,955,000.00				
		2. Structural Steel Erection	\$ 806,120.00				
238130		<u>Framing Contractors</u>		0.3%	3	21	0.05%
		2. Rough Carpentry	\$ 136,500.00				
238140		<u>Masonry Contractors</u>		0.9%	1	18	0.05%
		1. Masonry	\$ 354,500.00				
238150		<u>Glass and Glazing Contractors</u>		5.5%	1	7	0.79%
		1. Curtainwall	\$ 2,087,100.00				
		2. Glass/Glazing	\$ 214,225.00				
238160		<u>Roofing Contractors</u>		3.3%	9	11	2.68%
		1. Roofing	\$ 611,400.00				
		2. Sheetmetal	\$ 750,000.00				
238170		<u>Siding Contractors</u>		0.9%	5	6	0.78%
		1. Composite Panels	\$ 387,500.00				
238190		<u>Other Foundation, Structure, and Building Exterior Contractors</u>		0.7%	0	2	0.00%
		1. Miscellaneous Metals	\$ 307,560.00				
238210		<u>Electrical Contractors and Other Wiring Installation Contractors</u>		9.8%	9	34	2.58%
		1. Electrical	\$ 3,935,000.00				
Sub517		2. Telecommunications	\$ 119,780.00				
238220		<u>Plumbing, Heating, Air Conditioning Contractors</u>		12.4%	4	27	1.83%
		1. Plumbing and HVAC	\$ 4,611,500.00				
		2. Fire Protection	\$ 525,000.00				

238290		<u>Other Building Equipment Contractors</u>		12.9%	0	3	0.00%
		1. Conveying Systems	\$ 5,235,000.00				
		2. Automatic Door Systems	\$ 140,000.00				
238310		<u>Drywall and Insulation Contractors</u>		2.5%	1	16	0.16%
		1. Drywall	\$ 1,020,880.00				
		2. Acoustical Ceilings	\$ 26,000.00				
238320		<u>Painting and Wallcovering</u>		0.6%	6	23	0.16%
		1. Painting	\$ 252,650.00				
238330		<u>Flooring Contractors</u>		0.3%	1	18	0.01%
		1. Carpet	\$ 106,000.00				
238340		<u>Tile and Terrazzo Contractors</u>		3.9%	1	7	0.56%
		1. Terrazzo Flooring	\$ 1,482,500.00				
		2. Ceramic Tile	\$ 156,720.00				
337110		<u>Wood Kitchen Cabinet and Countertop Manufacturing</u>		0.3%	0	2	0.00%
		1. Architectural Millwork	\$ 143,300.00				
238350		<u>Finish Carpentry Contractors</u>		0.2%	6	25	0.04%
		1. Finish Carpentry	\$ 75,000.00				
332321		<u>Metal Window and Door Manufacturing</u>		1.0%	0	8	0.00%
		1. Doors and Hardware	\$ 288,760.00				
		2. Specialty Doors	\$ 116,390.00				
238390		<u>Other Building Finishing Contractors</u>		5.9%	0	4	0.00%
		1. Metal Ceilings	\$ 1,398,064.00				
		2. Caulking	\$ 40,000.00				
		3. Waterproofing	\$ 208,000.00				

		4. Furniture Installation	\$ 600,000.00				
		5. Moveable Partitions	\$ 78,840.00				
		6. Accessories	\$ 119,160.00				
541380		Testing Laboratories		0.6%	0	1	0.00%
		1. Testing Services	\$ 234,375.00				
541370		Land Surveying Services		0.1%	5	18	0.04%
		1. Surveying	\$ 61,500.00				
		Total Project Cost:	\$ 41,571,845	100.0%	84.00	373.00	19.81%
		TOTAL PROJECT COST	\$ 41,571,845				
		ANTICIPATED DBE PARTICIPATION	19.81%				
		*** DBE Adjustment Factor	0.25				
		DBE Project Goal	4.95%				
*RWA = Ready Willing and Able							
**DBE= Disadvantaged Business Enterprise							
***DBE Adjustment Factor = Factor based on the following							
		Previous Years Participation					
		Current Bidding Climate					
		Project Schedule					
		Project Size					

Step 2: 26.45(d)

The Duluth Airport Authority past goal history was reviewed. The following projects are listed for reference.

1. AIP 93-2-3-27-0024-18 T/W B Phase 1 Paving and Lighting	6.6%
2. AIP 94-2-3-27-0024-22 T/W B Phase 2 Grading and Paving	12.3%
3. AIP 96-1-3-27-0024-23 R/W 3-21 Pavement Rehab	2.1%
4. AIP 99-1-3-27-0024-28-99 Install R/W Centerline / Touchdown Zone Lighting; Rehab R/W 9 Concrete	5.1%
5. AIP 00-1-3-27-0024-29-00 Install R/W 9 ALSF2 Lighting; Rehab Passenger Terminal Ramp	11.7%
6. AIP 3 27-0024-30-01 Construct R/W Safety Area; Security Fencing	0.6%
7. AIP 3-27-0024-36-04 Construct R/W 9/27 Shoulders and Lighting East	1.7%
8. AIP 3-27-0024-37-05 Construct Perimeter Road Phase 1 and ARFF Phase	1.94%
9. AIP 3-27-0024-37-04 Construct an Aircraft Rescue and Firefighting Facility; Perimeter Road; Install Fence; Wildlife Assessment; Runway Sweeper; Loading Bridge	1.93%
10. AIP 3-27-0024-39-05 Rehab Runway 9/27; Rehab West end Runway 9/27 shoulders & Taxiway Shoulders within Runway Safety Area; Improve West End Drainage, Replace West End Runway 9/27 HIRLS; Rehabilitate West End Taxiway Lights, Replace West End Airfield Signs	18.3%
11. AIP 3-27-0024-41-06 Phase III Rwy 9/27 Center Shld, Lighting, Drainage, PCI, SPCC, 3/21 Pavement Rehab, Boiler	5.8%
12. AIP 3-27-0024-43-07 TSA Terminal Baggage Area	2.8%
13. AIP 3-27-0024-43-07 Passenger Bridge Design	2.3%
14. AIP 3-27-0024-44-08 GA Taxiway & Apron, GA Taxiway to Future Hangers, GA Access Road to GA Arrivals Building, Replace Beacon, Purchase MN Power Hanger & Monaco T-Hangers.	1.2%

TOTAL: 60.47% AVERAGE: 6.0%

These past projects utilized the same SIC codes to compare past DBE participation with this year's goals. Because our base goal of 3.8% is close to past DBE participation with a similar project (Construct R/W 9-27 Shoulders and Lighting East 1.7%), the DAA will maintain this figure.

Public Participation

We published our goal information in these publications: Duluth News Tribune, Duluth, MN

Copies of the newspaper advertisements and any public comments received will be forwarded for review and included in this Attachment 4.

LEGAL ADVERTISING**NOTICE OF 2010-2011
DBE CONSTRUCTION GOAL**

THE DULUTH AIRPORT AUTHORITY HAS SET A DISADVANTAGED BUSINESS ENTERPRISE GOAL OF 3.8% FOR THE FY 2010-2011 FEDERALLY FUNDED PROJECTS. THE FEDERALLY FUNDED PROJECTS INCLUDE AN IN PAVEMENT SNOW MELTER AND PHASE 2 OF THE NEW DULUTH INTERNATIONAL TERMINAL, AND PREPERATION OF THE NORTH BUSINESS DEVELOPMENT AREA. THE GOALS AND RATIONALE ARE AVAILABLE FOR INSPECTION AND COMMENT DURING NORMAL BUSINESS HOURS AT THE AIRPORT ADMINISTRATION OFFICE, 4701 GRINDEN DRIVE, DULUTH, MN 55811 UNTIL MAY 20, 2010. THE DULUTH AIRPORT WILL ACCEPT COMMENTS ON THE CONSTRUCTION GOAL UNTIL MAY 31, 2010 AT THE ABOVE ADDRESS OR EMAIL: daa@duluthairport.com

Attachment 5**Section 26.51: Breakout of Estimated
Race-Neutral & Race Conscious Participation**

Duluth Airport Authority will meet the maximum feasible portion of its overall goal by using race-neutral means of facilitating DBE participation. The Duluth Airport Authority uses the following race-neutral means to increase DBE participation: (1) Solicitation dates are scheduled to give potential participants ample time to direct questions and respond to bid requests. Bid advertisements are published in minority and non-minority publications to insure that potential participants are aware of the project. (2) While bonding is required of prime contractors to meet federal requirement the DAA does not impose these requirements on subcontractors and material suppliers. (3) Pre-bid conferences are held to explain the DBE program and make prime contractors aware of potential sources. (4) We will participate in local presentations or programs to explain contracting opportunities when such opportunities are available. (5) Copies of all plan holders are made available to all contractors in accordance with our standard copy policy.

We estimate that, in meeting our overall goal of 3.5%, we will obtain 0 to 1% from race-neutral participation and the majority (3.5%) through race-conscious measures (contract goals). An analysis (see next page – "DBE Participation Summary") was done of the overall goal accomplishments during the last few years to determine the airport's ability to achieve DBE participation on DOT assisted projects.

This analysis showed that less than 1% of our DBE accomplishments were beyond those required by contract goals. Because of the size of our organization, it is not feasible to devote extensive additional staffing or other resources to concentrate solely on the use of race-neutral means beyond what we have mentioned in this program. Should we become successful in obtaining higher than anticipated DBE participation, we will adjust the estimated breakout of race-neutral and race-conscious participation as needed to reflect actual DBE participation (see 26.51(0) and we will track and report race-neutral and race conscious participation separately. For reporting purposes, race-neutral DBE participation includes, but is not necessarily limited to, the following: DBE participation through a prime contract a DBE obtains through customary competitive procurement procedures; DBE participation through a subcontract on a prime contract that does not carry a DBE goal; DBE participation on a prime contract exceeding a contract goal; and DBE participation through a subcontract from a prime contractor that did not consider a firm's DBE status in making the award.

Attachment 6

1. Forms 1 & 2 for Demonstration of Good Faith Efforts

**Minnesota Department of Transportation
Office of Civil Rights**

GOOD FAITH EFFORTS AFFIDAVIT

STATE OF MINNESOTA
COUNTY OF _____

I, _____ hereby acknowledge that I am the _____
of _____, the company that has been
identified as the apparent successful bidder of the following State Project:

S.P. _____

The undersigned, having been first duly sworn, says that the information given in the above certificate and DBE Good Faith Efforts documentation is true and correct to the best of his or her knowledge and belief.

Signed _____
Bidder or authorized representative

Subscribed and sworn to before me

This _____ day of _____, 200_____

Notary Public

My commission expires _____, 20_____



MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF CIVIL RIGHTS

CERTIFICATE OF GOOD FAITH EFFORTS

S.P. _____
 Prime Contractor _____ Low Bid _____ Goal _____ %
 Total DBE Commitment _____ (_____ %)

LIST YOUR SOLICITATION OF ALL SUBCONTRACTORS, SUPPLIERS, AND SERVICE PROVIDERS
 (Include all DBE and non-DBE firms solicited)

Subcontractor/Supplier/Service provider	DBE?	Phone	Dates, Method of Contact	Description of Work	Dollar Amount of Quote
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

(Make additional copies of this form as necessary)

Min/DOT OCR
3/2008

Page _____ of _____

Withholding Affidavit for Contractors

This affidavit must be approved by the Minnesota Department of Revenue before the state of Minnesota or any of its subdivisions can make final payment to contractors.

Please type or print clearly. This will be your mailing label for returning the completed form.

Company name		Daytime phone ()	Minnesota tax ID number
Address		Total contract amount \$	Month/year work began
City	State	Zip Code	Month/year work ended
		Amount still due \$	

Project
information

Project number	Project location			
Project owner	Address	City	State	Zip code
Did you have employees work on this project? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, who did the work?				

Contractor type

Check the box that describes your involvement in the project and fill in all information requested.

☐ **Sole contractor**

☐ **Subcontractor**

Name of contractor who hired you

Address

☐ **Prime contractor**—If you subcontracted out any work on this project, all of your subcontractors must file their own IC134 affidavits and have them certified by the Department of Revenue *before* you can file your affidavit. For each subcontractor you had, fill in the information below and attach a copy of each subcontractor's certified IC134. If you need more space, attach a separate sheet.

Business name

Address

Owner/Officer

Sign here

I declare that all information I have filled in on this form is true and complete to the best of my knowledge and belief. I authorize the Department of Revenue to disclose pertinent information relating to this project, including sending copies of this form, to the prime contractor if I am a subcontractor, and to any subcontractors if I am a prime contractor, and to the contracting agency.

Contractor's signature

Title

Date

Mail to: Minnesota Revenue, Mail Station 6610, St. Paul, MN 55146-6610

Certificate of Compliance

Based on records of the Minnesota Department of Revenue, I certify that the contractor who has signed this certificate has fulfilled all the requirements of Minnesota Statutes 290.92 and 270C.66 concerning the withholding of Minnesota income tax from wages paid to employees relating to contract services with the state of Minnesota and/or its subdivisions.

Department of Revenue approval

Date

Instructions for Form IC134

Who must file

If you are a prime contractor, a contractor or a subcontractor who did work on a project for the state of Minnesota or any of its local government subdivisions — such as a county, city or school district — you must file Form IC134 with the Minnesota Department of Revenue.

This affidavit must be certified and returned before the state or any of its subdivisions can make final payment for your work.

If you're a prime contractor and a subcontractor on the same project

If you were hired as a subcontractor to do work on a project, and you subcontracted all or a part of your portion of the project to another contractor, you are a prime contractor as well. Complete both the subcontractor and prime contractor areas on a single form.

When to file

The IC134 cannot be processed until you finish the work. If you submit the form before the project is completed, it will be returned to you unprocessed. Mail Form IC134 to the address at the bottom of the form.

If you are a subcontractor or sole contractor, send in the form when you have completed your part of the project.

If you are a prime contractor, send in the form when the entire project is completed and you have received certified affidavits from all of your subcontractors.

How to file

If you have fulfilled the requirements of Minnesota withholding tax laws, the Department of Revenue will sign your affidavit and return it to you.

If any withholding payments are due to the state, Minnesota law requires certified payments before we approve the IC134.

Submit the certified affidavit to the government unit for which the work was done to receive your final payment. If you are a subcontractor, submit the certified affidavit to your prime contractor to receive your final payment.

Minnesota tax ID number

You must enter your Minnesota tax ID number on the form. You must have a Minnesota tax ID number if you have employees who work in Minnesota.

If you don't have a Minnesota ID number, you must apply for one. Call 651-282-5225.

An applications (Form ABR) is also available on our website at www.taxes.state.mn.us.

If you have no employees and did all the work yourself, you do not need a Minnesota tax ID number. If this is the case, enter your Social Security number in the space for Minnesota tax ID number and explain who did the work.

Information and assistance

If you need help or more information to complete this form, call 651-282-9999.

Additional forms are available on our website at www.taxes.state.mn.us or by calling 651-296-4444. TTY: Call 711 for Minnesota Relay.

We'll provide information in other formats upon request to persons with disabilities.

Use of information

The Department of Revenue needs all the information to determine if you have met all state income tax withholding requirements. If all required information is not provided, the IC134 will be returned to you for completion.

All information on this affidavit is private by state law. It cannot be given to others without your permission, except to the Internal Revenue Service, other states that guarantee the same privacy and certain government agencies as provided by law.

Surety Deposits for Non-Minnesota Construction Contractors

12

Withholding Fact Sheet 12

Fact Sheet

This fact sheet explains the Minnesota law requiring surety deposits for many non-Minnesota construction contractors (M.S. 290.9705). If you need more information, call the phone number at the bottom of this page.

There must be 8 percent (.08) Minnesota withholding on payments made to non-Minnesota construction contractors once cumulative payments made to the contractor for work done in Minnesota exceed \$50,000 in a calendar year. The 8 percent payment is deposited with the Minnesota Department of Revenue to ensure the contractor's obligations to the State of Minnesota are met for withholding, sales and use, franchise and income taxes.

Contractors are eligible for an exemption if any one of the following applies:

1. The construction contractor gives the department a bond for 8 percent of the contract secured by an insurance company licensed in Minnesota. This is to guarantee that the construction contractor will comply with Minnesota law regarding withholding, sales and use, franchise and income taxes.
2. The construction contractor gives the department a cash surety. A cash surety is evidence of a savings account, deposit, or certificate of deposit in, or issued by, a state bank, national bank, or savings and loan association doing business in Minnesota. Interest and dividends earned on the principal amount may be retained by the contractor.
3. The construction contractor has a payment and performance bond required by government agencies.
4. The construction contractor has done construction work in Minnesota during the past three calendar years and has fully complied with Minnesota law regarding withholding, sales and use, franchise and income taxes.

Construction contractors can apply for an exemption from Minnesota surety deposit requirements by filing Form SDE, *Exemption from Surety Deposits for Non-Minnesota Contractors*.

If the contractor is not exempt, whoever hires the construction contractor is required to withhold the surety deposit from each payment made to the contractor. Form SDD, *Surety Deposits for Non-Minnesota Contractors*, is used to make the surety deposit.

The department will hold the surety deposits until the construction contractor's state tax obligations are considered fulfilled. The construction contractor can apply for a refund after the project is completed using Form SDR, *Refund of Surety Deposits for Non-Minnesota Contractors*. The department will refund, with interest, any amounts held as surety.

In addition, non-Minnesota construction contractors who are carrying on a trade or business as a sole proprietor and who work in Minnesota, are required to have 2 percent withheld from payments of \$600 or more. See Fact Sheet 18 for more information.

Non-Minnesota construction contractors doing work for Minnesota subdivisions (counties, cities, school districts, etc.) must file Form IC134, *Withholding Affidavit for Contractors*, in addition to complying with this surety provision.

Information and assistance

Forms, fact sheets and the withholding instruction booklet are available on our website at www.taxes.state.mn.us. If you don't have Internet access or have questions about your withholding responsibilities, call our office at the number below.

Withholding Tax Division, Mail Station 6501, St. Paul, MN 55146-6501
Phone: 651-282-9999 or 1-800-657-3594 (outside the MN metro area)
Minnesota Relay 711 (TTY)
E-mail: withholding.tax@state.mn.us

This fact sheet is intended to help you become more familiar with Minnesota tax laws and your rights and responsibilities under the laws. Nothing in this fact sheet supersedes, alters, or otherwise changes any provisions of the tax law, administrative rules, court decisions or revenue notices. Alternative formats available upon request.

Exemption from Surety Deposits for Non-Minnesota Contractors

Please type or print clearly. This will be your mailing label for returning the form to you.

Contractor
information

Contractor			Total contract amount	Minnesota tax ID number
Address			\$	
City State Zip Code			Contact person	Daytime phone ()
			Contract starting date	Projected completion date
			Business type (check one):	<input type="checkbox"/> Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> S corporation <input type="checkbox"/> Sole proprietor

Project
information

Name of business or government agency	Contact person	Daytime phone ()
Contract owner's address City State Zip Code		Project number
Project location address City State Zip code		

I request exemption from surety deposits under Minnesota law (MS 290.9705) for the following reason (check one and complete the information requested):

- ☐ I have a cash surety or a bond secured by an insurance company licensed in Minnesota. The bond must be 8 percent of the total contract amount. **Attach a copy of the bonding agreement.**

Reason for exemption

Bonding company	Bonding agent
Address	Daytime phone ()
City State Zip code	Period of bond (month/day/year) From / / To / /

- ☐ I have done construction work in Minnesota during the past three calendar years and have fully complied with Minnesota law regarding Minnesota income, sales and withholding taxes.
- ☐ I am performing work for a government agency and have a payment and performance bond.
- ☐ I am performing work for a government agency and have a cash surety issued by a state bank, national bank, or savings and loan association doing business in Minnesota.

Sign here

I declare this information is true and complete to the best of my knowledge and belief. I authorize the Department of Revenue to send a copy of this form to the contract owner and discuss this case and related taxes with the bonding company.

Contractor's signature	Title	Date
------------------------	-------	------

Mail to: Minnesota Revenue, Mail Station 6501, St. Paul, MN 55146-6501

Department of Revenue Approval

The above-named out-of-state contractor is exempt from the surety requirements of Minnesota Statute 290.9705 for this project.

Department of Revenue approval

Date

Instructions for Form SDE

Who can apply?

A non-Minnesota contractor can apply for an exemption if your contract exceeds or is expected to exceed \$50,000 or multiple contracts have exceeded \$50,000 cumulative per calendar year for work done in Minnesota.

Before you start

You must have a Minnesota tax ID number from the Department of Revenue to request this exemption.

If you don't have one, you must apply for one. Go to our website at www.taxes.state.mn.us and click "Register for a Minnesota tax ID number" on the e-services menu. If you do not have Internet access, call Registration Services at 651-282-5225 or 1-800-657-3605.

How to apply

To apply for an exemption from Minnesota surety deposits, file Form SDE before the project is started.

Mail this form and any required attachments to the address on the front.

If you're approved

If we approve the exemption, we'll sign the bottom of this form and return it to you. Make a copy for your records and give the original to the business for whom you are doing the work.

If you're not approved

If we determine you're not eligible for exemption, 8 percent of each payment made to you must be withheld by the business for whom you are doing the work and deposited with the Department of Revenue.

To apply for a refund, complete Form SDR, *Refund of Surety Deposits for Non-Minnesota Contractors*. When the project is complete, and we determine that you have complied with Minnesota income, withholding and sales tax laws, you'll receive a refund plus interest at the current rate required by law.

Use of information

All information on this form is required except for your phone number.

All information is private by state law. It cannot be given to others without your permission, except to the Internal Revenue Service, other states that guarantee the same privacy, the contract owner or bonding company, and certain government agencies as provided by law.

Information and assistance

If you need help or additional information to fill out this form, call 651-282-9999 or 1-800-657-3594. TTY: Call 711 for Minnesota Relay.

A fact sheet on surety deposit requirements (Fact Sheet 12) is also available upon request.

We'll provide information in another format upon request to persons with disabilities.

Surety Deposits for Non-Minnesota Contractors

Please print

Business entity or Minnesota government unit making deposit		Contact person		
Contact person's address		Daytime phone ()		
Name of non-Minnesota contractor	Address	City	State	Zip code
Minnesota tax ID number	Project description/number			

Deposit

Date of payment _____

1 Gross payment made to the contractor **1** _____**2** Withholding rate **2** _____ .08**3** Amount to withhold from payment (*multiply line 1 by line 2*) **3** _____

Send this amount to the address below. Make check payable to Minnesota Revenue.

Mail to: Minnesota Revenue, Mail Station 6501, St. Paul, MN 55146-6501

Instructions for Form SDD

If you're a person, cooperative, business or government unit that has hired a non-Minnesota contractor to perform construction work in Minnesota and the project is over or expected to go over \$50,000 (cumulative per calendar year) you must withhold 8 percent of each payment made to the contractor unless they have received an exemption.

Use Form SDD to make the deposits with the Minnesota Department of Revenue. Notify the contractor of the date and amount of the deposit because the contractor will need that information when requesting a refund.

Information and assistance

If you have questions or need help completing this form, call (651) 282-9999 or 1-800-657-3594. TTY: Call 711 for Minnesota Relay.

We'll provide information in an alternative format upon request to persons with disabilities.

Second Tier Subcontractor Information

Second Tier Subcontractor:			Federal Tax I.D. Number:		
Street Address:			State Tax I.D. Number:		
City, State, Zip Code:			Email:		
Telephone Number: ()			Certified DBE Contractor: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Fax Number: ()			Currently Debarred or Suspended: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Specification or Item No.	Specification or Item Description	Quantity	Unit of Measurement	Unit Price	Amount
					<u>Total</u>
					\$

CONTRACTOR'S STATEMENT OF COMPLIANCE

<u>Print Name and Title of Prime Contractor Representative</u>	<u>Signature</u>	<u>Date</u>
As a representative of the Prime Contractor, I hereby certify that the information described on this form is truthful and accurate to the best of my knowledge. I certify that all subcontracts contain at a minimum the Federal and/or State Special Provisions Division A, Federal and/or State certified prevailing wage determinations and the State certified truck rental rates. I will ensure that all subcontractors demonstrate compliance with all contract specifications. Additionally, I understand that prior written consent to sublet any portion of the contract does not relieve the Prime Contractor of liabilities and obligations under the Contract and Bonds.		
<u>Print Name and Title of First Tier Subcontractor Representative</u>	<u>Signature</u>	<u>Date</u>
As a representative of the First Tier Subcontractor, I hereby certify that all company information is true and accurate and that our company has contracted to perform the work prescribed in the above-mentioned specifications/item descriptions. I've reviewed and understand all applicable contract specifications, which include but are not limited to the following: Federal and/or State Special Provisions Division A, Federal and/or State certified prevailing wage determinations, State certified truck rental rates and have provided these specifications to all Second Tier Subcontractors.		
<u>Print Name and Title of Second Tier Subcontractor Representative</u>	<u>Signature</u>	<u>Date</u>
As a representative of the Second Tier Subcontractor, I hereby certify that all company information is true and accurate and that our company has contracted to perform the work prescribed in the above-mentioned specifications/item descriptions. I've reviewed and understand all applicable contract specifications, which include but are not limited to the following: Federal and/or State Special Provisions Division A, Federal and/or State certified prevailing wage determinations, State certified truck rental rates.		
<u>Print Name and Title of Project Engineer</u>	<u>Signature</u>	<u>Date</u>
As a representative of the Department, I approve the Prime Contractor's utilization of the above-mentioned Subcontractors. Additionally, the Prime Contractor has complied with the terms established in Mn/DOT Standard Specifications for Construction, Section 1801.		

All persons signing this form understand that willful falsification of this document may result in civil and/or criminal prosecution under federal and/or state law. See Minnesota Statutes 16B, 161.315, Subdivision 2, 177.43, Subdivision 5, 177.44, Subdivision 6, 609.63; or the United States Code 18 U.S.C. 1001, 31 U.S.C. 231, CFR 5.12.

For additional information, visit the Labor Compliance website at: <http://www.dot.state.mn.us/const/labor/>

DEPARTMENT OF LABOR AND INDUSTRY
LABOR STANDARDS UNIT

February 7, 2011

**NOTICE OF DETERMINATION OF TRUCK RENTAL RATES
AND NOTICE OF INFORMAL CONFERENCE PURSUANT TO
MINNESOTA RULES, PART 5200.1105**

On February 7, 2011 the commissioner determined the operating costs and the minimum truck rental rates for highway projects in the state's ten highway and heavy construction areas for trucks and drivers operating "five or more axle units, straight body trucks," "four axle units, straight body trucks," "three axle units," "tractor only," and "tractor trailers."

The operating costs were determined by survey on a statewide basis. The operating cost for five or more axle units, straight body trucks" is determined to be \$ 42.30 per hour. The operating cost for "four axle units, straight body trucks" is determined to be \$ 38.33 per hour. The operating cost for "three axle units" is determined to be \$ 37.35 per hour. The operating cost for "tractor only" is determined to be \$ 38.79 per hour. The operating cost for "trailer only" is determined to be \$11.46 per hour. The operating cost for "tractor trailers" is determined to be \$ 50.25 per hour.

Adding the prevailing wage for drivers of these five types of trucks from each of the State's ten highway and heavy construction areas to the operating costs, the minimum hourly truck rental rate for the five types of trucks in each area is determined to be as follows:

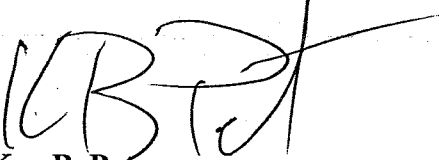
	Tractor Trailer	Five or more axle	Four axle	Three Axle	Tractor only
Region 1	90.00	67.24	63.27	76.45	78.54
Region 2	83.67	75.21	71.24	67.41	72.21
Region 3	83.67	66.26	62.29	70.11	72.21
Region 4	73.80	65.85	61.88	70.11	62.34
Region 5	87.20	69.66	65.69	66.75	75.74
Region 6	70.25	72.43	68.46	67.15	58.79
Region 7	76.10	79.70	75.73	74.65	64.64
Region 8	77.76	69.66	65.69	70.11	66.30
Region 9	90.40	69.66	65.69	76.85	78.94
Region 10	83.67	75.21	71.24	70.11	72.21

The operating costs and truck rental rates may also be reviewed by accessing the department's web site at www.dli.mn.gov. Questions regarding the truck rental rates or the informal conference noticed below can be answered by calling (651) 284-5091.

PLEASE TAKE NOTICE that on Tuesday March 1, 2011 from 10:00AM to 12:00 Noon, in the Minnesota Room, at the Minnesota Department of Labor and Industry, 443 Lafayette Road North, St. Paul, Minnesota, 55155, the department will hold the informal conference pursuant to *Minnesota Rules*, part 5200.1105. The informal conference is a public meeting and its purpose is to receive further input prior to the certification and publication of the minimum truck rental rates for these five types of trucks on highway and heavy construction projects. The data, summary sheets and other documents used in making the determinations will be reviewed and available for inspection at the informal conference.

Subsequent to the informal conference the minimum truck rental rates for these five types of trucks will be certified and notice of the certification will be published in the *State Register*.

The minimum truck rental rates for these five types of trucks in the state's ten highway and heavy construction areas will be effective for all highway and heavy construction projects financed in whole or part with state funds advertised for bid on or after the day the notice of certification is published in the *State Register*.



Ken B. Peterson,

COMMISSIONER

DEPARTMENT OF LABOR AND INDUSTRY
LABOR STANDARDS UNIT

April 4, 2011

**NOTICE OF CERTIFICATION OF TRUCK RENTAL RATES AND EFFECTIVE
DATE PURSUANT TO MINNESOTA RULES, PART 5200.1105**

On April 4, 2011, the Commissioner of the Department of Labor and Industry ("DLI") certified the minimum truck rental rates for highway projects in the state's ten highway and heavy construction areas for trucks and drivers operating "five or more axle units, straight body trucks," "four axle units, straight body trucks," "three axle units," "tractor only" and "tractor trailers." The certification followed publication of the Notice of Determination of Truck Rental Rates in the *State Register* on February 7, 2011 and the informal conference held pursuant to Minnesota Rules, part 5200.1105 on March 1, 2011.

According to Minnesota Rules, part 5200.1105, the purpose of the informal conference is for DLI to obtain further input regarding the proposed rates before the rates are certified. Approximately 50 individuals attended the informal conference. Many of the attendees voiced strong concerns regarding the inadequacy of the proposed rates. Among the concerns raised was the fact that the proposed rates were based on 2009 costs, including the 2009 price of fuel. Speakers indicated that because of the dramatic increase in the price of diesel in recent months, the published rates were far below the operators' current costs. As stated by one attendee:

I might not even be able to survive until next year. If I have a bad season, there's no room left, you know. The price of oil and the price of fuel is going to kill all of us guys this summer.

Testimony of Mike McDonald, Transcript of Informal Conference, p. 63.

Following the informal conference, DLI staff obtained data from the United States Department of Energy ("DOE") regarding the price of diesel during 2009 as compared to current costs. That data, available at www.eia.doe.gov, show that the average price of diesel during 2009 was \$2.463 per gallon. The average price of diesel during January and February 2011 was \$3.497 per gallon. Consequently, the average price of diesel for the first two months of this year was 41.9% higher than the average cost of diesel during 2009.

The purpose of Minnesota Rules, part 5200.1105, as stated in its Statement of Need and Reasonableness, is to "provide equitable compensation" to independent truck operators. The commissioner finds that in order to carry out the purpose of the rule, it is appropriate to consider the concerns expressed at the informal conference¹ and to use average 2011 diesel costs in computing and certifying 2011 truck rental rates. Specifically, the commissioner finds that the extreme disparity between 2009 and current

¹ The DLI has historically used input from the informal conferences to establish certified rates. For example, truck rental rates certified in 2009 varied from the proposed rates based on information gathered at the informal conference.

fuel costs warrants this adjustment in order for truck operators to be equitably compensated.²

Construction truck operating costs were initially determined by survey on a statewide basis and were the subject of further input by interested parties attending the informal conference pursuant to Minnesota Rules, part 5200.1105 on March 1, 2011 and further data on fuel prices from the DOE for 2009 and 2011. In light of the discussion above, fuel costs stated in the surveys were adjusted upward by 41.9% to determine statewide operating costs. As a result of this adjustment, the operating cost for “five or more axle units, straight body trucks” is determined to be \$49.10 per hour; the operating cost for “four axle units, straight body trucks” is determined to be \$45.49 per hour; the operating cost for “three axle units” is determined to be \$37.35 per hour; the operating cost for “tractor only” is determined to be \$46.02 per hour; and the operating cost for “tractor trailers” is determined to be \$57.48 per hour.

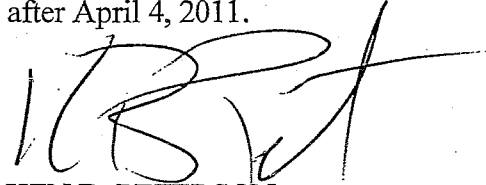
Adding the prevailing wage for drivers of these five types of trucks from each of the State’s ten highway and heavy construction areas to the operating costs, the minimum hourly truck rental rate for the five types of trucks in each area is certified to be as follows:

	Tractor Trailer	Five or more axle	Four axle	Three Axle	Tractor only
Region 1	97.23	74.04	70.43	76.45	85.77
Region 2	90.90	82.01	78.40	67.41	79.44
Region 3	90.90	73.06	69.45	70.11	79.44
Region 4	81.03	72.65	69.04	70.11	69.57
Region 5	94.43	76.46	72.85	66.75	82.97
Region 6	77.48	79.23	75.62	67.15	66.02
Region 7	83.33	86.50	82.89	74.65	71.87
Region 8	84.99	76.46	72.85	70.11	73.53
Region 9	97.63	76.46	72.85	76.85	86.17
Region 10	90.90	82.01	78.40	70.11	79.44

² The commissioner notes that the Minnesota Department of Transportation incorporates a fuel adjustment clause in certain of its contracts to accommodate the fluctuating price of fuel. That clause generally provides for the adjustment of contract payments when the cost of fuel increases or decreases by more than 15% from an indexed rate during the term of the contract. By using 2011 fuel costs in certifying 2011 truck rental rates, the commissioner is not intending to adopt or establish a similar fuel adjustment mechanism. Rather, he is taking this action to effectuate the purpose of Part 5200.1105 in light of the concerns raised at the informal conference and the dramatic increase in the price of diesel between 2009 and effective date of 2011 truck rental rates.

The operating costs, including the average truck broker fees paid by those survey respondents who reported paying truck broker fees, and the truck rental rates may also be reviewed by accessing DLI's website at www.dli.mn.gov. Questions regarding the operational costs and truck rental rates can be answered by calling (651) 284-5091.

The minimum truck rental rates certified for these five types of trucks in the state's ten highway and heavy construction areas will be effective for all highway and heavy construction projects financed in whole or part with state funds advertised for bid on or after April 4, 2011.

A handwritten signature in black ink, appearing to read 'KBP', with a long horizontal stroke extending to the right.

KEN B. PETERSON
COMMISSIONER

NOTICE TO BIDDERS

SUSPENSIONS/DEBARMENTS

December 13, 2011

Page 1 of 2

DEPARTMENT OF TRANSPORTATION

NOTICE OF DEBARMENT

NOTICE IS HEREBY GIVEN that the Department of Transportation ("MnDOT") has ordered that the following vendors be debarred for a period of two (2) years, effective January 4, 2010 until January 4, 2012:

- Riley Bros. Companies, Inc. and its affiliates, Morris, MN
- Riley Bros. Construction, Inc. and its affiliates, Morris, MN
- Riley Bros. Properties, LLC and its affiliates, Morris, MN
- Riley Bros. Utilities, Inc., d/b/a Chris Riley Utilities, Inc., and its affiliates, Morris, MN

NOTICE IS HEREBY GIVEN that MnDOT has ordered that the following vendors be debarred for a period of three (3) years, effective February 24, 2010 until February 24, 2013:

- Joseph Edward Riley, Morris, MN
- John Thomas Riley, Morris, MN

NOTICE IS HEREBY GIVEN that MnDOT has ordered that the following vendors be debarred for a period of three (3) years, effective March 25, 2011 until March 25, 2014:

- Philip Joseph Franklin, Leesburg, VA
- Franklin Drywall, Inc. and its affiliates, Little Canada, MN
- Master Drywall, Inc. and its affiliates, Little Canada, MN

NOTICE OF SUSPENSION

NOTICE IS HEREBY GIVEN that the Department of Transportation ("MnDOT") has ordered that the following vendors be suspended for a period of sixty (60) days, effective December 12, 2011 until February 10, 2012:

- Marlon Louis Danner and his affiliates, South St. Paul, MN
- Danner, Inc. and its affiliates, South St. Paul, MN
- Bull Dog Leasing, Inc. and its affiliates, Inver Grove Heights, MN
- Danner Family Limited Partnership and its affiliates, South St. Paul, MN
- Ell-Z Trucking, Inc. and its affiliates, South St. Paul, MN

Minnesota Statute section 161.315 prohibits the Commissioner, counties, towns, or home rule or statutory cities from awarding or approving the award of a contract for goods or services to a person who is suspended or debarred, including:

- 1) any contract under which a debarred or suspended person will serve as a subcontractor or material supplier,
- 2) any business or affiliate which the debarred or suspended person exercises substantial influence or control, and
- 3) any business or entity, which is sold or transferred by a debarred person to a relative or any other party over whose actions the debarred person exercises substantial influence or control, remains ineligible during the duration of the seller's or transfer's debarment.

NOTICE TO BIDDERS

SUSPENSIONS/DEBARMENTS

November 15, 2011

Page 2 of 2

DEPARTMENT OF ADMINISTRATION

As of the date of this notice and in accordance with Minnesota Rules 1230.1150, the Minnesota Department of Administration has debarred and disqualified the following persons and businesses from entering into or receiving a State of Minnesota contract:

NAME	DATE OF DEBARMENT
Alternative Counseling Clinic 337 97 th Lane NE Minneapolis, MN 55434	Oct. 22, 2008 through Oct. 22, 2011 (eligible for reinstatement on Oct. 22, 2012)
Bull Dog Leasing, Inc. 7854 Danner Court Inver Grove Heights, MN 55076	Aug. 30, 2011 through Aug. 30, 2014 (eligible for reinstatement on Aug. 30, 2015)
Danner Family Ltd. Ptnship. 843 Hardman Ave. S. S. St. Paul, MN 55075	Aug. 30, 2011 through Aug. 30, 2014 (eligible for reinstatement on Aug. 30, 2015)
Danner, Inc. 843 Hardman Ave. S. S. St. Paul, MN 55075	Aug. 30, 2011 through Aug. 30, 2014 (eligible for reinstatement on Aug. 30, 2015)
Ell-Z Trucking, Inc. 843 Hardman Ave. S. S. St. Paul, MN 55075	Aug. 30, 2011 through Aug. 30, 2014 (eligible for reinstatement on Aug. 30, 2015)
Franklin Drywall, Inc. 43279 Fieldsview Crt. Leesburg, VA 20176	March 25, 2011 through March 25, 2014 (eligible for reinstatement on March 25, 2015)
Master Drywall, Inc. 43279 Fieldsview Crt. Leesburg, VA 20176	March 25, 2011 through March 25, 2014 (eligible for reinstatement on March 25, 2015)
Polyphase Electric Company 2515 West Superior Street Duluth, MN 55816-0151	May 5, 2010 through May 5, 2011 (eligible for reinstatement on May 5, 2012)
Riley Brothers Construction PO Box 535 Morris, MN 56267	Nov. 9, 2009 through Nov. 9, 2012

Minnesota Administrative Rule part 1230.1150, subpart 6 requires the Materials Management Division to maintain a master list of all suspensions and debarments. The master list must retain all information concerning suspensions and debarments as a public record for at least three (3) years following the end of a suspension or debarment. Refer to the following website for the master list: <http://www.mmd.admin.state.mn.us/debarredreport.asp>.

If the project is financed in whole or in part with federal funds, refer to the following website for vendors debarred by federal government agencies: <https://www.epls.gov/>.

**INFORMATION TO BE GIVEN TO GOPHER STATE ONE-CALL SYSTEM
FOR LOCATIONS OF ALL UTILITIES (1-800-252-1166)**

CALL 48 HOURS (2 WORKING DAYS) IN ADVANCE OF ANY EXCAVATION.
The ONE-CALL Operator will require the following information:

- | | |
|-------------------------------------|--|
| 1. Type of request being placed. | 9. Duration of work |
| 2. Telephone/Caller I.D. Number | 10. Type of work |
| 3. Caller name and company name | 11. Who the work is being done for |
| 4. Mailing address | 12. County and City/Place name |
| 5. Alternate contact name & phone # | 13. Street address of work site |
| 6. Date work is to begin | 14. Marking instructions |
| 7. Whether explosives will be used | 15. Remarks |
| 8. Is work in Right of Way (R.O.W.) | 16. Township, Range, Section & Quarter |

WARNING
BEFORE DIGGING CALL 1-800-252-1166
TO NOTIFY LOCAL UTILITIES
== REQUIRED BY LAW ==

UTILITY LOCATION & COORDINATION COUNCIL
UNIFORM COLOR CODE

RED	ELECTRIC POWER LINES, CABLES, CONDUIT AND LIGHTING CABLES.
YELLOW	GAS, OIL, STEAM, PETROLEUM OR GASEOUS MATERIALS.
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES OR CONDUIT.
BLUE	WATER, IRRIGATION AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES.
FLUORESCENT PINK	FOR SURVEYING PURPOSES
WHITE	PROPOSED EXCAVATION

**GUIDELINES FOR UNIFORM
TEMPORARY MARKING
OF UNDERGROUND FACILITIES**

This marking guide provides for universal use and understanding of the temporary marking of subsurface facilities to prevent accidental damage or service interruption by contractors, utility companies or any others working on or near those underground facilities.

USE OF MARKINGS

Use color-coded surface marks (paint or similar coating) to indicate the location, change in direction and deadends of buried lines. To increase visibility, color-coded vertical markers (temporary stakes or flags) should supplement surface marks. All marks and markers should indicate the name, initials or logo of the company that owns or operates the line, and the width of the facility if it is greater than two inches.

If the surface over the buried line is to be removed, supplemental offset marking may be used. Offset markings should be on a uniform alignment and must clearly indicate that the actual facility is a specific distance away.

LOCATION TOLERANCE ZONE

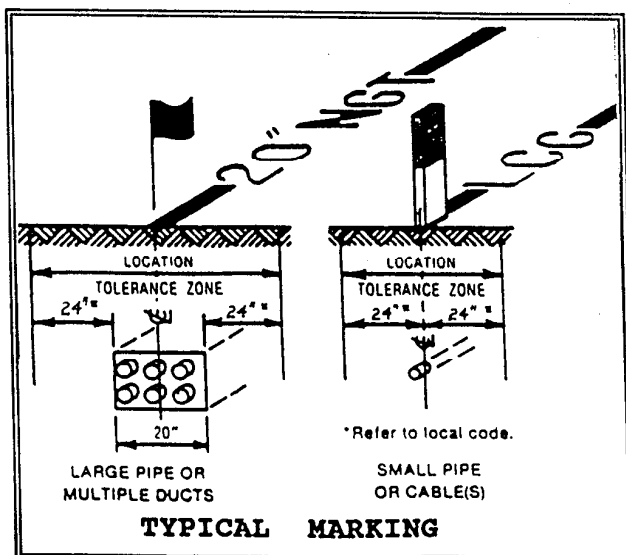
Usually, any excavation within the location tolerance zone must be performed with hand tools until the marked facility is exposed.

PROPOSED EXCAVATION

The location or the boundary of proposed excavations should be indicated in a color (usually white) which does not conflict with the Uniform Color Code.

ONE-CALL DAMAGE PREVENTION SYSTEMS

Existing ONE-CALL systems must be used to minimize damage to buried lines.



SPECIAL INSTRUCTIONS TO BIDDERS REGARDING EEO

Notice of Requirement for Affirmative Action (41 CFR Part 60-2 and Executive Order 11246, as amended)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

TIMETABLES

Goals of minority participation in each trade	Goals for female participation in each trade
1.0%	6.9%
(Vol. 45, Fed. Reg., Pg. 65984, 10/03/80)	

These goals are applicable to all the contractor's construction work (whether or not it is Federal or Federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The contractor's compliance with the executive order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR Part 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project, for the sole purpose of meeting the contractor's goals, shall be a violation of the contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The contractor shall provide written notification to the Director, OFCCP, within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and, the geographical area in which the contract is to be performed.
4. As used in this notice and in the contract resulting from this solicitation, the "covered area" is Duluth, Minnesota.

**Certification Regarding Debarment, Suspension,
Ineligibility and Voluntary Exclusion
(49 CFR PART 29)**

The bidder (offeror) certifies, by submission of this proposal or acceptance of this contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. It further agrees that by submitting this proposal that it will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the bidder/offeror/contractor or any lower tier participant is unable to certify to this statement, it shall attach an explanation to this solicitation/proposal.

**Certification Regarding Foreign Trade Restrictions
(49 CFR PART 30)**

The contractor or subcontractor, by submission of an offer and/or execution of a contract, certifies that it:

a. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR);

b. has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list.

c. has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to a contractor or subcontractor who is unable to certify to the above. If the contractor knowingly procures or subcontracts for the supply of any product or service of a foreign country on said list for use on the project; the Federal Aviation Administration may direct, through the Sponsor, cancellation of the contract at no cost to the Government.

Further, the contractor agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The contractor may rely upon the certification of a prospective subcontractor unless it has knowledge that the certification is erroneous.

The contractor shall provide immediate written notice to the sponsor if the contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The subcontractor agrees to provide immediate written notice to the contractor, if at any time it learns that its certification was erroneous by reason of changed circumstances.

This certification is a material representation of fact upon which reliance was placed when making the award. If it is later determined that the contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration may direct, through the Sponsor, cancellation of the contract or subcontract for default at no cost to the Government.

07/25/03

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code, Section 1001.

Buy American Certification
(Aviation Safety and Capacity Expansion Act of 1990)

By submitting a bid/proposal under this solicitation, except for those items listed by the offeror below or on a separate and clearly identified attachment to this bid/proposal, the offeror certifies that steel and each manufactured product, is produced in the United States, as defined in the clause Buy American - Steel and Manufactured Products for Construction Contracts, and that components of unknown origin are considered to have been produced or manufactured outside the United States.

Offerors may obtain from the City of Duluth, Minnesota (insert sponsor representative) a listing of articles, materials, and supplies excepted from this provision.

PRODUCT**COUNTRY OF ORIGIN**

APPENDIX D

List of Supplies/Materials that the U.S. Government has determined are not produced in the United States in sufficient and reasonably available quantities and of sufficient quality. (January 1991)

- | | |
|--|---|
| <ul style="list-style-type: none"> • Acetylene, black • Agar, bulk • Anise • Antimony, as metal or oxide • Asbestos, amosite, chrysolite and crocidolite | <ul style="list-style-type: none"> • Emetine, bulk • Ergot, crude • Erthrityl tetranitrate • Fair linen, altar • Fibers of the following type: abaca, abace, agave, coir, flax, jute, jute burlaps, palmyra and sisal • Goat and kidskins • Graphite, natural, chrystalline, crucible grade • Handsewing needles • Hemp yarn • Hog bristles for brushes • Hyoscine, bulk • Ipecac, root |
| <ul style="list-style-type: none"> • Bananas • Bauxite • Beef, corned, canned • Beef extract • Bephenium Hydroxynapthoate • Bismuth • Books, trade, text, technical, or scientific; newspapers; pamphlets; magazines; periodicals; printed briefs and films; not printed in the United States and for which domestics editions are not available • Brazil nuts, unroasted • Cadmium, ores and flue dust • Calcium cyanamide • Capers • Cashew nuts • Castor beans and castor oil • Chalk, English • Chestnuts • Chicle | <ul style="list-style-type: none"> • Iodine, crude • Kaurigum • Lac • Leather, sheepskin, hair type • Lavender oil • Manganese • Menthol, natural bulk • Mica • Microprocessor chips (brought onto a construction site as separate units for incorporation into building systems during construction or repair and alteration of real property) • Nickel, primary, in ingots, pigs, shots, cathodes, or similar forms; nickel oxide and nickel salts • Nitroguanidine (also known as picrite) • Nux vomica, crude |
| <ul style="list-style-type: none"> • Chrome ore or chromite | <ul style="list-style-type: none"> • Oiticica oil • Olive oil |
| <ul style="list-style-type: none"> • Cinchona bark • Cobalt, in cathodes, rondelles, or other primary ore and metal forms • Cocoa beans • Coconut and coconut meat, unsweetened, in shredded, desiccated or similarly prepared form • Coffee, raw or green bean • Colchicine alkaloid, raw • Copra • Cork, wood or bark and waste | <ul style="list-style-type: none"> • Olives (green), pitted or unpitted, or stuffed, in bulk • Opium, crude • Oranges, mandarin, canned • Petroleum, crude oil, unfinished oils, and finished products (see definitions below) |

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- Cover glass, microscope slide
- Cryolite, natural
- Dammar gum
- Diamonds, industrial, stones and abrasives
- Pine needle oil
- Platinum and related group metals, refined, as sponge, powder, ingots, or cast bars
- Pyrethrum flowers
- Quartz crystals

APPENDIX D

List of Supplies/Materials that the U.S. Government has determined are not produced in the United States in sufficient and reasonably available quantities and of sufficient quality. (January 1991) (CONTINUED)

- Quebracho
- Quinidine
- Quinine
- Rabbit fur felt
- Radium salts, source and special nuclear materials
- Rosettes
- Rubber, crude and latex
- Rutile
- Santonin, crude
- Secretin
- Shellac
- Silk, raw and unmanufactured
- Spare and replacement parts for equipment of foreign manufacture, and for which domestic parts are not available
- Spices and herbs, in bulk
- Sugars, raw
- Swords and scabbards
- Talc, block, steatite
- Tantalum
- Tapioca flour and cassava
- Tartar, crude; tartaric acid and cream or tartar in bulk
- Tea in bulk
- Thread, metallic (gold)
- Thyme oil
- Tin in bars, blocks, and pigs
- Triprolidine hydrochloride
- Tungsten
- Vanilla beans
- Venom, cobra
- Wax, canauba
- Woods; logs, veneer, and lumber of the following species: Alaskan yellow cedar, angelique, balsa, ekki, greenhart, lignum vitae, mahogany, and teak
- Yarn, 50 Denier rayon

APPENDIX D

List of Supplies/Materials that the U.S. Government has determined are not produced in the United States in sufficient and reasonably available quantities and of sufficient quality. (January 1991) (CONTINUED)

Petroleum terms are used as follows:

“Crude oil” means crude petroleum, as it is produced at the well head, and liquids (under atmospheric conditions) that have been recovered from mixtures of hydrocarbons that existed in a vaporous phase in a reservoir and that are not natural gas products.

“Finished products” means any one or more of the following petroleum oils, or a mixture or combination of these oils, to be used without further process except blending by mechanical means:

- (A) “Asphalt” – a solid or semi-solid cementitious material that (1) gradually liquefies when heated, (2) has bitumens as its predominating constituents, and (3) is obtained in refining crude oil.
- (B) “Fuel oil” – a liquid or liquefiable petroleum product burned for lighting or for the generation of heat or power and derived directly or indirectly from crude oil, such as kerosene, range oil, distillate fuel oils, gas oil, diesel fuel, topped crude oil, or residues.
- (C) “Gasoline” – a refined petroleum distillate that, by its consumption, is suitable for use as a carburant in internal combustion engines.
- (D) “Jet fuel” – a refined petroleum distillate used to fuel jet propulsion engines.
- (E) “Liquefied gases” – hydrocarbon gases recovered from natural gas or produced from petroleum refining and kept under pressure to maintain a liquid state at ambient temperatures.
- (F) “Lubricating oil” – a refined petroleum distillate or specially treated petroleum residue used to lessen friction between surfaces.
- (G) “Naphtha” – a refined petroleum distillate falling within a distillation range overlapping the higher gasoline and the lower kerosenes.
- (H) “Natural gas products” – liquids (under atmospheric conditions; including natural gasoline, that -
 - (1) are recovered by a process of absorption, compression, refrigeration, cycling, or a combination of these processes, from mixtures of hydrocarbons that existed in a vaporous phase in a reservoir, and
 - (2) when recovered and without processing in a refinery, definitions of products contained in subdivision (B), (C), and (G) above.
- (I) “Residual fuel oil” – a topped crude oil or viscous residuum that, as obtained in refining or after blending with other fuel oil, meets or is the equivalent of MILSPEC

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Mil-F-859 for Navy Special Fuel Oil and any more viscous fuel oil, such as No. 5 or Bunker C.

- (J) "Unfinished oils" means one or more the petroleum oils listed under "Finished products" above, or a mixture or combination of these oils, that are to be further processed other than by blending by mechanical means.

**CERTIFICATION OF BIDDER REGARDING
EQUAL EMPLOYMENT OPPORTUNITY**

GENERAL

BIDDER'S NAME _____
ADDRESS _____

INTERNAL REVENUE SERVICE EMPLOYER IDENTIFICATION NO. _____

NONSEGREGATED FACILITIES

**NOTICE TO PROSPECTIVE FEDERALLY ASSISTED
CONSTRUCTION CONTRACTORS
(41 CFR Part 60-1.8)**

1 A Certification of Nonsegregated Facilities must be submitted prior to the award of a federally assisted construction contract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause.

2 Contractors receiving federally assisted construction contract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the following notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause.

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR
CERTIFICATION OF NONSEGREGATED FACILITIES**

1 A Certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause.

2 Contractors receiving subcontract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause.

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

CERTIFICATION OF NONSEGREGATED FACILITIES

The federally assisted construction contractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that she or he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor certifies that she or he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are

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maintained. The federally assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directives or are, in fact, segregated on the basis of race, color, religion, sex, or national origin, because of habit, local custom, or any other reason. The federally assisted construction contractor agrees that (except where she or he has obtained identical certifications from proposed subcontractors for specific time periods) she or he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause, and that she or he will retain such certifications in his files.

**NOTICE TO PROSPECTIVE CONTRACTORS OF REQUIREMENT FOR
CERTIFICATION OF NONSEGREGATED FACILITIES**

A Certification of Nonsegregated Facilities must be submitted prior to the award of a contract or subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause.

Certification - The information above is true and complete to the best of my knowledge and belief.

Name and Title of Signer (Please Type)

Signature

Date

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

SECTION A

WAGE, LABOR, EEO, SAFETY AND GENERAL REQUIREMENTS (Federal Aviation Administration (FAA) Requirements)

A-1 Airport and Airway Improvement Program Project.

The work in this contract is included in AIP:3-27-0024-54-12 which is being undertaken and accomplished by the Duluth Airport Authority, Duluth Minnesota (Sponsor) in accordance with the terms and conditions of a grant agreement between the Sponsor and the United States, under the Airport and Airway Improvement Act of 1982 (P.L. 97-248) as amended by the Airport and Airway Safety and Capacity Expansion Act of 1987 (P.L. 100-223) and Part 152 of the Federal Aviation Regulations (14 CFR Part 152), pursuant to which the United States has agreed to pay a certain percentage of the costs under those Acts. The United States is not a party to this contract and no reference in this contract to the FAA or any representative thereof, or the United States, by the contract, makes the United States a party to this contract.

A-2 Consent to Assignment.

The contractor shall obtain the prior written consent of the Sponsor to any proposed assignment of any interest in or part of this contract.

A-3 Convict Labor.

No convict labor may be employed under this contract.

A-4 Veterans Preference.

In the employment of labor (except in executive, administrative, and supervisory positions), preference shall be given to veterans of the Vietnam era and disabled veterans as defined in Section 515(c)(1) and (2) of the Airport and Airway Improvement Act of 1982. However, this preference shall apply only where the individuals are available and qualified to perform the work to which the employment relates.

A-5 Withholding: Sponsor from Contractor.

Whether or not payments or advances to the Duluth Airport Authority, **(Sponsor)** are withheld or suspended by the FAA, the Sponsor may withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics employed by the contractor or any subcontractor on the work, the full amount of wages required by this contract.

A-6 Nonpayment of Wages.

If the contractor or subcontractor fails to pay any laborer or mechanic employed or working on the site of the work any of the wages required by this contract, the Duluth Airport Authority(Sponsor) may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment or advance of funds until the violations cease.

A-7 FAA inspection and review.

The contractor shall allow any authorized representative of the FAA to inspect and review any work or materials used in the performance of this contract.

A-8 Subcontracts.

The contractor shall insert in each of his subcontracts the provisions contained in paragraphs A-1, A-3, A-4, A-5, A-6, and A-7 requiring the subcontractors to include these provisions in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

A-9 Contract termination.

Any violation or breach of the terms of this contract on the part of the contractor or their subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement. He duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. (49 CFR Part 18).

A-10 Inspection of Records.

The contractor shall maintain an acceptable cost accounting system. The Contractor agrees to provide the Sponsor, the Federal Aviation Administration and the Comptroller General of the United States or any of their duly authorized representatives access to any books, documents, papers, and records of the contractor which are directly pertinent to the specific contract for the purposes of making audit, examination, excerpts and transcriptions. The Contractor agrees to maintain all books, records and reports required under this contract for a period of not less than three years after final payment is made and all other pending matters are closed. (49 CFR Part 18.36(i)).

A-11 Rights to Inventions.

All rights to inventions and materials generated under this contract are subject to regulations issued by the FAA and the Sponsor of the Federal grant under which this contract is executed. Information regarding these rights is available from the FAA and the Sponsor. (49 CFR Part 18.36(i)(8)).

A-12 General Civil Rights Provisions.

The contractor assures that it will comply with pertinent statutes, Executive orders and such rules as are promulgated to assure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or handicap be excluded from participating in any activity conducted with or benefiting from Federal assistance. This provision obligates the tenant/concessionaire/lessee or its transferee for the period during which Federal assistance is extended to the airport a program, except where Federal assistance is to provide, or is in the form of personal property or real property or interest therein or structures or improvements thereon. In these cases the provision obligates the party or any transferee for the longer of the following periods: (a) the period during which the property is used by the airport sponsor or any transferee for a purpose for which Federal assistance is extended, or for another purpose involving the provision of similar services or benefits or (b) the period during which the airport sponsor or any transferee retains ownership or possession of the property. In the case of contractors, this provision binds the

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contractors from the bid solicitation period through the completion of the contract. This provision is in addition to that required of Title VI of the Civil Rights Act of 1964.

SECTION B

DAVIS-BACON ACT REQUIREMENTS (29 CFR PART 5)

B-1 Minimum Wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalent thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can easily be seen by the workers.

(ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determinations; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of

receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140).

B-2 Withholding.

The Federal Aviation Administration or the Sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of work, all or part of the wages required by the contract, the Federal Aviation Administration may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

B-3 Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or

mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph 5.5(a)(3)(i) above. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under paragraph (3)(i) above and that such information is correct and complete;

(2) That each laborer and mechanic (including each helper, apprentice and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (3)(i) of this section available for inspection, copying or transcription by authorized representatives of the Sponsor, the Federal Aviation Administration or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

B-4 Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable programs approved.

(iii) Equal Employment Opportunity (EEO). The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

B-5 Compliance With Copeland Act Requirements.

The contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

B-6 Subcontracts.

The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR Part 5.5(a)(1) through (10) and such other clauses as the Federal Aviation Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5.

B-7 Contract Termination: Debarment.

A breach of the contract clauses in paragraph 1 through 10 of this section may be grounds for termination of the contract, and for the debarment as a contractor and a subcontractor as provided in 29 CFR 5.12

B-8 Compliance With Davis-Bacon and Related Act Requirements.

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

B-9 Disputes Concerning Labor Standards.

Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6 and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

B-10 Certification of Eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

SECTION C

CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS (29 CFR PART 5)

C-1 Overtime Requirements.

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic, including watchmen and guards, in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

C-2 Violation; Liability for Unpaid Wages; Liquidated Damages.

In the event of any violation of the clause set forth in paragraph C-1 above, the contractor or any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph C-1 above, in the sum of \$3,000 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph C-1 above.

C-3 Withholding for Unpaid Wages and Liquidated Damages.

The Federal Aviation Administration or the Sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph C-2 above.

C-4 Subcontractors.

The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs C-1 through C-4 and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs C-1 through C-4 of this section.

C-5 Working Conditions.

No contractor or subcontractor may require any laborer or mechanic employed in the performance of any contract to work in surroundings or under working conditions that are unsanitary, hazardous or dangerous to his health or safety as determined under construction safety and health standards (29 CFR Part 1926) issued by the Department of Labor.

SECTION D

CLEAN AIR AND WATER POLLUTION CONTROL REQUIREMENTS

D-1 Any other provision herein to the contrary notwithstanding, the contractor in carrying out work under this contract, shall at all times comply with all applicable state and federal air and water quality standards; with all pollution control laws; and with such rules, regulations, and directives as may be lawfully issued by a local, state, or federal agency having within its jurisdiction the protection of the environment in the area surrounding where work under this contract will be performed. In addition, the contractor shall comply with directives given by the Project Engineer in implementation of the letter and intent of FAA Advisory Circular 150/5370-10, Item P-156, Temporary Air and Water Pollution, Soil Erosion and Siltation Control. Copies of this Advisory Circular can be obtained from Department of Transportation, Distribution Unit, TAD-484.3, Washington, D.C. 20590.

D-2 Contractors and subcontractors agree:

a. That any facility to be used in the performance of the contract or subcontract or to benefit from the contract is not listed on the Environmental Protection Agency (EPA) List of Violating Facilities;

b. To comply with all the requirements of Section 114 of the Clean Air Act, as amended, 42 U.S.C. 1857 et seq. and Section 308 of the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq. relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in Section 114 and Section 308 of the Acts, respectively, and all other regulations and guidelines issued thereunder;

c. That, as a condition for the award of this contract, the contractor or subcontractor will notify the awarding official of the receipt of any communication from the EPA indicating that a facility to be used for the performance of or benefit from the contract is under consideration to be listed on the EPA List of Violating Facilities;

d. To include or cause to be included in any construction contract or subcontract which exceeds \$100,000 the aforementioned criteria and requirements.

SECTION E

CONTRACTOR CONTRACTUAL REQUIREMENTS PURSUANT TO CIVIL RIGHTS ACT OF 1964, TITLE VI (49 CFR PART 21)

During the performance of this contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

E-1 Compliance with Regulations. The contractor shall comply with the Regulations relative to nondiscrimination in federally assisted programs of the Department of Transportation (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

E-2 Nondiscrimination. The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

E-3 Solicitations for Subcontracts, Including Procurements of Materials and Equipment. In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

E-4 Information and Reports. The contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Sponsor or the Federal Aviation Administration (FAA) to be pertinent to ascertain compliance with such Regulations, orders, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the sponsor or the FAA, as appropriate, and shall set forth what efforts it has made to obtain the information.

E-5 Sanctions for Noncompliance. In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the sponsor shall impose such contract sanctions as it or the FAA may determine to be appropriate, including, but not limited to:

- a. Withholding of payments to the contractor under the contract until the contractor complies, and/or
- b. Cancellation, termination, or suspension of the contract, in whole or in part.

E-6 Incorporation of Provisions. The contractor shall include the provisions of paragraphs 1 through 5 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the sponsor or the FAA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Sponsor to enter into such litigation to protect the interests of the sponsor and,

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in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

SECTION F

TERMINATION OF CONTRACT (49 CFR PART 18)

F-1 The Sponsor may, by written notice, terminate this contract in whole or in part at any time, either for the Sponsor's convenience or because of failure to fulfill the contract obligations. Upon receipt of such notice services shall be immediately discontinued (unless the notice directs otherwise) and all materials as may have been accumulated in performing this contract, whether completed or in progress, delivered to the Sponsor.

F-2 If the termination is for the convenience of the Sponsor, an equitable adjustment in the contract price shall be made, but no amount shall be allowed for anticipated profit on unperformed services.

F-3 If the termination is due to failure to fulfill the contractor's obligations, the Sponsor may take over the work and prosecute the same to completion by contract or otherwise. In such case, the contractor shall be liable to the Sponsor for any additional cost occasioned to the Sponsor thereby.

F-4 If, after notice of termination for failure to fulfill contract obligations, it is determined that the contractor had not so failed, the termination shall be deemed to have been effected for the convenience of the Sponsor. In such event, adjustment in the contract price shall be made as provided in paragraph 2 of this clause.

F-5 The rights and remedies of the sponsor provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

SECTION G**BUY AMERICAN - STEEL AND MANUFACTURED PRODUCTS
FOR CONSTRUCTION CONTRACTS
(Aviation Safety and Capacity Expansion Act of 1990)**

(a) The Aviation Safety and Capacity Expansion Act of 1990 provides that preference be given to steel and manufactured products produced in the United States when funds are expended pursuant to a grant issued under the Airport Improvement Program. The following terms apply:

1. Steel and manufactured products. As used in this clause, steel and manufactured products include (1) those produced in the United States or (2) a manufactured product produced in the United States, if the cost of its components mined, produced or manufactured in the United States exceeds 60 percent of the cost of all its components and final assembly has taken place in the United States. Components of foreign origin of the same class or kind as the products referred to in subparagraphs b. (1) or (2) shall be treated as domestic.

2. Components. As used in this clause, components means those articles, materials, and supplies incorporated directly into steel and manufactured products.

3. Cost of Components. This means the cost for production of the components, exclusive of final assembly labor costs.

(b) The successful bidder will be required to assure that only domestic steel and manufactured products will be used by the Contractor, subcontractors, materialmen, and suppliers in the performance of this contract, except those:

1. that the U.S. Department of Transportation has determined, under the Aviation Safety and Capacity Expansion Act of 1990, are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality;

2. that the U.S. Department of Transportation has determined, under the Aviation Safety and Capacity Expansion Act of 1990, that domestic preference would be inconsistent with the public interest; or

3. that inclusion of domestic material will increase the cost of the overall project contract by more than 25 percent.

SECTION H
EQUAL EMPLOYMENT OPPORTUNITY
(41 CFR PART 60-1.4(b))

During the performance of this contract, the contractor agrees as follows:

H-1 The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

H-2 The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.

H-3 The contractor will send to each labor union or representative of workers with which s/he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

H-4 The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.

H-5 The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

H-6 In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedure authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

H-7 The contractor will include the portion of the sentence immediately preceding paragraph D-1 and the provisions of paragraphs D-1 through D-7 in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provision, including sanctions for noncompliance: *Provided, however*, that in the event a contractor becomes involved in, or is threatened with, litigation with a

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subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

SECTION I

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (41 CFR 60-4.3)

I-1 As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;

d. "Minority" includes:

(1) Black (all) persons having origins in any of the Black African racial groups not of Hispanic origin);

(2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin regardless of race);

(3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(4) American Indian or Alaskan native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

I-2 Whenever the contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

I-3 If the contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors shall be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

I-4 The contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted

are expressed as percentages of the total hours of employment and training of minority and female utilization the contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in a geographical area where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

I-5 Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the contractor has a collective bargaining agreement to refer either minorities or women shall excuse the contractor's obligations under these specifications, Executive Order 11246 or the regulations promulgated pursuant thereto.

I-6 In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees shall be employed by the contractor during the training period and the contractor shall have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees shall be trained pursuant to training programs approved by the U.S. Department of Labor.

I-7 The contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor shall document these efforts fully and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the contractor's employees are assigned to work. The contractor, where possible, will assign two or more women to each construction project. The contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the contractor by the union or, if referred, not employed by the contractor, this shall be documented in the file with the reason therefore along with whatever additional actions the contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the contractor has a collective bargaining agreement has not referred to the contractor a minority person or female sent by the contractor, or when the contractor has other information that the union referral process has impeded the contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with onsite supervisory personnel such as superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the contractor's EEO policy with other contractors and subcontractors with whom the contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students; and to minority and female recruitment and training organizations serving the contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel, for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the contractor's EEO policies and affirmative action obligations.

I-8 Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through 7p). The efforts of a contractor association, joint contractor union, contractor community, or other similar groups of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through 7p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's and failure of such a group to fulfill an obligation shall not be a defense for the contractor's noncompliance.

I-9 A single goal for minorities and a separate single goal for women have been established. The contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non minority. Consequently, if the particular group is employed in a substantially disparate manner (for example, even though the contractor has achieved its goals for women generally,) the contractor may be in violation of the Executive Order if a specific minority group of women is underutilized.

I-10 The contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

I-11 The contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

I-12 The contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

I-13 The contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

I-14 The contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee, the name, address, telephone number, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of

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pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

I-15 Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

SECTION J**MANDATORY REQUIREMENT FOR ALL AIP FUNDED CONSTRUCTION
PROJECTS INVOLVING ELECTRICAL ENERGY OR OTHER
HAZARDOUS ENERGY SOURCES**

For projects involving electrical energy or other hazardous energy source, the contractor shall submit a copy of their Lockout/Tagout program which meets the requirements of 29 CFR 1910.331, Safety Related Work Practices (OSHA). During the performance of electrical work, it is recommended that an unannounced inspection be performed by the airport sponsor or his agent to determine if the Lockout/Tagout program is being followed. Immediate action shall be taken to correct noncompliance, including suspension of work when necessary.

SECTION K

DISADVANTAGED BUSINESS ENTERPRISE CONTRACT PROVISIONS (49 CFR PART 26)

PART A

Policy. The requirements of 49 CFR Part 26, Regulations of the U.S. Department of Transportation, apply to this contract. It is the policy of the City of Pensacola, Florida, to practice nondiscrimination based on race, color, sex, or national origin in the award or performance of this contract. All firms qualifying under this solicitation are encouraged to submit bids/proposals. Award of this contract will be conditioned upon satisfying the requirements of this bid specification. These requirements apply to all bidders/offerors, including those who qualify as a DBE. A DBE contract goal of **4.95 percent** has been established for this contract. The bidder/offeror shall make good faith efforts, as defined in Appendix A, 49 CFR Part 26 (Attachment 1), to meet the contract goal for DBE participation in the performance of this contract.

Contract Assurance (§26.13). The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the recipient deems appropriate.

Prompt Payment (§26.29). The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 7 days from the receipt of each payment the prime contractor receives from the Duluth Airport Authority. The prime contractor agrees further to return retainage payments to each subcontractor within 7 days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Duluth Airport Authority. This clause applies to both DBE and non-DBE subcontractors.

DBE Participation. DBE Participation in this contract may be in form of a prime contract, subcontract, joint venture, or another arrangement that qualifies under 49 CFR Sections 26.55, "How is DBE participation counted toward goals?" or 26.53(g), both of which are included as Attachment 1.

Subcontract Clauses. All bidders and potential contractors hereby assure that they will include the above clauses in all subcontracts which offers further subcontracting opportunities.

PART B

It is further understood and agreed:

The award procedure for this solicitation will include the selection criteria of 49 CFR Part 26 to ensure that prime contracts are awarded to competitors that meet Disadvantaged Business Enterprise (DBE) goals.

Notification is hereby given that DBE goals are established for this prime contract. The goal for firms owned and controlled by socially and economically disadvantaged individuals is **4.95 percent** of the dollar value of this contract.

The bidder/offeror will be required to submit the following information: (1) the names and addresses of DBE firms that will participate in the contract; (2) a description of the work that each DBE firm will perform; (3) the dollar amount of the participation of each DBE firm participating; (4) written documentation of the bidder/offeror's commitment to use a DBE subcontractor whose participation it submits to meet the contract goal; (5) written confirmation from the DBE that it is participating in the contract as provided in the commitment made under (4); and (6) if the contract goal is not met, evidence of good faith efforts.

Agreements between bidder/proposer and a DBE in which the DBE promises not to provide sub-contracting quotations to other bidders/proposers are prohibited. All bidders and proposers shall make a good faith effort to replace a DBE subcontractor that is unable to perform successfully with another DBE subcontractor.

The bidder shall establish and maintain records and submit regular reports, as required, which will identify and assess progress in achieving DBE subcontract goals and other DBE affirmative action efforts.

SECTION L

ENERGY CONSERVATION REQUIREMENTS (49 CFR PART 18.36(i)(13))

The contractor agrees to comply with mandatory standards and policies relating to energy efficiency that are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Public Law 94-163).

SECTION M

LOBBYING AND INFLUENCING FEDERAL EMPLOYEES (49 CFR PART 20, APPENDIX A)

(1) No Federal appropriated funds shall be paid, by or on behalf of the contractor, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the making of any Federal grant and the amendment or modification of any Federal grant.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any Federal grant, the contractor shall complete and submit Standard Form-LLL, "Disclosure of Lobby Activities", in accordance with its instructions.

GENERAL PROVISIONS

SECTION 10

DEFINITION OF TERMS

Where portions of text have been lined through (~~example~~) this text has been deleted and does not apply to this project. Where portions of text have been added with shading (example), this text has been added and is binding to this project. This process is utilized throughout the specifications and contract documents (excluding the plans).

Whenever the following terms are used in these specifications, in the contract, or in any documents or other instruments pertaining to construction where these specifications govern, the intent and meaning shall be interpreted as follows:

10-01 AASHTO. The American Association of State Highway and Transportation Officials, the successor association to AASHO.

10-02 ACCESS ROAD. The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public highway.

10-03 ADVERTISEMENT. A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.

10-04 AIP. The Airport Improvement Program, a grant-in-aid program, administered by the Federal Aviation Administration.

10-05 AIR OPERATIONS AREA. For the purpose of these specifications, the term air operations area shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.

10-06 AIRPORT. Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; and airport buildings and facilities located in any of these areas, and includes a heliport.

10-07 ASTM. The American Society for Testing and Materials.

10-08 AWARD. The acceptance, by the Owner, of the successful bidder's proposal.

10-09 BIDDER. Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.

10-10 BUILDING AREA. An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.

10-11 CALENDAR DAY. Every day shown on the calendar. The contract duration and phase durations set forth in the Contract Documents include inclement weather days normally encountered at the Project site, as well as observed holidays defined below. The Contractor shall be charged for each calendar day during the term of construction including observed holidays defined below and inclement weather days normally encountered at the Project site. Normal inclement weather days shall be established by the Contractor obtaining the previous ten (10) years of inclement weather data from the National

Oceanographic and Atmospheric Administration (NOAA) and averaging the previous ten (10) years of each type of inclement weather for each month and comparing it to each month of construction activities to determine if the number of inclement weather days occurring in any given month exceeds the average for that month over the past ten (10) years for that type of inclement weather, i.e. rain, snow, etc. If the Contractor is unable to work at least 50% of the normal work day on pre-determined controlling work items due to abnormal inclement weather conditions, the Contractor may not be charged a calendar day provided the Contractor submits data and records to justify not charging a calendar day for that specific day. Contract time shall be based upon calendar days counting from the effective date of the Notice to Proceed and including Saturdays, Sundays, observed holidays defined below, and other non-work days.

Legal Holidays for which a calendar day shall be charged but which the Contractor shall not be allowed to work are as follows:

New Year's Day

Memorial Day and the Saturday/Sunday prior to Memorial Day

July 4th

Labor Day and the Saturday/Sunday prior to Labor Day

Thanksgiving and the Friday and Saturday after Thanksgiving

Christmas Day

10-12 CHANGE ORDER. A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for the work affected by such changes. The work, covered by a change order, shall be within the scope of the contract.

10-13 CONTRACT. The written agreement covering the work to be performed. The awarded contract shall include, but is not limited to: The Advertisement; The Contract Form; The Proposal; The Performance Bond; The Payment Bond; any required insurance certificates; The Specifications; The Plans, and any addenda issued to bidders.

10-14 CONTRACT ITEM (PAY ITEM). A specific unit of work for which a price is provided in the contract.

10-15 CONTRACT TIME. The number of calendar days ~~or working days~~, stated in the proposal, allowed for completion of the contract, including authorized time extensions. ~~If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date.~~

10-16 CONTRACTOR. The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.

10-17 DRAINAGE SYSTEM. The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.

10-18 ENGINEER. The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering inspection of the contract work and acting directly or through an authorized representative. The Engineer shall be understood to be the Engineer of the Owner or the Owner's duly authorized representative.

10-19 EQUIPMENT. All machinery, together with the necessary supplies for upkeep and maintenance, and also all tools and apparatus necessary for the proper construction and acceptable completion of the work.

10-20 EXTRA WORK. An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Engineer to be necessary to complete the work within the intended scope of the contract as previously modified.

10-21 FAA. The Federal Aviation Administration of the U.S. Department of Transportation. When used to designate a person, FAA shall mean the Administrator or his/her duly authorized representative.

10-22 FEDERAL SPECIFICATIONS. The Federal Specifications and Standards, Commercial Item Descriptions, and supplements, amendments, and indices thereto are prepared and issued by the General Services Administration of the Federal Government.

10-23 FORCE ACCOUNT. Force account construction work is construction that is accomplished through the use of material, equipment, labor, and supervision provided by the Owner or by another public agency pursuant to an agreement with the Owner. It is also construction performed by the Contractor through the use of material, equipment, labor, and supervision which includes an allowance for overhead and profit where no bid item or established payment provision is provided within the contract documents.

10-24 INSPECTOR. An authorized representative of the Engineer assigned to make all necessary inspections and/or tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.

10-25 INTENTION OF TERMS. Whenever, in these specifications or on the plans, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer, subject in each case to the final determination of the Owner.

Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.

10-26 LABORATORY. The official testing laboratories of the Owner or such other laboratories as may be designated by the Engineer.

10-27 LIGHTING. A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.

10-27A LIQUIDATED DAMAGES TO BE CHARGED. The Contractor shall be charged liquidated damages in the amounts defined below for each calendar day or night after the applicable time has elapsed until the work is completed and accepted by the Owner and Engineer and as defined in General Provisions Section 80-08.

10-28 MAJOR AND MINOR CONTRACT ITEMS. A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20 percent of the total amount of the award contract. All other items shall be considered minor contract items.

10-29 MATERIALS. Any substance specified for use in the construction of the contract work.

10-30 NOTICE TO PROCEED. A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.

10-31 OWNER. The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. For AIP contracts, the term "sponsor" shall have the same meaning as the term "Owner." Where the term "Owner" is capitalized in this document, it shall mean airport owner or sponsor only.

10-32 PAVEMENT. The combined surface course, base course, and subbase course, if any, considered as a single unit.

10-33 PAYMENT BOND. The approved form of security furnished by the Contractor and his/her surety as a guaranty that he will pay in full all bills and accounts for materials and labor used in the construction of the work.

10-34 PERFORMANCE BOND. The approved form of security furnished by the Contractor and his/her surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.

10-35 PLANS. The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications.

10-36 PROJECT. The agreed scope of work for accomplishing specific airport development with respect to a particular airport.

10-37 PROPOSAL. The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.

10-38 PROPOSAL GUARANTY. The security furnished with a proposal to guarantee that the bidder will enter into a contract if his/her proposal is accepted by the Owner.

10-38A RESIDENT PROJECT REPRESENTATIVE. An authorized representative of the Engineer or Owner assigned to make all necessary inspections and/or tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.

10-39 RUNWAY. The area on the airport prepared for the landing and takeoff of aircraft.

10-40 SPECIFICATIONS. A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.

10-41 SPONSOR. See definition above of "Owner."

10-42 STRUCTURES. Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; flexible and rigid pavements; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.

10-43 SUBGRADE. The soil that forms the pavement foundation.

10-44 SUPERINTENDENT. The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the Engineer, and who shall supervise and direct the construction.

10-45 SUPPLEMENTAL AGREEMENT. A written agreement between the Contractor and the Owner covering (1) work that would increase or decrease the total amount of the awarded contract, or any major contract item, by more than 25 percent, such increased or decreased work being within the scope of the originally awarded contract; or (2) work that is not within the scope of the originally awarded contract.

10-46 SURETY. The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.

10-47 TAXIWAY. For the purpose of this document, the term taxiway means the portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways or aircraft parking areas.

10-48 WORK. The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.

~~**10-49 WORKING DAY.** A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least 6 hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work, requiring the presence of an inspector, will be considered as working days.~~

END OF SECTION 10

SECTION 20

PROPOSAL REQUIREMENTS AND CONDITIONS

20-01 ADVERTISEMENT (Notice to Bidders).

~~**20-02 PREQUALIFICATION OF BIDDERS.** Each bidder shall furnish the owner satisfactory evidence of his/her competency to perform the proposed work. Such evidence of competency, unless otherwise specified, shall consist of statements covering the bidder's past experience on similar work, a list of equipment that would be available for the work, and a list of key personnel that would be available. In addition, each bidder shall furnish the owner satisfactory evidence of his/her financial responsibility. Such evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the Contractor's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the bidder shall further certify whether his/her financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder's financial responsibility has changed, the bidder shall qualify the public accountant's statement or report to reflect his/her (bidder's) true financial condition at the time such qualified statement or report is submitted to the Owner.~~

~~Unless otherwise specified, a bidder may submit evidence that he is prequalified with the State Highway Division and is on the current "bidder's list" of the state in which the proposed work is located. Such evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports hereinbefore specified, provided the costs of projects submitted as evidence of prequalification is equal to the estimated costs of the project for which the bidder is submitting a bid.~~

~~Each bidder shall submit "evidence of competency" and "evidence of financial responsibility" to the Owner at the time of bid opening.~~

20-03 CONTENTS OF PROPOSAL FORMS. The Owner shall furnish bidders with proposal forms. All papers bound with or attached to the proposal forms are necessary parts and must not be detached.

The plans specifications, and other documents designated in the proposal form shall be considered a part of the proposal whether attached or not.

20-04 ISSUANCE OF PROPOSAL FORMS. The Owner reserves the right to refuse to issue a proposal form to a prospective bidder should such bidder be in default for any of the following reasons: The Owner reserves the right to refuse to issue a proposal form to a prospective bidder should such bidder be in default for any of the following, but not limited to, reasons:

- a. Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the proposal as a requirement for bidding.
- b. Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force (with the Owner) at the time the Owner issues the proposal to a prospective bidder.
- c. Contractor default under previous contracts with the Owner.
- d. Unsatisfactory work on previous contracts with the Owner.
- e. Contractor has an interest in any litigation or arbitration or other type claim against the Owner or Engineer.

20-05 INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES. An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful calculations and is believed to be correct. It is given only as a basis for comparison of proposals and the award of the contract. The Owner does not expressly or by implication agree that the actual quantities involved will correspond exactly therewith; nor shall the bidder plead misunderstanding or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as hereinafter provided in the subsection titled ALTERATION OF WORK AND QUANTITIES of Section 40 without in any way invalidating the unit bid prices.

20-06 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE. The bidder is expected to carefully examine the site of the proposed work, the proposal, plans specifications, and contract forms. He shall satisfy himself as to the character, quality, and quantities of work to be performed, materials to be furnished, and as to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the proposed contract, plans, and specifications.

Boring logs and other records of subsurface investigations and tests are available for inspection of bidders. It is understood and agreed that such subsurface information, whether included in the plans, specifications, or otherwise made available to the bidder, was obtained and is intended for the Owner's design and estimating purposes only. Such information has been made available for the convenience of all bidders. It is further understood and agreed that each bidder is solely responsible for all assumptions, deductions, or conclusions which he/she may make or obtain from his/her examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

20-07 PREPARATION OF PROPOSAL. The bidder shall submit his/her proposal on the forms furnished by the Owner. All blank spaces in the proposal forms must be correctly filled in where indicated for each and every item for which a quantity is given. The bidder shall state the price (written in ink or typed) both in words and numerals for which he proposes to do each pay item furnished in the proposal. In case of conflict between words and numerals, the words, unless obviously incorrect, shall govern.

The bidder shall sign his/her proposal correctly and in ink. If the proposal is made by an individual, his/her name and post office address must be shown. If made by a partnership, the name and post office address of each member of the partnership must be shown. If made by a corporation, the person signing the proposal shall give the name of the state under the laws of which the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer. Anyone signing a proposal as an agent shall file evidence of his/her authority to do so and that the signature is binding upon the firm or corporation.

20-08 IRREGULAR PROPOSALS. ~~Proposals shall be considered irregular for the following reasons:~~
Proposals shall be considered irregular for the following, but not limited to, reasons:

- a. If the proposal is on a form other than that furnished by the Owner, or if the Owner's form is altered, or if any part of the proposal form is detached.
- b. If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind that make the proposal incomplete, indefinite, or otherwise ambiguous.
- c. If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized alternate pay items, for which the bidder is not required to furnish a unit price.

d. If the proposal contains unit prices that are obviously unbalanced unbalanced as interpreted by the Owner and Engineer.

e. If the proposal is not accompanied by the proposal guaranty specified by the Owner.

The Owner reserves the right to reject any irregular proposal and the right to waive technicalities if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts.

20-09 BID GUARANTEE. Each separate proposal shall be accompanied by a certified check, or other specified acceptable collateral, in the amount specified in the proposal form. Such check, or collateral, shall be made payable to the Owner. The proposal guarantee shall be in the amount of 5% of the maximum bid price submitted unless a different amount is required by the Owner.

20-10 DELIVERY OF PROPOSAL. Each proposal submitted shall be placed in a sealed envelope plainly marked with the project number, location of airport, and name and business address of the bidder on the outside. When sent by mail, preferably registered, the sealed proposal, marked as indicated above, should be enclosed in an additional envelope. No proposal will be considered unless received at the place specified in the advertisement before the time specified for opening all bids. Proposals received after the bid opening time shall be returned to the bidder unopened.

20-11 WITHDRAWAL OR REVISION OF PROPOSALS. A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the bidder's request for withdrawal is received by the Owner in writing or by telegram before the time specified for opening bids. Revised proposals must be received at the place specified in the advertisement before the time specified for opening all bids.

20-12 PUBLIC OPENING OF PROPOSALS. Proposals shall be opened, and read, publicly at the time and place specified in the advertisement. Bidders, their authorized agents, and other interested persons are invited to attend. Proposals that have been withdrawn (by written or telegraphic request) or received after the time specified for opening bids shall be returned to the bidder unopened.

20-13 DISQUALIFICATION OF BIDDERS. A bidder shall be considered disqualified for any of the following, but not limited to, reasons:

a. Submitting more than one proposal from the same partnership, firm, or corporation under the same or different name.

b. Evidence of collusion among bidders. Bidders participating in such collusion shall be disqualified as bidders for any future work of the Owner until any such participating bidder has been reinstated by the Owner as a qualified bidder.

c. If the bidder is considered to be in "default" for any reason specified in the subsection titled ISSUANCE OF PROPOSAL FORMS of this section.

d. Where the Bidder has an interest in any litigation or arbitration or other type claim against the Owner or Engineer.

e. Lack of competency as revealed by the Statement of Bidder's Qualifications.

f. Uncompleted work which, in the judgment of the Owner, will hinder or prevent the prompt completion of additional work, if awarded.

g. Previous projects where, in the judgment of the Owner, the Bidder performed unsatisfactorily and did not complete and close out the project in a timely manner resulting in the Owner not being able to close out the project with various funding agencies and resulting in the Owner potentially or actually losing planned funding for other projects.

END OF SECTION 20

SECTION 30

AWARD AND EXECUTION OF CONTRACT

30-01 CONSIDERATION OF PROPOSALS. After the proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the estimated quantities shown in the proposal by the unit bid prices. If a bidder's proposal contains a discrepancy between unit bid prices written in words and unit bid prices written in numbers, the unit price written in words shall govern.

Until the award of a contract is made, the Owner reserves the right to reject a bidder's proposal for any of the following reasons:

a. If the proposal is irregular as specified in the subsection titled IRREGULAR PROPOSALS of Section 20.

b. If the bidder is disqualified for any of the reasons specified in the subsection titled DISQUALIFICATION OF BIDDERS of Section 20.

In addition, until the award of a contract is made, the Owner reserves the right to reject any or all proposals, waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable state and local laws or regulations pertaining to the letting of construction contracts; advertise for new proposals; or proceed with the work otherwise. All such actions shall promote the Owner's best interests.

30-02 AWARD OF CONTRACT. The award of a contract, if it is to be awarded, shall be made within [] calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.

Award of the contract shall be made by the Owner to the lowest, qualified bidder whose proposal conforms to the cited requirements of the Owner.

30-03 CANCELLATION OF AWARD. The Owner reserves the right to cancel the award without liability to the bidder, except return of proposal guaranty, at any time before a contract has been fully executed by all parties and is approved by the Owner in accordance with the subsection titled APPROVAL OF CONTRACT of this section.

30-04 RETURN OF PROPOSAL GUARANTY. All proposal guaranties, except those of the ~~two~~ **three** (3) lowest bidders, will be returned immediately after the Owner has made a comparison of bids as hereinbefore specified in the subsection titled CONSIDERATION OF PROPOSALS of this section. Proposal guaranties of the ~~two~~ **three** lowest bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful bidder's proposal guaranty will be returned. The successful bidder's proposal guaranty will be returned as soon as the Owner receives the contracts bonds as specified in the subsection titled REQUIREMENTS OF CONTRACT BONDS of this section.

30-05 REQUIREMENTS OF CONTRACT BONDS. At the time of the execution of the contract, the successful bidder shall furnish the Owner a surety bond or bonds that have been fully executed by the bidder and the surety guaranteeing the performance of the work and the payment of all legal debts that may be incurred by reason of the Contractor's performance of the work. The surety and the form of the bond or bonds shall be acceptable to the Owner. Unless otherwise specified in this subsection, the surety bond or bonds shall be in a sum equal to the full amount of the contract.

30-06 EXECUTION OF CONTRACT. The successful bidder shall sign (execute) the necessary agreements for entering into the contract and return such signed contract to the owner, along with the fully executed surety bond or bonds specified in the subsection titled REQUIREMENTS OF CONTRACT BONDS of this section, within 45 ~~20~~ calendar days from the date mailed or otherwise delivered to the successful bidder. If the contract is mailed, special handling is recommended.

The contract executed by the successful bidder shall have within the body of the contract the following language that documents the following assurances:

“The contractor, sub-recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.”

30-07 APPROVAL OF CONTRACT. Upon receipt of the contract and contract bond or bonds that have been executed by the successful bidder, the Owner shall complete the execution of the contract in accordance with local laws or ordinances, and return the fully executed contract to the Contractor. Delivery of the fully executed contract to the Contractor shall constitute the Owner's approval to be bound by the successful bidder's proposal and the terms of the contract.

30-08 FAILURE TO EXECUTE CONTRACT. Failure of the successful bidder to execute the contract and furnish an acceptable surety bond or bonds within the 45 ~~20~~ calendar day period specified in the subsection titled REQUIREMENTS OF CONTRACT BONDS of this section shall be just cause for cancellation of the award and forfeiture of the proposal guaranty, not as a penalty, but as liquidation of damages to the Owner.

END OF SECTION 30

SECTION 40

SCOPE OF WORK

40-01 INTENT OF CONTRACT. The intent of the contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies and incidentals required to complete the work in accordance with the plans, specifications, and terms of the contract.

40-02 ALTERATION OF WORK AND QUANTITIES. The owner reserves and shall have the right to make such alterations in the work as may be necessary or desirable to complete the work originally intended in an acceptable manner. Unless otherwise specified herein, the Engineer shall be and is hereby authorized to make such alterations in the work as may increase or decrease the originally awarded contract quantities, provided that the aggregate of such alterations does not change the total contract cost or the total cost of any major contract item by more than 25 percent (total cost being based on the unit prices and estimated quantities in the awarded contract). Alterations that do not exceed the 25 percent limitation shall not invalidate the contract nor release the surety, and the Contractor agrees to accept payment for such alterations as if the altered work had been a part of the original contract. These alterations that are for work within the general scope of the contract shall be covered by "Change Orders" issued by the Engineer. Change orders for altered work shall include extensions of contract time where, in the Engineer's opinion, such extensions are commensurate with the amount and difficulty of added work.

Should the aggregate amount of altered work exceed the 25 percent limitation hereinbefore specified, such excess altered work shall be covered by supplemental agreement. If the owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

For AIP contracts, all supplemental agreements shall be approved by the FAA and shall include valid wage determinations of the U.S. Secretary of Labor when the amount of the supplemental agreement exceeds \$2,000. However, if the Contractor elects to waive the limitations on work that increases or decreases the originally awarded contract or any major contract item by more than 25 percent, the supplemental agreement shall be subject to the same U.S. Secretary of Labor wage determination as was included in the originally awarded contract.

All supplemental agreements shall require consent of the Contractor's surety and separate performance and payment bonds.

40-03 OMITTED ITEMS. The Engineer may, in the Owner's best interest, omit from the work any contract item, except major contract items. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be nonperformed, the Contractor shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item. Payment for work performed shall be in accordance with the subsection titled PAYMENT FOR OMITTED ITEMS of Section 90.

40-04 EXTRA WORK. Should acceptable completion of the contract require the Contractor to perform an item of work for which no basis of payment has been provided in the original contract or previously issued change orders or supplemental agreements, the same shall be called "Extra Work." Extra Work that is within the general scope of the contract shall be covered by written change order. Change orders for such Extra Work shall contain agreed unit prices for performing the change order work in accordance with the

requirements specified in the order, and shall contain any adjustment to the contract time that, in the Engineer's opinion, is necessary for completion of such Extra Work.

When determined by the Engineer to be in the Owner's best interest, he may order the Contractor to proceed with Extra Work by force account as provided in the subsection titled PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK of Section 90.

Extra Work that is necessary for acceptable completion of the project, but is not within the general scope of the work covered by the original contract shall be covered by a Supplemental Agreement as hereinbefore defined in the subsection titled SUPPLEMENTAL AGREEMENT of Section 10.

Any claim for payment of Extra Work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the Owner.

40-05 MAINTENANCE OF TRAFFIC. It is the explicit intention of the contract that the safety of aircraft, as well as the Contractor's equipment and personnel, is the most important consideration. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas of the airport with respect to his/her own operations and the operations of all his/her subcontractors as specified in the subsection titled LIMITATION OF OPERATIONS of Section 80. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in the subsection titled CONTRACTOR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS in Section 70.

With respect to his/her own operations and the operations of all his/her subcontractors, the Contractor shall provide marking, lighting, and other acceptable means of identifying: personnel; equipment; vehicles; storage areas; and any work area or condition that may be hazardous to the operation of aircraft, fire-rescue equipment, or maintenance vehicles at the airport.

When the contract requires the maintenance of vehicular traffic on an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep such road, street, or highway open to all traffic and shall provide such maintenance as may be required to accommodate traffic. The Contractor shall furnish erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the manual of Uniform Traffic Control Devices for Streets and Highways (published by the United States Government Printing Office), unless otherwise specified herein. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways. Unless otherwise specified herein, the Contractor will not be required to furnish snow removal for such existing road, street, or highway.

The Contractor shall make his/her own estimate of all labor, materials, equipment, and incidentals necessary for providing the maintenance of aircraft and vehicular traffic as specified in this subsection.

The cost of maintaining the aircraft and vehicular traffic specified in this subsection shall not be measured or paid for directly, but shall be included in the various contract items.

40-06 REMOVAL OF EXISTING STRUCTURES. All existing structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.

Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Engineer shall be notified prior to disturbing such structure.

The disposition of existing structures so encountered shall be immediately determined by the Engineer in accordance with the provisions of the contract.

Except as provided in the subsection titled RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK of this section, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

40-07 RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK. Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be either embankment or waste, he may at his/her option either:

- a. Use such material in another contract item, providing such use is approved by the Engineer and is in conformance with the contract specifications applicable to such use; or,
- b. Remove such material from the site, upon written approval of the Engineer; or
- c. Use such material for his/her own temporary construction on site; or,
- d. Use such material as intended by the terms of the contract.

Should the Contractor wish to exercise option a., b., or c., he shall request the Engineer's approval in advance of such use.

Should the Engineer approve the Contractor's request to exercise option a., b., or c., the Contractor shall be paid for the excavation or removal of such material at the applicable contract price. The Contractor shall replace, at his/her own expense, such removed or excavated material with an agreed equal volume of material that is acceptable for use in constructing embankment, backfills, or otherwise to the extent that such replacement material is needed to complete the contract work. The Contractor shall not be charged for his/her use of such material so used in the work or removed from the site.

Should the Engineer approve the Contractor's exercise of option a., the Contractor shall be paid, at the applicable contract price, for furnishing and installing such material in accordance with requirements of the contract item in which the material is used.

It is understood and agreed that the Contractor shall make no claim for delays by reason of his/her exercise of option a., b., or c.

The Contractor shall not excavate, remove, or otherwise disturb any material, structure, or part of a structure which is located outside the lines, grades, or grading sections established for the work, except where such excavation or removal is provided for in the contract, plans, or specifications.

40-08 FINAL CLEANING UP. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. He shall cut all brush and woods within the limits indicated and shall leave the site in a neat and presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the Contractor has obtained the written permission of such property owner.

END OF SECTION 40

SECTION 50

CONTROL OF WORK

50-01 AUTHORITY OF THE ENGINEER. The Engineer shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, and as to the manner of performance and rate of progress of the work. The Engineer shall decide all questions that may arise as to the interpretation of the specifications or plans relating to the work. The Engineer shall determine the amount and quality of the several kinds of work performed and materials furnished which are to be paid for the under contract.

The Engineer does not have the authority to accept pavements that do not conform to FAA specification requirements.

50-02 CONFORMITY WITH PLANS AND SPECIFICATIONS. All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans or specifications.

If the Engineer finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications but that the portion of the work affected will, in his/her opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, he will advise the Owner of his/her determination that the affected work be accepted and remain in place. In this event, the Engineer will document his/her determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the work. The Engineer's determination and recommended contract price adjustments will be based on good engineering judgment and such tests or retests of the affected work as are, in his/her opinion, needed. Changes in the contract price shall be covered by contract modifications (change order or supplemental agreement) as applicable.

If the Engineer finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the Engineer's written orders.

For the purpose of this subsection, the term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the contract, plans, and specifications. The term shall not be construed as waiving the Engineer's responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's prosecution of the work, when, in the Engineer's opinion, such compliance is essential to provide an acceptable finished portion of the work.

For the purpose of this subsection, the term "reasonably close conformity" is also intended to provide the Engineer with the authority, after consultation with the FAA, to use good engineering judgment in his/her determinations as to acceptance of work that is not in strict conformity but will provide a finished product equal to or better than that intended by the requirements of the contract, plans and specifications.

All defined tolerances shall apply before, during and after incorporation of the materials into the work. It is the intent of the specifications that all materials meet all of the requirements of the specifications after all material has been set in place in its final form.

The Owner shall keep the FAA advised of the Engineer's determinations as to acceptance of the work that is not in reasonably close conformity with the contract, plans, and specifications. Change orders or supplemental agreements must bear the written approval of the FAA.

The Engineer will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

50-03 COORDINATION OF CONTRACT, PLANS, AND SPECIFICATIONS. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited FAA advisory circulars; contract general provisions shall govern over plans, cited standards for materials or testing, and cited FAA advisory circulars; plans shall govern over cited standards for materials or testing and cited FAA advisory circulars. If any paragraphs contained in the Special Provisions Conditions conflict with General Provisions or Technical Specifications, the Special Provisions Conditions shall govern.

From time to time, discrepancies within cited standards for testing occur due to the timing of changing, editing, and replacing of standards. In the event the Contractor discovers any apparent discrepancy within standard test methods, he shall immediately call upon the Engineer for his/her interpretation and decision, and such decision shall be final.

The Contractor shall not take advantage of any apparent error or omission on the plans or specifications. In the event the Contractor discovers any apparent error or discrepancy, he shall immediately call upon the Engineer for his/her interpretation and decision, and such decision shall be final.

~~LIST OF SPECIAL PROVISIONS~~

The 50-04 COOPERATION OF CONTRACTOR. The Contractor will be supplied with five copies each of the plans and specifications. He shall have available on the work at all times one copy each of the plans and specifications. Additional copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the work to facilitate the progress thereof, and he shall cooperate with the Engineer and his/her inspectors and with other contractors in every way possible. The Contractor shall have a competent superintendent on the work at all times who is fully authorized as his/her agent on the work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the Engineer or his/her authorized representative.

50-05 COOPERATION BETWEEN CONTRACTORS. The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

When separate contracts are let within the limits of any one project, each Contractor shall conduct his/her work so as not to interfere with or hinder the progress of completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with his/her contract and shall protect and save harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced by him because of the presence and operations of other Contractors working within the limits of the same project.

The Contractor shall arrange his/her work and shall place and dispose of the materials being used so as not to interfere with the operations of the other Contractors within the limits of the same project. He shall join his/her work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

50-06 CONSTRUCTION LAYOUT AND STAKES. ~~The Engineer shall establish horizontal and vertical control only. The Contractor must establish all layout required for the construction of the work. Such stakes and markings as the Engineer may set for either his/her own or the Contractor's guidance shall be preserved by the Contractor. In case of negligence on the part of the Contractor, or his/her employees, resulting in the destruction of such stakes or markings, an amount equal to the cost of replacing the same may be deducted from subsequent estimates due the Contractor at the discretion of the Engineer.~~ The Contractor shall furnish, as his expense, all horizontal and vertical control, all staking and layout of construction work called for on the plans and in accordance with Technical Specification P-104, Project Survey and Stakeout and as more stringently required herein. The Engineer and Owner shall not be responsible for such work. However, the Owner and Engineer reserve the right to check all said lines, grades, and measurements with their appointed surveyor(s). Should the Owner's surveyor(s) detect errors in said lines, grades, and measurements, the Contractor shall pay for all said surveying costs and subsequent surveying costs performed to verify correction of errors found in said lines, grades, and measurements. Included in this are all blue top staking for subgrade and base course installation. Definition of an error shall be 1/4" or more. In the case of a discrepancy between the technical specifications and this defined tolerance, the more stringent tolerance shall govern.

~~The Contractor will be required to furnish all lines, grades and measurements from the control points necessary for the proper prosecution and control of the work contracted for under these specifications.~~

The Contractor must give weekly copies of the survey notes to the Engineer so that the Engineer may check them as to accuracy and method of staking. All areas that are staked by the Contractor must be checked by the Engineer prior to beginning any work in the area. The Engineer will make periodic checks of the grades and alignment set by the Contractor. In case of error on the part of the Contractor, or his/her employees, resulting in establishing grades and/or alignment that are not in accordance with the plans or established by the Engineer, all construction not in accordance with the established grades and/or alignment shall be replaced without additional cost to the Owner.

~~No direct payment will be made, unless otherwise specified in contract documents, for this labor, materials, or other expenses therewith. The cost thereof shall be included in the price of the bid for the various items of the Contract.~~

Construction Staking and Layout includes but is not limited to:

Clearing and Grubbing perimeter staking.

Rough Grade slope stakes at 100-foot stations.

Drainage Swales slope stakes and flow line blue tops at 50-foot stations.

Subgrade blue tops at 25-foot stations and 25-foot offset distance (max.) for the following section locations:

- a. Runway – minimum 5 per station
- b. Taxiways – minimum 3 per station
- c. Holding apron areas – minimum 3 per station
- d. Roadways – minimum 3 per station

Base Course blue tops at 25 foot stations and 25-foot offset distance (max.) for the following section locations:

- a. Runway – minimum 5 per station
- b. Taxiways – minimum 3 per station
- c. Holding apron areas – minimum 3 per station

Pavement areas:

- a. Edge of Pavement hubs and tacks (for stringline by Contractor) at 100-foot stations
- b. Between Lifts at 25-foot stations for the following section locations:
 - (1). Runways – each paving lane width
 - (2). Taxiways – each paving lane width
 - (3). Holding areas – each paving lane width
- c. After finish paving operations at 50-foot stations
 - (1). All paved areas – Edge of each paving lane prior to next paving lot
- d. Shoulder and safety area blue tops at 50-foot stations and at all break points with maximum of 50 foot offsets

Fence lines at 100-foot stations

Electrical and Communications System locations, lines and grades including but not limited to duct runs, connections, fixtures, signs, lights, VASIs, PAPIs, REILs, Wind Cones, Distance Markers (signs), pull boxes and manholes.

Drain lines, cut stakes and alignment on 25-foot stations, inlet and manholes.

Painting and Striping layout (pinned with 1.5 in PK nails) marked for paint Contractor. (All nails shall be removed after painting)

Laser, or other automatic control devices, shall be checked with temporary control point or grade hub at a minimum of once per 400 feet per pass (that is, paving lane).

Note: Controls and stakes disturbed or suspect of having been disturbed shall be checked and/or reset as directed by the Engineer without additional cost to the Owner.

50-07 AUTOMATICALLY CONTROLLED EQUIPMENT. Whenever batching or mixing plant equipment is required to be operated automatically under the contract and a breakdown or malfunction of the automatic controls occurs, the equipment may be operated manually or by other methods for a period 48 hours following the breakdown or malfunction, provided this method of operations will produce results which conform to all other requirements of the contract.

50-08 AUTHORITY AND DUTIES OF INSPECTORS. Inspectors employed by the Owner shall be authorized to inspect all work done and all material furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. Inspectors are not authorized to revoke, alter, or waive any provision of the contract. Inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

Inspectors employed by the Owner are authorized to notify the Contractor or his/her representatives of any failure of the work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the Engineer for his/her decision.

50-09 INSPECTION OF THE WORK. All materials and each part or detail of the work shall be subject to inspection by the Engineer. The Engineer shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the Engineer requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

Any work done or materials used without supervision or inspection by an authorized representative of the Owner may be ordered removed and replaced at the Contractor's expense unless the Owner's representative failed to inspect after having been given reasonable notice in writing that the work was to be performed.

Should the contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (contract) Owner, authorized representatives of the owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility owner a party to the contract, and shall in no way interfere with the rights of the parties to this contract.

The Engineer and/or his authorized representative shall have full authority to inspect all materials on the project site, test all materials at as many locations and at any frequency he deems necessary to satisfy himself that the final in-place product meets the requirements of the plans and specifications.

50-10 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the Engineer as provided in the subsection titled CONFORMITY WITH PLANS AND SPECIFICATIONS of this section.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with the provisions of the subsection titled CONTRACTOR'S RESPONSIBILITY FOR WORK of Section 70.

~~No removal work made under provision of this subsection shall be done without lines and grades having been given by the Engineer. Work done contrary to the instructions of the Engineer, work done beyond the lines shown on the plans or as given, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.~~

Upon failure on the part of the Contractor to comply forthwith with any order of the Engineer made under the provisions of this subsection, the Engineer will have authority to cause unacceptable work to be remedied or removed and replaced and unauthorized work to be removed and to deduct the costs (incurred by the Owner) from any monies due or to become due the Contractor.

50-11 LOAD RESTRICTIONS. The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the Contractor of liability for damage that may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor shall be responsible for all damage done by his/her hauling equipment and shall correct such damage at his/her own expense.

50-12 MAINTENANCE DURING CONSTRUCTION. The Contractor shall maintain the work during construction and until the work is accepted. This maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

In the case of a contract for the placing of a course upon a course or subgrade previously constructed, the Contractor shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices bid on the various contract items, and the Contractor will not be paid an additional amount for such work.

50-13 FAILURE TO MAINTAIN THE WORK. Should the Contractor at any time fail to maintain the work as provided in the subsection titled MAINTENANCE DURING CONSTRUCTION of this section, the Engineer shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the Engineer's notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be deducted from monies due or to become due the Contractor.

50-14 PARTIAL ACCEPTANCE. If at any time during the prosecution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, he may request the Engineer to make final inspection of that unit. If the Engineer finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, he may accept it as being completed, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract. Partial acceptance of any part of the work shall not constitute acceptance from a warranty standpoint. The warranty for any work completed and accepted shall not begin until the entire project is complete and accepted by the Owner.

50-15 FINAL ACCEPTANCE. ~~Upon due notice from the Contractor of presumptive completion of the entire project, the Engineer and Owner will make an inspection.~~ Upon due notice from the Contractor of presumptive completion of the entire project, the Engineer, Owner and representative of the Federal Aviation Administration and/or State funding agency (when applicable) will make an inspection. Final acceptance of the project shall not occur until the FAA and/or State funding agency representative(s) (when applicable) have made their inspection and the FAA and State funding agency has accepted the project (when applicable). If all construction provided for and contemplated by the contract is found to be completed in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The Engineer shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the Engineer will give the Contractor the necessary instructions for correction of same and the Contractor shall immediately comply with and execute such instructions. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the Engineer will make the recommendation for final acceptance and notify the Contractor in writing of the Owner's this acceptance as of the date of final inspection.

50-16 CLAIMS FOR ADJUSTMENT AND DISPUTES. If for any reason the Contractor deems that additional compensation is due him for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, he shall notify the Engineer in writing of his/her intention to claim such additional compensation before he begins the work on which he bases the claim. If such notification is not given or the Engineer is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the Engineer has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within ten (10) calendar days, submit his/her written claim to the Engineer who will present it to the Owner for consideration in accordance with local laws or ordinances.

Nothing in this subsection shall be construed as a waiver of the Contractor's right to dispute final payment based on differences in measurements or computations.

~~**50-17 COST REDUCTION INCENTIVE.** The provisions of this subsection will apply only to contracts awarded to the lowest bidder pursuant to competitive bidding.~~

~~On projects with original contract amounts in excess of \$100,000, the Contractor may submit to the Engineer, in writing, proposals for modifying the plans, specifications or other requirements of the contract for the sole purpose of reducing the cost of construction. The cost reduction proposal shall not impair, in any manner, the essential functions or characteristics of the project, including but not limited to service life, economy of operation, ease of maintenance, desired appearance, design and safety standards. This provision shall not apply unless the proposal submitted is specifically identified by the Contractor as being presented for consideration as a value engineering proposal.~~

~~Not eligible for cost reduction proposals are changes in the basic design of a pavement type, runway and taxiway lighting, visual aids, hydraulic capacity of drainage facilities, or changes in grade or alignment that reduce the geometric standards of the project.~~

~~As a minimum, the following information shall be submitted by the Contractor with each proposal:~~

- ~~a. A description of both existing contract requirements for performing the work and the proposed changes, with a discussion of the comparative advantages and disadvantages of each;~~
- ~~b. An itemization of the contract requirements that must be changed if the proposal is adopted;~~
- ~~c. A detailed estimate of the cost of performing the work under the existing contract and under the proposed changes;~~
- ~~d. A statement of the time by which a change order adopting the proposal must be issued;~~
- ~~e. A statement of the effect adoption of the proposal will have on the time for completion of the contract; and~~

~~f. The contract items of work affected by the proposed changes, including any quantity variation attributable to them.~~

~~The Contractor may withdraw, in whole or in part, any cost reduction proposal not accepted by the Engineer, within the period specified in the proposal. The provisions of this subsection shall not be construed to require the Engineer to consider any cost reduction proposal that may be submitted.~~

~~The Contractor shall continue to perform the work in accordance with the requirements of the contract until a change order incorporating the cost reduction proposal has been issued. If a change order has not been issued by the date upon which the Contractor's cost reduction proposal specifies that a decision should be made, or such other date as the Contractor may subsequently have requested in writing, such cost reduction proposal shall be deemed rejected.~~

~~The Engineer shall be the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings from the adoption of all or any part of such proposal. In determining the estimated net savings, the Engineer may disregard the contract bid prices if, in the Engineer's judgment such prices do not represent a fair measure of the value of the work to be performed or deleted.~~

~~The Owner may require the Contractor to share in the Owner's costs of investigating a cost reduction proposal submitted by the Contractor as a condition of considering such proposal. Where such a condition is imposed, the Contractor shall acknowledge acceptance of it in writing. Such acceptance shall constitute full authority for the Owner to deduct the cost of investigating a cost reduction proposal from amounts payable to the Contractor under the contract.~~

~~If the Contractor's cost reduction proposal is accepted in whole or in part, such acceptance will be by a contract change order that shall specifically state that it is executed pursuant to this subsection. Such change order shall incorporate the changes in the plans and specifications which are necessary to permit the cost reduction proposal or such part of it as has been accepted and shall include any conditions upon which the Engineer's approval is based. The change order shall also set forth the estimated net savings attributable to the cost reduction proposal. The net savings shall be determined as the difference in costs between the original contract costs for the involved work items and the costs occurring as a result of the proposed change. The change order shall also establish the net savings agreed upon and shall provide for adjustment in the contract price that will divide the net savings equally between the Contractor and the Owner.~~

~~The Contractor's 50 percent share of the net savings shall constitute full compensation to the Contractor for the cost reduction proposal and the performance of the work.~~

~~Acceptance of the cost reduction proposal and performance of the cost reduction work shall not extend the time of completion of the contract unless specifically provided for in the contract change order.~~

END OF SECTION 50

SECTION 60

CONTROL OF MATERIALS

60-01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS. The materials used on the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of materials, the Contractor shall furnish complete statements to the Engineer as to the origin, composition, and manufacture of all materials to be used in the work. Such statements shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

At the Engineer's option, materials may be approved at the source of supply before delivery is stated. If it is found after trial that sources of supply for previously approved materials do not produce specified products, the Contractor shall furnish materials from other sources.

The Contractor shall furnish airport lighting equipment that conforms to the requirements of cited materials specifications. In addition, where an FAA specification for airport lighting equipment is cited in the plans or specifications, the Contractor shall furnish such equipment that is:

- a. Listed in FAA Advisory Circular (AC) 150/5345-53, Airport Lighting Equipment Certification Program, and Addendum that is in effect on the date of advertisement; and,
- b. Produced by the manufacturer as listed in the Addendum cited above for the certified equipment part number.

~~The following airport lighting equipment is required for this contract and is to be furnished by the Contractor in accordance with the requirements of this subsection:~~

~~EQUIPMENT NAME~~

~~CITED FAA SPECIFICATIONS~~

~~EFFECTIVE FAA AC OR APPROVAL LETTER FOR EQUIPMENT AND MANUFACTURER~~

60-02 SAMPLES, TESTS, AND CITED SPECIFICATIONS. Unless otherwise designated, all materials used in the work shall be inspected, tested, and approved by the Engineer before incorporation in the work. Any work in which untested materials are used without approval or written permission of the Engineer shall be performed at the Contractor's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the Engineer, shall be removed at the Contractor's expense.

Unless otherwise designated, tests in accordance with the cited standard methods of ASTM, AASHTO, Federal Specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids, will be made by and at the expense of the ~~Engineer~~ Owner.

The testing organizations performing on site field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel, including the Contractor's representative at his/her request. Unless otherwise designated, samples will be taken by a qualified representative of the ~~Engineer~~ Owner. All materials being used are subject to inspection, test, or rejection at any time prior to, ~~or during~~ or after incorporation into the work. Copies of all tests will be furnished to the Contractor's representative at his/her request.

~~The Contractor shall employ a testing organization to perform all Contractor required tests. The Contractor shall submit to the Engineer resumes on all testing organizations and individual persons who will be performing the tests. The Engineer will determine if such persons are qualified. All the test data shall be reported to the Engineer after the results are known. A legible, handwritten copy of all test data shall be given to the Engineer daily, along with printed reports, in an approved format, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the Engineer showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.~~

The Owner shall pay for all passing tests. The Contractor shall pay for all failing tests. Charges for failing tests will be deducted from the Contractor's earnings at the end of the project at the time of final payment. The Contractor shall furnish, at his own expense, all necessary specimens for testing of the materials, as required by the Engineer or his authorized representative. The Contractor shall be responsible for notifying the Owner authorized testing laboratory to pick up the test samples. Also, the Engineer reserves the right to test at any location on the project, and at any frequency he deems necessary before, during and after incorporation of all materials into the project to satisfy himself and insure that all materials meet the specified requirements. All materials utilized in the project must meet specification requirements before, during and after incorporation into the project.

60-03 CERTIFICATION OF COMPLIANCE. The Engineer may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's certificates of compliance stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified.

Materials or assemblies used on the basis of certificates of compliance may be sampled and tested at any time and if found not to be in conformity with contract requirements will be subject to rejection whether in place or not.

The form and distribution of certificates of compliance shall be as approved by the Engineer.

When a material or assembly is specified by "brand name or equal" and the Contractor elects to furnish the specified "brand name," the Contractor shall be required to furnish the manufacturer's certificate of compliance for each lot of such material or assembly delivered to the work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

- a. Conformance to the specified performance, testing, quality or dimensional requirements; and,
- b. Suitability of the material or assembly for the use intended in the contract work.

Should the Contractor propose to furnish an "or equal" material or assembly, he shall furnish the manufacturer's certificates of compliance as hereinbefore described for the specified brand name material or assembly. However, the Engineer shall be the sole judge as to whether the proposed "or equal" is suitable for use in the work.

The Engineer reserves the right to refuse permission for use of materials or assemblies on the basis of certificates of compliance.

60-04 PLANT INSPECTION. The Engineer or his/her authorized representative may inspect, at its source, any specified material or assembly to be used in the work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing

methods or materials to be used in the work and to obtain samples required for his/her acceptance of the material or assembly.

Should the Engineer conduct plant inspections, the following conditions shall exist:

- a. The Engineer shall have the cooperation and assistance of the Contractor and the producer with whom he has contracted for materials.
- b. The Engineer shall have full entry at all reasonable times to such parts of the plant that concern the manufacture or production of the materials being furnished.
- c. If required by the Engineer, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Office or working space should be conveniently located with respect to the plant.

It is understood and agreed that the Owner shall have the right to retest any material that has been tested and approved at the source of supply after it has been delivered to the site. The Engineer shall have the right to reject only material which, when retested, does not meet the requirements of the contract, plans, or specifications.

60-05 ENGINEER'S FIELD OFFICE. ~~The Contractor shall furnish for the duration of the project one building for the use of the field engineers and inspectors, as a field office. This facility shall be an approved weatherproof building meeting the current State Highway Specifications (for example, Class I Field Office or Type C Structure). This building shall be located conveniently near to the construction and shall be separate from any building used by the Contractor. A land line telephone and answering machine shall be provided. The Contractor shall be responsible for payment of the basic monthly charge and local calls only. Any Long Distance Tolls shall be the responsibility of the caller. The Contractor shall furnish [FAX machine, photocopy machine, water, sanitary facilities, heat, air conditioning, and electricity]. No direct payment will be made for this building or labor, materials, ground rental, or other expense in connection therewith. The cost hereof shall be included in the price bid for the various items of the contract. The Contractor and his/her superintendent shall provide all reasonable facilities to enable the Engineer to inspect the workmanship and materials entering into the work.~~

60-06 STORAGE OF MATERIALS. Materials shall be so stored as to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located so as to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the Engineer. Materials to be stored on airport property shall not create an obstruction to air navigation nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the plans, the storage of materials and the location of the Contractor's plant and parked equipment or vehicles shall be as directed by the Engineer. Private property shall not be used for storage purposes without written permission of the owner or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish the Engineer a copy of the property owner's permission.

All storage sites on private or airport property shall be restored to their original condition by the Contractor at his/her entire expense, except as otherwise agreed to (in writing) by the owner or lessee of the property.

60-07 UNACCEPTABLE MATERIALS. Any material or assembly that does not conform to the requirements of the contract, plans, or specifications shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the Engineer.

Rejected material or assembly, the defects of which have been corrected by the Contractor, shall not be returned to the site of the work until such time as the Engineer has approved its used in the work.

60-08 OWNER FURNISHED MATERIALS. The Contractor shall furnish all materials required to complete the work, except those specified herein (if any) to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified herein.

All costs of handling, transportation from the specified location to the site of work, storage, and installing Owner-furnished materials shall be included in the unit price bid for the contract item in which such Owner-furnished material is used.

After any Owner-furnished material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor's handling, storage, or use of Owner-furnished materials.

END OF SECTION 60

SECTION 70

LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

70-01 LAWS TO BE OBSERVED. The Contractor shall keep fully informed of all Federal and state laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. He/she shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner and all his/her officers, agents, Engineer or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by himself or his/her employees.

70-02 PERMITS, LICENSES, AND TAXES. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the work.

70-03 PATENTED DEVICES, MATERIALS, AND PROCESSES. If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, he shall provide for such use by suitable legal agreement with the patentee or owner. The Contractor and the surety shall indemnify and save harmless the Owner, Engineer any third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the Owner and Engineer for any costs, expenses, and damages which it may be obliged to pay by reason of an infringement, at any time during the prosecution or after the completion of the work. Also, the Contractor shall be required to include the Owner and Engineer as additional insureds on his insurance policies to protect the Owner and Engineer against all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright and any costs, expenses, and damages which it may be obliged to pay by reason of an infringement.

70-04 RESTORATION OF SURFACES DISTURBED BY OTHERS. The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work. To the extent that such construction, reconstruction, or maintenance has been coordinated with the Owner, such authorized work (by others) is indicated as follows:

~~Owner (Utility or Other Facility)~~
~~Location (See Plan Sheet No.)~~
~~Person to Contact (Name, Title, Address and Phone)~~

Except as listed above, the Contractor shall not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or facilities located within the limits of the work without the written permission of the Engineer.

Should the owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the work, the Contractor shall cooperate with such owners by arranging and performing the work in this contract so as to facilitate such construction, reconstruction or maintenance by others whether or not such work by others is listed above. When ordered as extra work by the Engineer, the Contractor shall make all necessary repairs to the work which are due to such authorized work by others, unless otherwise provided for in the contract, plans, or specifications. It is understood and agreed that the Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the work resulting from such authorized work.

70-05 FEDERAL AID PARTICIPATION. For AIP contracts, the United States Government has agreed to reimburse the Owner for some portion of the contract costs. Such reimbursement is made from time to time upon the Owner's request to the FAA. In consideration of the United States Government's (FAA's) agreement with the Owner, the Owner has included provisions in this contract pursuant to the requirements of Title 49 of the United States Code (USC) and the Rules and Regulations of the FAA that pertain to the work.

As required by the USC, the contract work is subject to the inspection and approval of duly authorized representatives of the Administrator, FAA, and is further subject to those provisions of the rules and regulations that are cited in the contract, plans, or specifications.

No requirement of the USC, the rules and regulations implementing the USC, or this contract shall be construed as making the Federal Government a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

70-06 SANITARY, HEALTH, AND SAFETY PROVISIONS. The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his/her employees as may be necessary to comply with the requirements of the state and local Board of Health, or of other bodies or tribunals having jurisdiction.

Attention is directed to Federal, state, and local laws, rules and regulations concerning construction safety and health standards. The Contractor shall not require any worker to work in surroundings or under conditions that are unsanitary, hazardous, or dangerous to his/her health or safety.

70-07 PUBLIC CONVENIENCE AND SAFETY. The Contractor shall control his/her operations and those of his/her subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to his/her own operations and those of his/her subcontractors and all suppliers in accordance with the subsection titled MAINTENANCE OF TRAFFIC of Section 40 hereinbefore specified and shall limit such operations for the convenience and safety of the traveling public as specified in the subsection titled LIMITATION OF OPERATIONS of Section 80 hereinafter.

70-08 BARRICADES, WARNING SIGNS, AND HAZARD MARKINGS. The Contractor shall furnish, erect, and maintain all barricades, warning signs, and markings for hazards necessary to protect the public and the work. When used during periods of darkness, such barricades, warning signs, and hazard markings shall be suitably illuminated. Unless otherwise specified, barricades, warning signs, and markings for hazards that are in the air operations area shall be a maximum of 18 in high. Unless otherwise specified, barricades shall be spaced not more than 25 feet apart. Barricades, warning signs, and markings shall be paid for under Section 40-05. This shall include any specialty barricades, warning signs, markings, lighted runway closure markers, etc.

For vehicular and pedestrian traffic, the Contractor shall furnish, erect, and maintain barricades, warning signs, lights and other traffic control devices in reasonable conformity with the Manual of Uniform Traffic Control Devices for Streets and Highways (published by the United States Government Printing Office).

When the work requires closing an air operations area of the airport or portion of such area, the Contractor shall furnish, erect, and maintain temporary markings and associated lighting conforming to the requirements of AC 150/5340-1, Standards for Airport Markings, latest change.

The Contractor shall furnish, erect, and maintain markings and associated lighting of open trenches, excavations, temporary stock piles, and his/her parked construction equipment that may be hazardous to

the operation of emergency fire-rescue or maintenance vehicles on the airport in reasonable conformance to AC 150/5370-2, Operational Safety on Airports During Construction, latest change.

The Contractor shall identify each motorized vehicle or piece of construction equipment in reasonable conformance to AC 150/5370-2, latest change.

The Contractor shall furnish and erect all barricades, warning signs, and markings for hazards prior to commencing work that requires such erection and shall maintain the barricades, warning signs, and markings for hazards until their dismantling is directed by the Engineer.

Open-flame type lights shall not be permitted within the air operations areas of the airport.

70-09 USE OF EXPLOSIVES. ~~When the use of explosives is necessary for the prosecution of the work, the Contractor shall exercise the utmost care not to endanger life or property, including new work. The Contractor shall be responsible for all damage resulting from the use of explosives.~~

~~All explosives shall be stored in a secure manner in compliance with all laws and ordinances, and all such storage places shall be clearly marked. Where no local laws or ordinances apply, storage shall be provided satisfactory to the Engineer and, in general, not closer than 1,000 feet (300 m) from the work or from any building, road, or other place of human occupancy.~~

~~The Contractor shall notify each property owner and public utility company having structures or facilities in proximity to the site of the work of his/her intention to use explosives. Such notice shall be given sufficiently in advance to enable them to take such steps as they may deem necessary to protect their property from injury.~~

~~The use of electrical blasting caps shall not be permitted on or within 1,000 feet (300 m) of the airport property.~~

Explosives are prohibited on the Airport and will not be used for this project.

70-10 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE. The Contractor shall be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer has witnessed or otherwise referenced their location and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character, during the prosecution of the work, resulting from any act, omission, neglect, or misconduct in his/her manner or method of executing the work, or at any time due to defective work or materials, and said responsibility will not be released until the project shall have been completed and accepted.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, he shall restore, at his/her own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise restoring as may be directed, or he shall make good such damage or injury in an acceptable manner.

70-11 RESPONSIBILITY FOR DAMAGE CLAIMS. The Contractor shall be required to include the Owner and Engineer as additional insureds on his insurance policies to protect the Owner and Engineer ~~indemnify and save harmless the Engineer and the Owner~~ and their officers, and employees from all suits actions, or claims of any character brought because of any injuries or damage received or sustained by

any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act," or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of his/her contract as may be considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, his/her surety may be held until such suits, actions, or claims for injuries or damages as aforesaid shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that he is adequately protected by public liability and property damage insurance.

70-12 THIRD PARTY BENEFICIARY CLAUSE. It is specifically agreed between the parties executing the contract that it is not intended by any of the provisions of any part of the contract to create the public or any member thereof a third party beneficiary or to authorize anyone not a party to the contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the contract.

70-13 OPENING SECTIONS OF THE WORK TO TRAFFIC. Should it be necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such "phasing" of the work shall be specified herein and indicated on the plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified. The Contractor shall make his/her own estimate of the difficulties involved in arranging his/her work to permit such beneficial occupancy by the Owner as described below:

~~Phase or Description
Required Date or Sequence of Owner's Beneficial Occupancy
Work Shown on Plan Sheet~~

Refer to the various Phasing Plan sheets of the drawings for phasing and Section 10-15 CONTRACT TIME AND ASSOCIATED PHASING for descriptions and durations of each phase.

Upon completion of any portion of the work listed above, such portion shall be accepted by the Owner in accordance with the subsection titled PARTIAL ACCEPTANCE of Section 50.

No portion of the work may be opened by the Contractor for public use until ordered by the Engineer in writing. Should it become necessary to open a portion of the work to public traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the Engineer, such portion of the work is in an acceptable condition to support the intended traffic. Temporary or intermittent openings are considered to be inherent in the work and shall not constitute either acceptance of the portion of the work so opened or a waiver of any provision of the contract. Any damage to the portion of the work so opened that is not attributable to traffic which is permitted by the Owner shall be repaired by the Contractor at his/her expense.

The Contractor shall make his/her own estimate of the inherent difficulties involved in completing the work under the conditions herein described and shall not claim any added compensation by reason of delay or increased cost due to opening a portion of the contract work.

Contractor shall be required to conform to safety standards contained AC 150/5370-2, Operational Safety on Airports During Construction, latest change. ~~(See Special Provisions.)~~

Contractor shall refer to the approved safety plan and associated phasing plans to identify barricade requirements and other safety requirements prior to opening up sections of work to traffic.

70-14 CONTRACTOR'S RESPONSIBILITY FOR WORK. Until the Engineer's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with the subsection titled PARTIAL ACCEPTANCE of Section 50, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause whatever, the Contractor shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The Contractor shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at his/her expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, seedings, and soddings furnished under his/her contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

70-15 CONTRACTOR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS. As provided in the subsection titled RESTORATION OF SURFACES DISTURBED BY OTHERS of this section, the Contractor shall cooperate with the owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control his/her operations to prevent the unscheduled interruption of such utility services and facilities.

To the extent that such public or private utility services, FAA, or NOAA facilities, or utility services of another governmental agency are known to exist within the limits of the contract work, the approximate locations have been indicated on the plans and the owners are indicated as follows:

~~Utility Service or Facility~~
~~Person to Contact (Name, Title, Address, & Phone)~~
~~Owner's Emergency Contact (Phone)~~

It is understood and agreed that the Owner does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities, or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the Contractor of his/her responsibility to protect such existing features from damage or unscheduled interruption of service.

It is further understood and agreed that the Contractor shall, upon execution of the contract, notify the owners of all utility services or other facilities of his/her plan of operations. Such notification shall be in writing addressed to THE PERSON TO CONTACT as provided hereinbefore in this subsection and the subsection titled RESTORATION OF SURFACES DISTURBED BY OTHERS of this section. A copy of each notification shall be given to the Engineer.

In addition to the general written notification hereinbefore provided, it shall be the responsibility of the Contractor to keep such individual owners advised of changes in his/her plan of operations that would affect such owners.

Prior to commencing the work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such owner of his/her plan of operation. If, in the Contractor's opinion, the owner's assistance is needed to locate the utility service or facility or the presence of a representative of the owner is desirable to observe the work, such advice should be included in the notification. Such notification shall be given by the most expeditious means to reach the utility owner's PERSON TO CONTACT no later than two normal business days prior to the Contractor's commencement of operations in such general vicinity. The Contractor shall furnish a written summary of the notification to the Engineer.

The Contractor's failure to give the two day's notice hereinabove provided shall be cause for the Owner to suspend the Contractor's operations in the general vicinity of a utility service or facility.

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use excavation methods acceptable to the Engineer within 3 feet (90 cm) of such outside limits at such points as may be required to ensure protection from damage due to the Contractor's operations.

Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, he shall immediately notify the proper authority and the Engineer and shall take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such events, shall cooperate with the utility service or facility owner and the Engineer continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to his/her operations whether or not due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the Contractor, or his/her surety.

70-15.1 FAA FACILITIES AND CABLE RUNS. The Contractor is hereby advised that the construction limits of the project include existing facilities and buried cable runs that are owned, operated and maintained by the FAA. The Contractor, during the prosecution of the project work, shall comply with the following:

a. The Contractor shall permit FAA maintenance personnel the right of access to the project work site for purposes of inspecting and maintaining all existing FAA owned facilities.

b. The Contractor shall notify the above named FAA Airway Facilities Point-of-Contact seven (7) calendar days prior to commencement of construction activities in order to permit sufficient time to locate and mark existing buried cables and to schedule any required facility outages.

c. If prosecution of the project work requires a facility outage, the Contractor shall contact the above named FAA Point-of-Contact a minimum of 48 hours prior to the time of the required outage.

d. If prosecution of the project work results in damages to existing FAA equipment or cables, the Contractor shall repair the damaged item in conformance with FAA Airway Facilities' standards to the satisfaction of the above named FAA Point-of-Contact.

e. If the project work requires the cutting or splicing of FAA owned cables, the above named FAA Point-of-Contact shall be contacted a minimum of 48 hours prior to the time the cable work commences. The FAA reserves the right to have a FAA Airway Facilities representative on site to observe the splicing of the cables as a condition of acceptance. All cable splices are to be accomplished in accordance with FAA Airway Facilities' specifications and require approval by the above named FAA Point-of-Contact as a condition of acceptance by the Owner. The Contractor is hereby advised that FAA Airway Facilities restricts the location of where splices may be installed. If a cable splice is required in a location that is not

permitted by FAA Airway Facilities, the Contractor shall furnish and install a sufficient length of new cable that eliminates the need for any splice.

70-16 FURNISHING RIGHTS-OF-WAY. The Owner will be responsible for furnishing all rights-of-way upon which the work is to be constructed in advance of the Contractor's operations.

70-17 PERSONAL LIABILITY OF PUBLIC OFFICIALS. In carrying out any of the contract provisions or in exercising any power or authority granted to him by this contract, there shall be no liability upon the Engineer, his/her authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

70-18 NO WAIVER OF LEGAL RIGHTS. Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of final acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or stopped from recovering from the Contractor or his/her surety, or both, such overpayment as may be sustained, or by failure on the part of the Contractor to fulfill his/her obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the contract, shall be liable to the Owner for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the owner's rights under any warranty or guaranty.

70-19 ENVIRONMENTAL PROTECTION. The Contractor shall comply with all Federal, state, and local laws and regulations controlling pollution of the environment. He/she shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, bitumens, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

70-20 ARCHAEOLOGICAL AND HISTORICAL FINDINGS. Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does not contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior.

Should the Contractor encounter, during his/her operations, any building, part of a building, structure, or object that is incongruous with its surroundings, he shall immediately cease operations in that location and notify the Engineer. The Engineer will immediately investigate the Contractor's finding and the Owner will direct the Contractor to either resume his/her operations or to suspend operations as directed.

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract modification (change order or supplemental agreement) as provided in the subsection titled EXTRA WORK of Section 40 and the subsection titled PAYMENT FOR EXTRA WORK AND FORCE ACCOUNT WORK of Section 90. If appropriate, the contract modification shall include an extension of contract time in accordance with the subsection titled DETERMINATION AND EXTENSION OF CONTRACT TIME of Section 80.

END OF SECTION 70

SECTION 80

PROSECUTION AND PROGRESS

80-01 SUBLETTING OF CONTRACT. The Owner and Engineer will not recognize any subcontractor on the work. The Contractor shall at all times when work is in progress be represented either in person, by a qualified superintendent, or by other designated, qualified representative(s) who is duly authorized to receive and execute orders of the Engineer.

Should the Contractor elect to assign his/her contract, said assignment shall be concurred in by the surety, shall be presented for the consideration and approval of the Owner, and shall be consummated only on the written approval of the Owner. In case of approval, the Contractor shall file copies of all subcontracts with the Engineer.

The Contractor shall perform, with his organization, an amount of work equal to at least [] percent of the total contract cost.

80-02 NOTICE TO PROCEED. ~~The notice to proceed shall state the date on which it is expected the Contractor will begin the construction and from which date contract time will be charged. The Contractor shall begin the work to be performed under the contract within 10 days of the date set by the Engineer in the written notice to proceed, but in any event, the Contractor shall notify the Engineer at least 24 hours in advance of the time actual construction operations will begin.~~

The Notice to Proceed shall be issued by the Owner.

The Contractor shall begin the work to be performed under the contract within not less than five (5) days nor more than ten (10) calendar days of the date set by the Owner in the written notice to proceed, but in any event, the Contractor shall notify the Owner and Engineer at least 48 hours in advance of the time actual construction operations will begin.

80-03 PROSECUTION AND PROGRESS. Unless otherwise specified, the Contractor shall submit his/her progress schedule for the Engineer's approval within 10 calendar days after the effective date of the notice to proceed. The Contractor's progress schedule, when approved by the Engineer, may be used to establish major construction operations and to check on the progress of the work. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the Engineer's request, submit a revised schedule for completion of the work within the contract time and modify his/her operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. ~~Should the prosecution of the work be discontinued for any reason, the Contractor shall notify the Engineer at least 24 hours in advance of resuming operations.~~ Should the prosecution of the work be discontinued for any reason, the Contractor shall notify the Owner and Engineer at least 48 hours in advance of resuming operations.

For AIP contracts, the Contractor shall not commence any actual construction prior to the date on which the notice to proceed is issued by the Owner.

80-04 LIMITATION OF OPERATIONS. The Contractor shall control his/her operations and the operations of his/her subcontractors and all suppliers so as to provide for the free and unobstructed movement of aircraft in the AIR OPERATIONS AREAS (AOA) of the airport.

When the work requires the Contractor to conduct his/her operations within an AOA of the airport, the work shall be coordinated with airport operations (through the Engineer) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the Engineer and until the necessary temporary marking and associated lighting is in place as provided in the subsection titled BARRICADES, WARNING SIGNS, AND HAZARD MARKINGS of Section 70.

When the contract work requires the Contractor to work within an AOA of the airport on an intermittent basis (intermittent opening and closing of the AOA), the Contractor shall maintain constant communications as hereinafter specified; immediately obey all instructions to vacate the AOA; immediately obey all instructions to resume work in such AOA. Failure to maintain the specified communications or to obey instructions shall be cause for suspension of the Contractor's operations in the AOA until the satisfactory conditions are provided. The following AOA cannot be closed to operating aircraft to permit the Contractor's operations on a continuous basis and will therefore be closed to aircraft operations intermittently as follows:

AOA

~~Time periods AOA can be closed~~

~~Type of communications required when working in an AOA~~

~~Control authority~~

Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction, latest change. ~~(See Special Provisions.)~~

80-04.1 OPERATIONAL SAFETY ON AIRPORT DURING CONSTRUCTION. All Contractors' operations shall be conducted in accordance with the project safety plan and the provisions set forth within the current version of Advisory Circular 150/5370-2. The safety plan included within the contract documents conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit a plan that details how it proposes to comply with the requirements presented within the safety plan.

The Contractor shall implement all necessary safety plan measures prior to commencement of any work activity. The Contractor shall conduct routine checks of the safety plan measures to assure compliance with the safety plan measures.

The Contractor is responsible to the Owner for the conduct of all subcontractors it employs on the project. The Contractor shall assure that all subcontractors are made aware of the requirements of the safety plan and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved safety plan unless approved in writing by the Owner or Engineer.

80-05 CHARACTER OF WORKERS, METHODS, AND EQUIPMENT. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the Contractor or by any subcontractor who violates any operational regulations and, in the opinion of the Engineer, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed forthwith by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the Engineer.

Should the Contractor fail to remove such persons or person, or fail to furnish suitable and sufficient personnel for the proper prosecution of the work, the Engineer may suspend the work by written notice until compliance with such orders.

In addition, the following requirements shall apply concerning all workers utilized on the project:

a. The Contractor shall provide and maintain, continually on the project site of the work during its progress, adequate and competent superintendence of all operations for and in connection with the work. The Contractor shall provide a capable superintendent acceptable to the Owner. Such representative shall be able to read, write and speak English fluently and shall be authorized to receive instructions from the Engineer or his authorized representative. Said superintendent shall have authority to see that the work is carried out in accordance with the Contract Documents and in a first class, thorough and workmanlike manner in every respect.

b. Incompetent, disorderly, intemperate or incorrigible employees of any authority level shall be dismissed from the project by the Contractor or his representative when requested by the Engineer or the Owner, and such persons shall not again be permitted to return to the work without the written consent of the Owner.

c. The Contractor agrees to indemnify and hold the Owner ~~and Engineer~~ harmless from any and all loss or damages arising out of jurisdictional labor disputes or other labor troubles of any kind that may occur during the construction and performance of the Contract.

d. The Contractor shall provide at the request of the Owner such reasonable information about his employees as may be necessary, including in part, name, address and social security number.

e. Any employee of the Contractor or any subcontractors who violate the badging requirements or leaves unbadged individuals in the Airport Operations Area (AOA) or the Secured Identification Display Area (SIDA) without properly badged individuals will be removed from the Airport and not be allowed back onto the Airport without prior approval by the Owner.

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to met requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall be such that no injury to previously completed work, adjacent property, or existing airport facilities will result from its use.

When the methods and equipment to be used by the Contractor in accomplishing the work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the contract, plans, and specifications.

When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized by the Engineer. If the Contractor desires to use a method or type of equipment other than specified in the contract, he may request authority from the Engineer to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the Engineer determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the Engineer may direct. No change will be made in basis of

payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this subsection.

80-06 TEMPORARY SUSPENSION OF THE WORK. The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods as he may deem necessary, due to unsuitable weather, or such other conditions as are considered unfavorable for the prosecution of the work, or for such time as is necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the contract.

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the Engineer's order to suspend work to the effective date of the Engineer's order to resume the work. Claims for such compensation shall be filed with the Engineer within the time period stated in the Engineer's order to resume work. The Contractor shall submit with his/her claim information substantiating the amount shown on the claim. The Engineer will forward the Contractor's claim to the Owner for consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather, for suspensions made at the request of the Owner, or for any other delay provided for in the contract, plans, or specifications.

If it should become necessary to suspend work for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way. He shall take every precaution to prevent damage or deterioration of the work performed and provide for normal drainage of the work. The Contractor shall erect temporary structures where necessary to provide for traffic on, to, or from the airport.

80-07 DETERMINATION AND EXTENSION OF CONTRACT TIME. The number of calendar or working days allowed for completion of the work shall be stated in the proposal and contract and shall be known as the CONTRACT TIME.

Should the contract time require extension for reasons beyond the Contractor's control, it shall be adjusted as follows:

~~a. CONTRACT TIME based on WORKING DAYS shall be calculated weekly by the Engineer. The Engineer will furnish the Contractor a copy of his/her weekly statement of the number of working days charged against the contract time during the week and the number of working days currently specified for completion of the contract (the original contract time plus the number of working days, if any, that have been included in approved CHANGE ORDERS or SUPPLEMENTAL AGREEMENTS covering EXTRA WORK).~~

The Engineer shall base his/her weekly statement of contract time charged on the following considerations:

(1) No time shall be charged for days on which the Contractor is unable to proceed with the principal item of work under construction at the time for at least 6 hours 50% of the normal work day with the normal work force employed on such principal item except where specific defined project elements, phases, etc. establishes a shorter time frame due to operational constraints of the airport. Should the normal work force be on a double-shift, 12 hours shall be used. Should the normal work force be on a triple-shift, 18 hours shall apply. Conditions beyond the Contractor's control such as strikes, lockouts, unusual delays in transportation, temporary suspension of the principal item of work under construction or

temporary suspension of the entire work which have been ordered by the Owner for reasons not the fault of the Contractor, shall not be charged against the contract time.

(2) The Engineer will not make charges against the contract time prior to the effective date of the notice to proceed.

(3) The Engineer will begin charges against the contract time ~~on the first working day after the effective date of the notice to proceed.~~ not less than five (5) calendar days nor more than ten (10) calendar days after the receipt of the notice to proceed as evidenced by the date of receipt shown on the certified mail return receipt.

(4) The Engineer will not make charges against the contract time after the date of final acceptance as defined in the subsection titled FINAL ACCEPTANCE of Section 50.

(5) The Contractor will be allowed 1 week in which to file a written protest setting forth his/her objections to the Engineer's weekly statement. If no objection is filed within such specified time, the weekly statement shall be considered as acceptable to the Contractor.

~~The contract time (stated in the proposal) is based on the originally estimated quantities as described in the subsection titled INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES of Section 20. Should the satisfactory completion of the contract require performance of work in greater quantities than those estimated in the proposal, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in contract time shall not consider either the cost of work or the extension of contract time that has been covered by change order or supplemental agreement and shall be made at the time of final payment.~~

b. CONTRACT TIME based on CALENDAR DAYS or NIGHTS shall consist of the number of calendar days or nights stated in the contract counting from the effective date of the notice to proceed and including all Saturdays, Sundays, holidays, and nonwork days. All calendar days or nights elapsing between the effective dates of the Owner's orders to suspend and resume all work, due to causes not the fault of the Contractor, shall be excluded.

~~At the time of final payment, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in the contract time shall not consider either cost of work or the extension of contract time that has been covered by a change order or supplemental agreement. Charges against the contract time will cease as of the date of final acceptance.~~

c. When the contract time is a specified completion date, it shall be the date on which all contract work shall be substantially completed.

If the Contractor finds it impossible for reasons beyond his/her control to complete the work within the contract time as specified, or as extended in accordance with the provisions of this subsection, he may, at any time prior to the expiration of the contract time as extended, make a written request to the Engineer for an extension of time setting forth the reasons which he believes will justify the granting of his/her request. Requests for extension of time on calendar day projects, caused by inclement weather, shall be supported with National Weather Bureau data showing the actual amount of inclement weather exceeded which could normally be expected during the contract period. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Engineer finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, he may extend the time for completion in such amount as the conditions justify. The extended time for completion shall then be in full force and effect, the same as though it were the original time for completion.

80-08 FAILURE TO COMPLETE ON TIME. For each calendar day ~~or working day~~, as specified in the contract, that any work remains uncompleted after the contract time (including all extensions and adjustments as provided in the subsection titled DETERMINATION AND EXTENSION OF CONTRACT TIME of this Section) the sum specified in the contract and proposal as liquidated damages will be deducted from any money due or to become due the Contractor or his/her surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in his/her contract.

Schedule	Liquidated Damages Cost	Allowed Construction Time
All	\$3,000	Per Work Scope Section 01014

~~The maximum construction time allowed for Schedules [] will be the sum of the time allowed for individual schedules but not more than [] days. (Note: this paragraph will be modified for each project.)~~

Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the contract.

80-09 DEFAULT AND TERMINATION OF CONTRACT. ~~The Contractor shall be considered in default of his/her contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons if the Contractor:~~ The Contractor shall be considered in default of his/her contract and such default will be considered as cause for the Owner to terminate the contract for any of following, but not limited to, reasons:

- a. Fails to begin the work under the contract within the time specified in the "Notice to Proceed," or
- b. Fails to perform the work or fails to provide sufficient workers, equipment or materials to assure completion of work in accordance with the terms of the contract, or
- c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or
- d. Discontinues the prosecution of the work, or
- e. Fails to resume work which has been discontinued ~~within a reasonable time~~ after notice to do so, or
- f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or
- g. Allows any final judgment to stand against him unsatisfied ~~for a period of 10 days~~, or
- h. Makes an assignment for the benefit of creditors, or
- i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

Should the Engineer consider the Contractor in default of the contract for any reason hereinbefore, he shall immediately give written notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the contract.

If the Contractor or surety, within a period of 10 days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the Engineer of the facts of such delay, neglect, or default and the Contractor's failure to comply with such notice, have full power and authority without violating the contract, to take the prosecution of the work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable and may enter into an agreement for the completion of said contract according to the terms and provisions thereof, or use such other methods as in the opinion of the Engineer will be required for the completion of said contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under contract, will be deducted from any monies due or which may become due the Contractor. If such expense exceeds the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of such excess.

80-10 TERMINATION FOR NATIONAL EMERGENCIES. The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the prosecution of war or in the interest of national defense.

When the contract, or any portion thereof, is terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained or ordered by the Contractor for the work and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the Engineer.

Termination of the contract or a portion thereof shall neither relieve the Contractor of his/her responsibilities for the completed work nor shall it relieve his/her surety of its obligation for and concerning any just claim arising out of the work performed.

80-11 WORK AREA, STORAGE AREA AND SEQUENCE OF OPERATIONS. The Contractor shall obtain approval from the Engineer ~~Owner~~ prior to beginning any work in all areas of the airport. No operating runway, taxiway, or Air Operations Area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate his/her work in such a manner as to insure safety and a minimum of hindrance to flight operations. ~~All Contractor equipment and material stockpiles shall be stored a minimum of [] feet from the centerline of an active runway. No equipment will be allowed to park within the approach area of an active runway at any time. No equipment shall be within [] feet of an active runway at any time.~~

END OF SECTION 80

SECTION 90

MEASUREMENT AND PAYMENT

90-01 MEASUREMENT OF QUANTITIES. All work completed under the contract will be measured by the Engineer, or his/her authorized representatives, using United States Customary Units of Measurement or the International System of Units.

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 sq ft (0.8 square meter) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the Engineer.

Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.

Unless otherwise specified, all contract items which are measured by the linear foot such as electrical ducts, conduits, pipe culverts, underdrains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

In computing volumes of excavation the average end area method or other acceptable methods will be used.

The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of in.

The term "ton" will mean the short ton consisting of 2,000 lb (907 kg) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, approved scales by competent, qualified personnel at locations designed by the Engineer. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the Engineer directs, and each truck shall bear a plainly legible identification mark.

Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable to the Engineer, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.

When requested by the Contractor and approved by the Engineer in writing, material specified to be measured by the cubic yard (cubic meter) may be weighed, and such weights will be converted to cubic yards (cubic meters) for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Engineer and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

Bituminous materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60 °F (15 °C) or will be corrected to the volume at 60 °F (15 °C) using ASTM D 1250 for asphalts or ASTM D 633 for tars.

Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when bituminous material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work.

When bituminous materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, may be used for computing quantities.

Cement will be measured by the ton (kg) or hundredweight (km).

Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.

The term "lump sum" when used as an item of payment will mean complete payment for the work described in the contract.

When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered by the Engineer in connection with force account work will be measured as agreed in the change order or supplemental agreement authorizing such force account work as provided in the subsection titled PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK of this section.

When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales.

Scales shall be accurate within one-half percent of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the inspector before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed one-tenth of 1 percent of the nominal rated capacity of the scale, but not less than 1 pound (454 grams). The use of spring balances will not be permitted.

Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the inspector can safely and conveniently view them.

Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment.

Scales must be tested for accuracy and serviced before use at a new site. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end.

Scales “overweighing” (indicating more than correct weight) will not be permitted to operate, and all materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of one-half of 1 percent.

In the event inspection reveals the scales have been underweighing (indicating less than correct weight), they shall be adjusted, and no additional payment to the Contractor will be allowed for materials previously weighed and recorded.

All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.

When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the Engineer. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

90-02 SCOPE OF PAYMENT. The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing all materials, for performing all work under the contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the prosecution thereof, subject to the provisions of the subsection titled NO WAIVER OF LEGAL RIGHTS of Section 70.

When the “basis of payment” subsection of a technical specification requires that the contract price (price bid) include compensation for certain work or material essential to the item, this same work or material will not also be measured for payment under any other contract item which may appear elsewhere in the contract, plans, or specifications.

90-03 COMPENSATION FOR ALTERED QUANTITIES. When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in the subsection titled ALTERATION OF WORK AND QUANTITIES of Section 40 will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from his/her unbalanced allocation of overhead and profit among the contract items, or from any other cause.

90-04 PAYMENT FOR OMITTED ITEMS. As specified in the subsection titled OMITTED ITEMS of Section 40, the Engineer shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

Should the Engineer omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed and acceptable prior to the Engineer’s order to omit or nonperform such contract item.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the Engineer’s order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the Engineer's order. Such additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs.

90-05 PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK. Extra work, performed in accordance with the subsection titled EXTRA WORK of Section 40, will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work. When the change order or supplemental agreement authorizing the extra work requires that it be done by force account, such force account shall be measured and paid for based on expended labor, equipment, and materials plus a negotiated and agreed upon allowance for overhead and profit.

a. Miscellaneous. No additional allowance will be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided.

b. Comparison of Record. The Contractor and the Engineer shall compare records of the cost of force account work at the end of each day. Agreement shall be indicated by signature of the Contractor and the Engineer or their duly authorized representatives.

c. Statement. No payment will be made for work performed on a force account basis until the Contractor has furnished the Engineer with duplicate itemized statements of the cost of such force account work detailed as follows:

(1) Name, classification, date, daily hours, total hours, rate and extension for each laborer and foreman including supplemental benefits, payroll taxes, insurance premiums and other reasonable charges that are paid by the Contractor pursuant to existing written agreements with employees and/or labor organizations.

(2) Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment.

For Contractor self-owned equipment, the maximum rate paid for equipment will be determined based upon the following factors:

(i) The base hourly rates shall be the daily rate as listed in the current Rental Rates for Construction Equipment prepared by Associated Equipment Distributors latest edition, divided by eight (8). Where no daily rate is listed, the daily rate will be determined by dividing the monthly rate by 10.

(ii) The first 20 hours will be paid at 90 percent of the above based hourly rate. For 21 to 40 hours, the rate will be 80 percent of the above base hourly rate. For over 40 hours, the rate will be 45 percent of the above base hourly rate.

(iii) The number of hours to be paid for shall be the number of hours that the equipment or plant is actually used on a specified force account job.

(iv) For rented equipment, such equipment will be paid for based upon rental cost as approved by the Engineer. Invoices showing rental charges must be submitted to the Engineer for such payment.

(v) For use of all equipment when, in the opinion of the Contractor and as approved by the Engineer, suitable equipment is not available on the site, the movement of required equipment to and from the site will be paid for at actual cost.

(vi) Equipment to be used by the Contractor shall be specifically described and be of suitable size and suitable capacity required for the work to be performed. In the event the Contractor elects to use equipment of a higher rental value than that suitable for the work, payment will be made at the rate applicable to the suitable equipment. The equipment actually used and the suitable equipment paid for will be recorded as part of the record for force account work. The Engineer shall determine the suitability of the equipment. If there is a differential in the rate of pay of the operator of oversize or higher rate equipment, the rate paid for the operator will likewise be that for the suitable equipment.

(vii) In the event that a rate is not established in the Associated Equipment Distributors Rental Rates, latest edition, for a particular piece of equipment or plant, the Owner shall establish a rate for that piece of equipment or plant that is consistent with its cost and use.

(3) Quantities of materials, prices, and extensions.

(4) Transportation of materials to the site.

(5) Cost of property damage, liability and workman's compensation insurance premiums, unemployment insurance contributions, and social security tax.

(6) Profit and Overhead. Profit and overhead amount shall be computed at fifteen (15) percent of the following:

(i) Total Direct Labor Cost (actual hours worked multiplied by the basic hourly wage rate) plus supplemental benefits payments, payroll taxes, insurance payments and other labor related fringe benefit payments as defined in (1) above, but not including the overtime additive payments. Profit and overhead shall not be paid on the premium portion of overtime.

(ii) Total Cost of Materials as defined in (3) and (4) above.

(iii) If any of the work is performed by a subcontractor, the Contractor shall be paid the actual and reasonable cost of such subcontracted work computed as outlined in (1) through (5) above, or on such other basis as may be approved by the Owner. Contractor's profit and overhead on subcontractor's work shall be computed at ~~fifteen (15)~~ five (5%) percent as limited in this section. Subcontractor's profit and overhead amount shall be computed at ~~five (5)~~ ten (10%) percent of materials and direct labor to cover the subcontractor's profit, superintendence, administration, insurance and other overhead. For purposes of computing profit and overhead, only one level or tier of subcontractors will be allowed.

(7) Overhead shall be defined to include the following items:

(i) Premium on bond.

(ii) Premium on insurance required by the State, Workmen's Compensation Insurance, public liability and property damage insurance, unemployment insurance, federal old-age benefits, other payroll taxes and such reasonable charges that are paid by the Contractor pursuant to written agreement with his employee.

(iii) All salary and expenses of executive officers, supervising officers or supervising employees.

(iv) All clerical or stenographic employees.

(v) All charges for minor equipment such as small tools, including shovels, picks, axes, saws, bars, sledges, lanterns, jacks, cables, pails, wrenches, etc. and other miscellaneous supplies and services.

(vi) All drafting room accessories such as paper, tracing cloth, blueprinting, etc.

Statements shall be accompanied and supported by a receipted invoice for all materials used and transportation charges. However, if materials used on the force account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the invoices the Contractor shall furnish an affidavit certifying that such materials were taken from his/her stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor.

90-06 PARTIAL PAYMENTS. Partial payments will be made to the Contractor at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the Engineer, of the value of the work performed and materials complete and in place in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with the subsection titled PAYMENT FOR MATERIALS ON HAND of this section. No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars. No partial payment will be made until all submittals and documentation required under Section "01027 Application for Payment" are submitted and approved.

The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 30 days after the Contractor has received a partial payment. The Owner must ensure prompt and full payment of retainage from the prime contractor to the subcontractor within 30 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

From the total of the amount determined to be payable on a partial payment, {insert amount of retainage, not to exceed 10 percent} percent of such total amount will be deducted and retained by the Owner until the final payment is made., ~~except as may be provided (at the Contractor's option) in the subsection titled PAYMENT OF WITHHELD FUNDS of this section.~~ The balance {(insert balance)} of the amount payable, less all previous payments, shall be certified for payment. ~~Should the Contractor exercise his/her option, as provided in the subsection titled PAYMENT OF WITHHELD FUNDS of this section, no such percent retainage shall be deducted.~~

When at least 95 percent of the work has been completed, the Engineer shall, at the Owner's discretion and with the consent of the surety, prepare estimates of both the contract value and the cost of the remaining work to be done.

The Owner may retain an amount not less than twice the contract value or estimated cost, whichever is greater, of the work remaining to be done. The remainder, less all previous payments and deductions, will then be certified for payment to the Contractor.

It is understood and agreed that the Contractor shall not be entitled to demand or receive partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess quantities have been determined by the Engineer to be a part of the final quantity for the item of work in question.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in the subsection titled ACCEPTANCE AND FINAL PAYMENT of this section.

The amount of retainage withheld from the Contractor's monthly partial payments shall be ~~40~~ 5%.

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the Contractor may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any potential lien or other such claim. The bond or collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

90-07 PAYMENT FOR MATERIALS ON HAND. Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

a. The material has been stored or stockpiled in a manner acceptable to the Engineer at or on an approved site.

b. The Contractor has furnished the Engineer with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

c. The Contractor has furnished the Engineer with satisfactory evidence that the material and transportation costs have been paid.

d. The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material so stored or stockpiled.

e. The Contractor has furnished the Owner evidence that the material so stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials shall in no way relieve the Contractor of his/her responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications.

In no case will the amount of partial payments for materials on hand exceed the contract price for such materials or the contract price for the contract item in which the material is intended to be used.

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this subsection.

90-08 PAYMENT OF WITHHELD FUNDS. ~~At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in subsection 90-06 PARTIAL PAYMENTS, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:~~

~~a. The Contractor shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.~~

~~b. The Contractor shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the retainage that would otherwise be withheld from partial payment.~~

~~c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.~~

~~d. The Contractor shall obtain the written consent of the surety to such agreement.~~

90-09 ACCEPTANCE AND FINAL PAYMENT. When the contract work has been accepted in accordance with the requirements of the subsection titled FINAL ACCEPTANCE of Section 50, the Engineer will prepare the final estimate of the items of work actually performed. The Contractor shall approve the Engineer's final estimate or advise the Engineer of his/her objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the Engineer shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the Engineer's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the Engineer's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with the subsection titled CLAIMS FOR ADJUSTMENT AND DISPUTES of Section 50.

After the Contractor has approved, or approved under protest, the Engineer's final estimate, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

Should elements of work require delay in final payment due to seasonal or other reasons, the Owner may retain or withhold an agreed upon amount from items of work associated with the delayed items and hold that retainage, even after final payment less the retained amounts, until the Contractor has fulfilled the elements of work delayed to the satisfaction of the Owner. The Owner shall release the retained amount after all associated work for which the delay item has been accepted by the Owner.

If the Contractor has filed a claim for additional compensation under the provisions of the subsection titled CLAIMS FOR ADJUSTMENTS AND DISPUTES of Section 50 or under the provisions of this subsection, such claims will be considered by the Owner in accordance with local laws or ordinances. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

END OF SECTION 90

SECTION 100

CONTRACTOR QUALITY CONTROL PROGRAM

100-01 GENERAL. When the specification requires a Contractor Quality Control Program, the Contractor shall establish, provide, and maintain an effective Quality Control Program that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The intent of this section is to enable the Contractor to establish a necessary level of control that will:

- a. Adequately provide for the production of acceptable quality materials.
- b. Provide sufficient information to assure both the Contractor and the Engineer that the specification requirements can be met.
- c. Allow the Contractor as much latitude as possible to develop his or her own standard of control.

The Contractor shall be prepared to discuss and present, at the preconstruction conference, his/her understanding of the quality control requirements. The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the Quality Control Program has been reviewed by the Engineer and a written finding of no objection to the Quality Control Program is provided by the Engineer. No partial payment will be made for materials subject to specific quality control requirements until the Quality Control Program has been reviewed and a written finding of no objection to the Quality Control Program is provided by the Engineer.

The quality control requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the acceptance testing requirements. Acceptance testing requirements are the responsibility of the Engineer.

100-02 DESCRIPTION OF PROGRAM.

a. General Description. The Contractor shall establish a Quality Control Program to perform inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. This Quality Control Program shall ensure conformance to applicable specifications and plans with respect to materials, workmanship, construction, finish, and functional performance. The Quality Control Program shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of quality control.

b. Quality Control Program. The Contractor shall describe the Quality Control Program in a written document that shall be reviewed by the Engineer prior to the start of any production, construction, or off-site fabrication. The written Quality Control Program shall be submitted to the Engineer for review at least [5] calendar days before the [Preconstruction Conference].

The Quality Control Program shall be organized to address, as a minimum, the following items:

- a. Quality control organization
- b. Project progress schedule
- c. Submittals schedule
- d. Inspection requirements
- e. Quality control testing plan
- f. Documentation of quality control activities
- g. Requirements for corrective action when quality control and/or acceptance criteria are not met

The Contractor is encouraged to add any additional elements to the Quality Control Program that he/she deems necessary to adequately control all production and/or construction processes required by this contract.

The cost of development, administration and/or performance of the Quality Control Program shall not be paid for separately but shall be included in various other bid items.

100-03 QUALITY CONTROL ORGANIZATION. The Contractor Quality Control Program shall be implemented by the establishment of a separate quality control organization. An organizational chart shall be developed to show all quality control personnel and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all quality control staff by name and function, and shall indicate the total staff required to implement all elements of the Quality Control Program, including inspection and testing for each item of work. If necessary, different technicians can be used for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the Quality Control Program, the personnel assigned shall be subject to the qualification requirements of paragraph 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The quality control organization shall consist of the following minimum personnel:

a. Program Administrator. The Program Administrator shall be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The Program Administrator shall have a minimum of 5 years of experience in airport and/or highway construction and shall have had prior quality control experience on a project of comparable size and scope as the contract.

Additional qualifications for the Program Administrator shall include at least 1 of the following requirements:

(1) Professional engineer with 1 year of airport paving experience acceptable to the Engineer.

(2) Engineer-in-training with 2 years of airport paving experience acceptable to the Engineer.

(3) An individual with 3 years of highway and/or airport paving experience acceptable to the Engineer, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

(4) Construction materials technician certified at Level III by the National Institute for Certification in Engineering Technologies (NICET).

(5) Highway materials technician certified at Level III by NICET.

(6) Highway construction technician certified at Level III by NICET.

(7) A NICET certified engineering technician in Civil Engineering Technology with 5 years of highway and/or airport paving experience acceptable to the Engineer.

The Program Administrator shall have full authority to institute any and all actions necessary for the successful implementation of the Quality Control Program to ensure compliance with the contract plans and technical specifications. The Program Administrator shall report directly to a responsible officer of the construction firm. The Program Administrator may supervise the Quality Control Program on more than one project provided that person can be at the job site within 2 hours after being notified of a problem.

b. Quality Control Technicians. A sufficient number of quality control technicians necessary to adequately implement the Quality Control Program shall be provided. These personnel shall be either engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II or higher construction materials technician or highway construction technician and shall have a minimum of 2 years of experience in their area of expertise.

The quality control technicians shall report directly to the Program Administrator and shall perform the following functions:

(1) Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by Section 100-06.

(2) Performance of all quality control tests as required by the technical specifications and Section 100-07.

Certification at an equivalent level, by a state or nationally recognized organization will be acceptable in lieu of NICET certification.

c. Staffing Levels. The Contractor shall provide sufficient qualified quality control personnel to monitor each work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians shall be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The Quality Control Program shall state where different technicians will be required for different work elements.

100-04 PROJECT PROGRESS SCHEDULE. The Contractor shall submit a coordinated construction schedule for all work activities. The schedule shall be prepared as a network diagram in Critical Path Method (CPM), PERT, or other format, or as otherwise specified in the contract. As a minimum, it shall provide information on the sequence of work activities, milestone dates, and activity duration.

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a twice monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Contractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

100-05 SUBMITTALS SCHEDULE. The Contractor shall submit a detailed listing of all submittals (for example, mix designs, material certifications) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include:

- a. Specification item number
- b. Item description
- c. Description of submittal
- d. Specification paragraph requiring submittal
- e. Scheduled date of submittal

100-06 INSPECTION REQUIREMENTS. Quality control inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by Section 100-07.

Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the particular feature of work. These shall include the following minimum requirements:

a. During plant operation for material production, quality control test results and periodic inspections shall be used to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications. All equipment used in proportioning and mixing shall be inspected to ensure its proper operating condition. The Quality Control Program shall detail how these and other quality control functions will be accomplished and used.

b. During field operations, quality control test results and periodic inspections shall be used to ensure the quality of all materials and workmanship. All equipment used in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The Program shall document how these and other quality control functions will be accomplished and used.

100-07 QUALITY CONTROL TESTING PLAN. As a part of the overall Quality Control Program, the Contractor shall implement a quality control testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by each technical specification item, as well as any additional quality control tests that the Contractor deems necessary to adequately control production and/or construction processes.

The testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

- a. Specification item number (for example, P-401)
- b. Item description (for example, Plant Mix Bituminous Pavements)
- c. Test type (for example, gradation, grade, asphalt content)
- d. Test standard (for example, ASTM or AASHTO test number, as applicable)

e. Test frequency (for example, as required by technical specifications or minimum frequency when requirements are not stated)

f. Responsibility (for example, plant technician)

g. Control requirements (for example, target, permissible deviations)

The testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples in accordance with ASTM D 3665. The Engineer shall be provided the opportunity to witness quality control sampling and testing.

All quality control test results shall be documented by the Contractor as required by Section 100-08.

100-08 DOCUMENTATION. The Contractor shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that the required inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the Engineer daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the Contractor's Program Administrator.

Specific Contractor quality control records required for the contract shall include, but are not necessarily limited to, the following records:

a. Daily Inspection Reports. Each Contractor quality control technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations on a form acceptable to the Engineer. These technician's daily reports shall provide factual evidence that continuous quality control inspections have been performed and shall, as a minimum, include the following:

- (1) Technical specification item number and description;
- (2) Compliance with approved submittals;
- (3) Proper storage of materials and equipment;
- (4) Proper operation of all equipment;
- (5) Adherence to plans and technical specifications;
- (6) Review of quality control tests; and
- (7) Safety inspection.

The daily inspection reports shall identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible quality control technician and the Program Administrator. The Engineer shall be provided at least one copy of each daily inspection report on the work day following the day of record.

b. Daily Test Reports. The Contractor shall be responsible for establishing a system that will record all quality control test results. Daily test reports shall document the following information:

- (1) Technical specification item number and description
- (2) Test designation
- (3) Location
- (4) Date of test
- (5) Control requirements
- (6) Test results
- (7) Causes for rejection
- (8) Recommended remedial actions
- (9) Retests

Test results from each day's work period shall be submitted to the Engineer prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical quality control charts. The daily test reports shall be signed by the responsible quality control technician and the Program Administrator.

100-09 CORRECTIVE ACTION REQUIREMENTS. The Quality Control Program shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the Quality Control Program as a whole, and for individual items of work contained in the technical specifications.

The Quality Control Program shall detail how the results of quality control inspections and tests will be used for determining the need for corrective action and shall contain clear sets of rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Contractor shall establish and use statistical quality control charts for individual quality control tests. The requirements for corrective action shall be linked to the control charts.

100-10 SURVEILLANCE BY THE ENGINEER. All items of material and equipment shall be subject to surveillance by the Engineer at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate quality control system in conformance with the requirements detailed herein and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to surveillance by the Engineer at the site for the same purpose.

Surveillance by the Engineer does not relieve the Contractor of performing quality control inspections of either on-site or off-site Contractor's or subcontractor's work.

100-11 NONCOMPLIANCE.

a. The Engineer will notify the Contractor of any noncompliance with any of the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Any

notice, when delivered by the Engineer or his/her authorized representative to the Contractor or his/her authorized representative at the site of the work, shall be considered sufficient notice.

b. In cases where quality control activities do not comply with either the Contractor Quality Control Program or the contract provisions, or where the Contractor fails to properly operate and maintain an effective Quality Control Program, as determined by the Engineer, the Engineer may:

(1) Order the Contractor to replace ineffective or unqualified quality control personnel or subcontractors.

(2) Order the Contractor to stop operations until appropriate corrective actions are taken.

END OF SECTION 100

SECTION 110

METHOD OF ESTIMATING PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL)

110-01 GENERAL. When the specifications provide for acceptance of material based on the method of estimating percentage of material within specification limits (PWL), the PWL will be determined in accordance with this section. All test results for a lot will be analyzed statistically to determine the total estimated percent of the lot that is within specification limits. The PWL is computed using the sample average (\bar{X}) and sample standard deviation (S_n) of the specified number (n) of sublots for the lot and the specification tolerance limits, L for lower and U for upper, for the particular acceptance parameter. From these values, the respective Quality index, Q_L for Lower Quality Index and/or Q_U for Upper Quality Index, is computed and the PWL for the lot for the specified n is determined from Table 1. All specification limits specified in the technical sections shall be absolute values. Test results used in the calculations shall be to the significant figure given in the test procedure.

There is some degree of uncertainty (risk) in the measurement for acceptance because only a small fraction of production material (the population) is sampled and tested. This uncertainty exists because all portions of the production material have the same probability to be randomly sampled. The Contractor's risk is the probability that material produced at the acceptable quality level is rejected or subjected to a pay adjustment. The Owner's risk is the probability that material produced at the rejectable quality level is accepted.

It is the intent of this section to inform the contractor that, in order to consistently offset the contractor's risk for material evaluated, production quality (using population average and population standard deviation) must be maintained at the acceptable quality specified or higher. In all cases, it is the responsibility of the contractor to produce at quality levels that will meet the specified acceptance criteria when sampled and tested at the frequencies specified.

110-02 METHOD FOR COMPUTING PWL. The computational sequence for computing PWL is as follows:

- a. Divide the lot into n sublots in accordance with the acceptance requirements of the specification.
- b. Locate the random sampling position within the subplot in accordance with the requirements of the specification.
- c. Make a measurement at each location, or take a test portion and make the measurement on the test portion in accordance with the testing requirements of the specification.
- d. Find the sample average (\bar{X}) for all subplot values within the lot by using the following formula:

$$\bar{X} = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

Where: \bar{X} = Sample average of all subplot values within a lot

x_1, x_2 = Individual subplot values

n = Number of sublots

- e. Find the sample standard deviation (S_n) by use of the following formula:

$$S_n = [(d_1^2 + d_2^2 + d_3^2 + \dots + d_n^2)/(n-1)]^{1/2}$$

Where: S_n = Sample standard deviation of the number of subplot values in the set

d_1, d_2 = Deviations of the individual subplot values x_1, x_2, \dots from the average value X

that is: $d_1 = (x_1 - X), d_2 = (x_2 - X) \dots d_n = (x_n - X)$

n = Number of sublots

f. For single sided specification limits (that is, L only), compute the Lower Quality Index Q_L by use of the following formula:

$$Q_L = (X - L) / S_n$$

Where: L = specification lower tolerance limit

Estimate the percentage of material within limits (PWL) by entering Table 1 with Q_L , using the column appropriate to the total number (n) of measurements. If the value of Q_L falls between values shown on the table, use the next higher value of PWL.

g. For double-sided specification limits (that is, L and U), compute the Quality Indexes Q_L and Q_U by use of the following formulas:

$$Q_L = (X - L) / S_n$$

AND

$$Q_U = (U - X) / S_n$$

Where: L and U = specification lower and upper tolerance limits

Estimate the percentage of material between the lower (L) and upper (U) tolerance limits (PWL) by entering Table 1 separately with Q_L and Q_U , using the column appropriate to the total number (n) of measurements, and determining the percent of material above P_L and percent of material below P_U for each tolerance limit. If the values of Q_L fall between values shown on the table, use the next higher value of P_L or P_U . Determine the PWL by use of the following formula:

$$PWL = (P_U + P_L) - 100$$

Where: P_L = percent within lower specification limit

P_U = percent within upper specification limit

EXAMPLE OF PWL CALCULATION

Project: Example Project

Test Item: Item P-401, Lot A.

A. PWL Determination for Mat Density.

1. Density of four random cores taken from Lot A.

$$A-1 = 96.60$$

$$A-2 = 97.55$$

$$A-3 = 99.30$$

$$A-4 = 98.35$$

$$n = 4$$

2. Calculate average density for the lot.

$$X = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

$$X = (96.60 + 97.55 + 99.30 + 98.35) / 4$$

$$X = 97.95 \text{ percent density}$$

3. Calculate the standard deviation for the lot.

$$S_n = [((96.60 - 97.95)^2 + (97.55 - 97.95)^2 + (99.30 - 97.95)^2 + (98.35 - 97.95)^2) / (4 - 1)]^{1/2}$$

$$S_n = [(1.82 + 0.16 + 1.82 + 0.16) / 3]^{1/2}$$

$$S_n = 1.15$$

4. Calculate the Lower Quality Index Q_L for the lot. ($L=96.3$)

$$Q_L = (X - L) / S_n$$

$$Q_L = (97.95 - 96.30) / 1.15$$

$$Q_L = 1.4348$$

5. Determine PWL by entering Table 1 with $Q_L = 1.44$ and $n = 4$.

$$PWL = 98$$

B. PWL Determination for Air Voids.

1. Air Voids of four random samples taken from Lot A.

$$A-1 = 5.00$$

$$A-2 = 3.74$$

$$A-3 = 2.30$$

$$A-4 = 3.25$$

2. Calculate the average air voids for the lot.

$$X = (x_1 + x_2 + x_3 \dots n) / n$$

$$X = (5.00 + 3.74 + 2.30 + 3.25) / 4$$

$$X = 3.57 \text{ percent}$$

3. Calculate the standard deviation S_n for the lot.

$$S_n = [((3.57 - 5.00)^2 + (3.57 - 3.74)^2 + (3.57 - 2.30)^2 + (3.57 - 3.25)^2) / (4 - 1)]^{1/2}$$

$$S_n = [(2.04 + 0.03 + 1.62 + 0.10) / 3]^{1/2}$$

$$S_n = 1.12$$

4. Calculate the Lower Quality Index Q_L for the lot. ($L = 2.0$)

$$Q_L = (X - L) / S_n$$

$$Q_L = (3.57 - 2.00) / 1.12$$

$$Q_L = 1.3992$$

5. Determine P_L by entering Table 1 with $Q_L = 1.41$ and $n = 4$.

$$P_L = 97$$

6. Calculate the Upper Quality Index Q_U for the lot. ($U = 5.0$)

$$Q_U = (U - X) / S_n$$

$$Q_U = (5.00 - 3.57) / 1.12$$

$$Q_U = 1.2702$$

7. Determine P_U by entering Table 1 with $Q_U = 1.29$ and $n = 4$.

$$P_U = 93$$

8. Calculate Air Voids PWL

$$PWL = (P_L + P_U) - 100$$

$$PWL = (97 + 93) - 100 = 90$$

EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E 178)

Project: Example Project

Test Item: Item P-401, Lot A.

A. Outlier Determination for Mat Density.

1. Density of four random cores taken from Lot A arranged in descending order.

A-3 = 99.30

A-4 = 98.35

A-2 = 97.55

A-1 = 96.60

2. Use $n=4$ and upper 5 percent significance level of to find the critical value for test criterion = 1.463.

3. Use average density, standard deviation, and test criterion value to evaluate density measurements.

- a. For measurements greater than the average:

If $(\text{measurement} - \text{average})/(\text{standard deviation})$ is less than test criterion,
then the measurement is not considered an outlier

For A-3, check if $(99.30 - 97.95) / 1.15$ is greater than 1.463.

Since 1.174 is less than 1.463, the value is not an outlier.

- b. For measurements less than the average:

If $(\text{average} - \text{measurement})/(\text{standard deviation})$ is less than test criterion,
then the measurement is not considered an outlier.

For A-1, check if $(97.95 - 96.60) / 1.15$ is greater than 1.463.

Since 1.435 is less than 1.463, the value is not an outlier.

NOTE: In this example, a measurement would be considered an outlier if the density were:

Greater than $(97.95 + 1.463 \times 1.15) = 99.63$ percent; OR

less than $(97.95 - 1.463 \times 1.15) = 96.27$ percent.

ROUNDING RULE

A. If the digit following the last digit to be kept is 0, 1, 2, 3, or 4, strike out that digit and all the following digits.

Example: For the number 28.69248539, if only three decimal places are being kept the number becomes 28.692.

B. If the digit following the last digit to be kept is 6, 7, 8, or 9, increase the last digit to be kept by 1 and strike out all the following digits.

Example: For the number 28.69248539, if only one decimal place is being kept the number becomes 28.7.

C. If the digit following the last digit to be kept is 5 and there are digits other than zero to the right of 5, increase the last digit to be retained by 1 and strike out all following digits.

Example: For the number 28.69248539, if five decimal places are being kept the number becomes 28.69249.

D. If the digit following the last digit to be kept is 5 and there are no digits other than zero beyond 5, increase the last digit to be retained by 1 if it is odd or leave it unchanged if it is even.

Example: For the number 28.69248500, if five decimal places are being kept the number becomes 28.69248.

Table 1. Table for Estimating Percent of Lot Within Limits (PWL)

Percent Within Limits (P _L and P _U)	Positive Values of Q (Q _L and Q _U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
99	1.1541	1.4700	1.6714	1.8008	1.8888	1.9520	1.9994	2.0362
98	1.1524	1.4400	1.6016	1.6982	1.7612	1.8053	1.8379	1.8630
97	1.1496	1.4100	1.5427	1.6181	1.6661	1.6993	1.7235	1.7420
96	1.1456	1.3800	1.4897	1.5497	1.5871	1.6127	1.6313	1.6454
95	1.1405	1.3500	1.4407	1.4887	1.5181	1.5381	1.5525	1.5635
94	1.1342	1.3200	1.3946	1.4329	1.4561	1.4717	1.4829	1.4914
93	1.1269	1.2900	1.3508	1.3810	1.3991	1.4112	1.4199	1.4265
92	1.1184	1.2600	1.3088	1.3323	1.3461	1.3554	1.3620	1.3670
91	1.1089	1.2300	1.2683	1.2860	1.2964	1.3032	1.3081	1.3118
90	1.0982	1.2000	1.2290	1.2419	1.2492	1.2541	1.2576	1.2602
89	1.0864	1.1700	1.1909	1.1995	1.2043	1.2075	1.2098	1.2115
88	1.0736	1.1400	1.1537	1.1587	1.1613	1.1630	1.1643	1.1653
87	1.0597	1.1100	1.1173	1.1192	1.1199	1.1204	1.1208	1.1212
86	1.0448	1.0800	1.0817	1.0808	1.0800	1.0794	1.0791	1.0789
85	1.0288	1.0500	1.0467	1.0435	1.0413	1.0399	1.0389	1.0382
84	1.0119	1.0200	1.0124	1.0071	1.0037	1.0015	1.0000	0.9990
83	0.9939	0.9900	0.9785	0.9715	0.9671	0.9643	0.9624	0.9610
82	0.9749	0.9600	0.9452	0.9367	0.9315	0.9281	0.9258	0.9241
81	0.9550	0.9300	0.9123	0.9025	0.8966	0.8928	0.8901	0.8882
80	0.9342	0.9000	0.8799	0.8690	0.8625	0.8583	0.8554	0.8533
79	0.9124	0.8700	0.8478	0.8360	0.8291	0.8245	0.8214	0.8192
78	0.8897	0.8400	0.8160	0.8036	0.7962	0.7915	0.7882	0.7858
77	0.8662	0.8100	0.7846	0.7716	0.7640	0.7590	0.7556	0.7531
76	0.8417	0.7800	0.7535	0.7401	0.7322	0.7271	0.7236	0.7211
75	0.8165	0.7500	0.7226	0.7089	0.7009	0.6958	0.6922	0.6896
74	0.7904	0.7200	0.6921	0.6781	0.6701	0.6649	0.6613	0.6587
73	0.7636	0.6900	0.6617	0.6477	0.6396	0.6344	0.6308	0.6282
72	0.7360	0.6600	0.6316	0.6176	0.6095	0.6044	0.6008	0.5982
71	0.7077	0.6300	0.6016	0.5878	0.5798	0.5747	0.5712	0.5686
70	0.6787	0.6000	0.5719	0.5582	0.5504	0.5454	0.5419	0.5394
69	0.6490	0.5700	0.5423	0.5290	0.5213	0.5164	0.5130	0.5105
68	0.6187	0.5400	0.5129	0.4999	0.4924	0.4877	0.4844	0.4820
67	0.5878	0.5100	0.4836	0.4710	0.4638	0.4592	0.4560	0.4537
66	0.5563	0.4800	0.4545	0.4424	0.4355	0.4310	0.4280	0.4257
65	0.5242	0.4500	0.4255	0.4139	0.4073	0.4030	0.4001	0.3980
64	0.4916	0.4200	0.3967	0.3856	0.3793	0.3753	0.3725	0.3705
63	0.4586	0.3900	0.3679	0.3575	0.3515	0.3477	0.3451	0.3432
62	0.4251	0.3600	0.3392	0.3295	0.3239	0.3203	0.3179	0.3161
61	0.3911	0.3300	0.3107	0.3016	0.2964	0.2931	0.2908	0.2892
60	0.3568	0.3000	0.2822	0.2738	0.2691	0.2660	0.2639	0.2624
59	0.3222	0.2700	0.2537	0.2461	0.2418	0.2391	0.2372	0.2358
58	0.2872	0.2400	0.2254	0.2186	0.2147	0.2122	0.2105	0.2093
57	0.2519	0.2100	0.1971	0.1911	0.1877	0.1855	0.1840	0.1829
56	0.2164	0.1800	0.1688	0.1636	0.1607	0.1588	0.1575	0.1566
55	0.1806	0.1500	0.1406	0.1363	0.1338	0.1322	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057	0.1049	0.1042
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0793	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264	0.0262	0.0260

Percent Within Limits (P _L and P _U)	Positive Values of Q (Q _L and Q _U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Percent Within Limits (P _L and P _U)	Negative Values of Q (Q _L and Q _U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042
45	-0.1806	-0.1500	-0.1406	-0.1363	-0.1338	-0.1322	-0.1312	-0.1304
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1588	-0.1575	-0.1566
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855	-0.1840	-0.1829
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122	-0.2105	-0.2093
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477	-0.3451	-0.3432
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753	-0.3725	-0.3705
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4030	-0.4001	-0.3980
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4355	-0.4310	-0.4280	-0.4257
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592	-0.4560	-0.4537
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877	-0.4844	-0.4820
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164	-0.5130	-0.5105
30	-0.6787	-0.6000	-0.5719	-0.5582	-0.5504	-0.5454	-0.5419	-0.5394
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747	-0.5712	-0.5686
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044	-0.6008	-0.5982
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344	-0.6308	-0.6282
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649	-0.6613	-0.6587
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958	-0.6922	-0.6896
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271	-0.7236	-0.7211
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590	-0.7556	-0.7531
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915	-0.7882	-0.7858
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245	-0.8214	-0.8192
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583	-0.8554	-0.8533
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928	-0.8901	-0.8882
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9315	-0.9281	-0.9258	-0.9241
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9671	-0.9643	-0.9624	-0.9610
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015	-1.0000	-0.9990
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399	-1.0389	-1.0382
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794	-1.0791	-1.0789
13	-1.0597	-1.1100	-1.1173	-1.1192	-1.1199	-1.1204	-1.1208	-1.1212
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630	-1.1643	-1.1653
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075	-1.2098	-1.2115
10	-1.0982	-1.2000	-1.2290	-1.2419	-1.2492	-1.2541	-1.2576	-1.2602
9	-1.1089	-1.2300	-1.2683	-1.2860	-1.2964	-1.3032	-1.3081	-1.3118
8	-1.1184	-1.2600	-1.3088	-1.3323	-1.3461	-1.3554	-1.3620	-1.3670
7	-1.1269	-1.2900	-1.3508	-1.3810	-1.3991	-1.4112	-1.4199	-1.4265
6	-1.1342	-1.3200	-1.3946	-1.4329	-1.4561	-1.4717	-1.4829	-1.4914
5	-1.1405	-1.3500	-1.4407	-1.4887	-1.5181	-1.5381	-1.5525	-1.5635

Percent Within Limits (P _L and P _U)	Positive Values of Q (Q _L and Q _U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
4	-1.1456	-1.3800	-1.4897	-1.5497	-1.5871	-1.6127	-1.6313	-1.6454
3	-1.1496	-1.4100	-1.5427	-1.6181	-1.6661	-1.6993	-1.7235	-1.7420
2	-1.1524	-1.4400	-1.6016	-1.6982	-1.7612	-1.8053	-1.8379	-1.8630
1	-1.1541	-1.4700	-1.6714	-1.8008	-1.8888	-1.9520	-1.9994	-2.0362

END OF SECTION 110

SECTION 120

NUCLEAR GAGES

120-01 TESTING. When the specifications provide for nuclear gauge acceptance testing of material for Items P-152, P-154, P-208, and P-209, the testing shall be performed in accordance with this section. At each sampling location, the field density shall be determined in accordance with ASTM D 6938 using the Direct Transmission Method. The nuclear gauge shall be calibrated in accordance with ASTM D 6938. Calibration and operation of the gauge shall be in accordance with the requirements of the manufacturer. The operator of the nuclear gauge must show evidence of training and experience in the use of the instrument. The gauge shall be standardized daily in accordance with ASTM standards.

When using the nuclear method, ASTM D 6938 shall be used to determine the moisture content of the material. The calibration curve furnished with the nuclear gauges shall be checked in accordance with ASTM standards. The calibration checks shall be made at the beginning of a job and at regular daily intervals.

~~-gauge~~

The material shall be accepted on a lot basis. Each Lot shall be divided into eight (8) sublots when ASTM D 6938 is used.

120-02. When PWL concepts are incorporated, compaction shall continue until a PWL of 90 percent or more is achieved using the lower specification tolerance limits (L) below.

The percentage of material within specification limits (PWL) shall be determined in accordance with the procedures specified in Section 110 of the General Provisions.

The lower specification tolerance limit (L) for density shall be:

Specification Item Number	Specification Tolerance (L) for Density, <u>(percent of laboratory maximum)</u>
Item P-152	90.5 for cohesive material, 95.5 for non-cohesive
Item P-154	95.5
Item P-208	97.0
Item P-209	97.0

If the PWL is less than 90 percent, the lot shall be reworked and recompacted by the Contractor at the Contractor's expense. After reworking and recompaction, the lot shall be resampled and retested. Retest results for the lot shall be reevaluated for acceptance. This procedure shall continue until the PWL is 90 percent or greater.

120-03 VERIFICATION TESTING. (For Items P-152 and P-154 only.) The Engineer will verify the maximum laboratory density of material placed in the field for each lot. A minimum of one test will be made for each lot of material at the site. The verification process will consist of; (1) compacting the material and determining the dry density and moisture-density in accordance with [ASTM D 698 for aircraft gross weights less than 60,000 pounds] [ASTM D 1557 for aircraft gross weights 60,000 pounds]

or more], and (2) comparing the result with the laboratory moisture-density curves for the material being placed. This verification process is commonly referred to as a “one-point Proctor”.

If the material does not conform to the existing moisture-density curves, the Engineer will establish the laboratory maximum density and optimum moisture content for the material in accordance with [ASTM D 698 for aircraft gross weights less than 60,000 pounds] [ASTM D 1557 for aircraft gross weights 60,000 pounds or more].

Additional verification tests will be made, if necessary, to properly classify all materials placed in the lot.

The percent compaction of each sampling location will be determined by dividing the field density of each subplot by the laboratory maximum density for the lot.

END OF SECTION 120

CITY OF DULUTH - PART II -
SUPPLEMENTARY GENERAL CONDITIONS FOR FEDERALLY AND/OR CITY ASSISTED ACTIVITIES
(revised 9/2/09)

The following conditions take precedence over any conflicting conditions in this Contract.

<u>Section</u>	<u>Title</u>
1	Restrictions on Disbursements, Subcontractors Federal Agency Requirements, Separability, Property
2	Miscellaneous Provisions
3	Definitions
4	Environmental Provisions
5	Contract Compliance
6	Records, Reports and Information, Audits and Inspections
7	Conflict of Interest and Lobbying
8	Labor Standards - Physical Improvement Projects
9	Minnesota Department of Transportation Specification 1960 Partial Payments
10	Housing and Urban Development (HUD) Section 4010
11	Equal Opportunity and Affirmative Action
12	Employment Opportunities - "HUD Section 3"
13	Federal Requirements for Minority/Women Business Enterprises Contract Guidance - MPFA
14	Forms

Section I

Restrictions on Disbursements

No money under this Contract shall be disbursed by the City to any Contractor except pursuant to a written contract which incorporates the applicable PART II, Supplementary General Conditions for Federally and/or City Assisted Activities, and unless the Contractor is in compliance with the Federal Agency requirements with regard to accounting and fiscal matters to the extent they are applicable.

Subcontractors

(A) The Contractor shall include in any subcontract the clauses set forth in the PART II, Supplementary General Conditions for Federally and/or City Assisted Activities in their entirety and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

(B) The Contractor shall not subcontract any part of the work covered by this Contract or permit subcontracted work to be further subcontracted without the City's prior written approval of the subcontractors. The City will not approve any subcontractor for work covered by this Contract who is at the time ineligible under the provisions of any applicable regulations issued by a Federal Agency or the Secretary of Labor, United States Department of Labor, to receive an award of such subcontract.

Federal Agency Requirements

Unearned payments under this Contract may be suspended or terminated upon refusal to accept any additional conditions that may be imposed by the Federal Agency at any time; or if the grant, if applicable, to the City under which this Contract is made is suspended or terminated.

Separability

If any provisions of this Contract is held invalid, the remainder of this Contract shall not be affected thereby if such remainder would then continue to conform to the terms and requirements of applicable law.

Property

Acquisition, use, and disposal of all property, materials and goods acquired as a result of activities made possible by this Contract shall be accomplished in accordance with the applicable provisions of Federal Management Circular (FMC)-74-7, as amended.

Section 2

Miscellaneous Provisions

(A) **Copyrights.** In the event this Contract results in a book or other copyrightable material, the author is free to copyright the work, but Federal Agency and the City reserve a royalty-free, nonexclusive, and irrevocable license to reproduce, publish or otherwise use, all copyrighted material and all material which can be copyrighted.

(B) **Patents.** Any discovery or invention arising out of or developed in the course of work aided by this Contract shall be promptly and fully reported to the Federal Agency and the City for determination by the Federal Agency as to whether patent protection on such invention or discovery shall be sought and how the rights in the invention or discovery, including rights under any patent issued thereon, shall be disposed of and administered in order to protect the public interests.

(C) **Political Activity Prohibited.** None of the funds, materials, property or services provided directly or indirectly under this Contract shall be used in the performance of this Contract on any partisan political activity, or to further the election or defeat of any candidate for public office.

(D) **Lobbying Prohibited.** None of the funds under this Contract shall be used for publicity or propaganda purposes designed to support or defeat legislation pending before the Congress or the City.

(E) **Prohibition of and Elimination of Lead-Based Paint Hazard.** Notwithstanding any other provision, the Agency and Contractor agree to comply with the regulation issued by the Secretary of Housing and Urban Development set forth in 37 F. R. 22732-3 and all applicable rules and orders issued thereunder which prohibit the use of lead-based paint in residential structures undergoing Federally assisted construction or rehabilitation and require the elimination of lead-based paint hazards. Every contract or subcontract, including paint, pursuant to which such Federally assisted construction or rehabilitation is performed shall include appropriate provisions prohibiting the use of lead-based paint.

(F) **Architectural Barriers Act.** The design for and construction of any facility funded in whole or in part by this Contract shall be in conformance with the American Standard Specification for Making Buildings and Facilities Accessible and Usable by the Physically Handicapped, Number A-117.1-1971, as modified.

(G) **Relocation and Acquisition.** Any relocation or acquisition resulting from activities funded in whole or in part by this Contract shall be in conformance with the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (40 U.S.C. 4601) and the implementing regulations 24CFR Part 42.

(H) **Prohibition Against Payments of Bonus or Commission.** The assistance provided under this Contract shall not be used in the payment of any bonus or commission for the purpose of obtaining Federal Agency approval for such assistance, or Federal Agency approval of applications for additional assistance, or any other approval or concurrence of a Federal Agency required under this Contract, Federal Law or Federal Regulations thereto; provided, however, that reasonable fees or bonafide technical, consultant, managerial or other such services, other than actual solicitation, are not hereby prohibited if otherwise eligible as project costs.

(I) **Hatch Act.** Where applicable, the Contractor will comply with the provisions of the Hatch Act which limits the political activity of the Contractor's employees.

Section 3

Definitions

(A) City means the City of Duluth, Contracting Officer, or other persons authorized to act on behalf of the City of Duluth.

(B) Contracting Officer is the delegated representative of the City who has the responsibility for administering the Project.

(C) Contractor means an entity, whether public or private, which furnishes (other than standard commercial supplies, office space or printing services) to the City, products, services or supplies as described in this project Contract.

(D) Federal Agency means the United States, the District of Columbia, and any executive department, independent establishment, administrative agency, or instrumentality of the United States or of the District of Columbia, including any corporation, all or substantially all of the stock of which is beneficially owned by the United States, by the District of Columbia, or by any of the foregoing departments, establishments, agencies, and instrumentalities. The term Federal Agency shall also include the person or persons authorized to act on behalf of said Federal Agency.

(E) Project means the activities to be undertaken by the Contractor as described in this Contract, which from time to time may be amended by mutual consent of the City and Contractor.

(F) Subcontractor means an entity, regardless of tier, which has entered into an agreement with the Contractor or another Subcontractor, to undertake certain Project activities as described in that agreement.

(G) The term labor standards, as used in the Contract, means the requirements of the Davis-Bacon Act, the Contract Work Hours and Safety Standards Act (other than those relating to safety and health), the Copeland Act, and the prevailing wage provisions of the other statutes listed in 20 CFR 5.1.

(H) Work means all labor necessary to produce the construction required by the Contract Documents, all materials and equipment incorporated or to be incorporated in such construction, products, services, or supplies required by the Contract Documents, or any other requirements set forth in the Contract.

(I) Additional Definitions, that are applicable to the Labor Standards provisions - Section 8 - of this Contract can be found in 29CFR5.2 as published by the U.S. Department of Labor and said definitions are hereby incorporated by reference into the provisions of this Contract.

Section 4

Environmental Provisions

(A) The Contractor agrees to follow the regulations, requirements, policies, goals and procedures set forth by the Council on Environmental Quality (CEQ) under provisions of the National Environmental Policy Act (NEPA) (Pub. L. 91-190, 42 U.S.C. 4321 et seq.), Executive Order 11514, and 40 CFR Part 1500.

(B) **Historic Properties.** The Contractor agrees to follow the regulations, requirements, policies, goals, and procedures set forth under provisions of the National Historic Preservation Act of 1966 (Pub. L. 89-665); Preservation of Historic and Archeological Data Act of 1974 (Pub. L. 93-291); Executive Order 11593; 36 CFR, Part 800 and applicable State legislation or regulations.

(C) **Coastal Zones and Wetlands.** The Contractor agrees to follow the regulations, requirements, policies, goals and procedures set forth under provisions of the Coastal Zone Management Act of 1972 (Pub. L. 92-583) and applicable State legislation or regulations.

(D) **Noise.** The Contractor agrees to comply with provisions set forth in the U.S. Department of Housing and Urban Development Handbook 1390.2, Noise Abatement and Control, Department Policy, Responsibility and Standards, 1971.

(E) **Flood Plain.** The Contractor agrees to comply with the provisions set forth in the Flood Disaster Protection Act of 1973 (Pub. L. 93-234) and implementing regulations; Title 24, Chapter X, Subchapter B, National Flood Insurance Program, Executive Order 11296, and Executive Order 11988 relating to the evaluation of flood hazards.

(F) **Air Quality.** The Contractor agrees to comply with provisions set forth in the Clean Air Act (Pub. L. 90-148) and Clean Air Act Amendments of 1970 (Pub. L. 91-604); and applicable U.S. Environmental Protection Agency implementing regulations.

(G) **Water Quality.** The Contractor agrees to comply with the provisions set forth in the Federal Water Pollution Control Act (Pub. L. 92-500) and applicable U.S. Environmental Protection Agency implementing regulations, and Executive Order 11288 relating to the prevention, control, and abatement of water pollution.

(H) **Wildlife.** The Contractor agrees to comply with the provisions of the Fish and Wildlife Coordination Act (Pub. L. 85-264).

Section 5

Contract Compliance

(A) In the event of the Contractor's noncompliance with the provisions of this Contract or with any of the said regulations, the City may withhold payment(s) until evidence of compliance by the Contractor has been demonstrated, or the Contract may be canceled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further City contracts.

(B) In the event the Contract is terminated or canceled as a result of noncompliance with any of the provisions of this Contract, the City may subject to bids the remainder of the Project for which this Contract was made. The City shall have the right upon termination or suspension to withhold all further payments under this Contract to the Contractor. Upon the award of a new contract for the remainder of the Project, the City shall pay to the Contractor an amount no more than the balance remaining due to the Contractor less the sum of the costs incurred by the City which are necessary in preparing the new bid specifications. In the event the amount paid the Contractor prior to the date of termination or cancellation exceeds the full amount of this Contract less the cost of the new contract and the additional costs mentioned above, the Contractor agrees to reimburse the City for such excess amount within ninety days after the new contract is awarded by the above procedures.

(C) Provisions contained in subparagraph (A) and (B) above shall not be interpreted as precluding any authorized Federal, State, or County governmental unit from exercising their legal administrative or other responsibilities in respect to the enforcement by said governmental units of laws or regulations concerning activities of the Contractor.

Section 6

Records

(A) **Establishment and Maintenance of Records.** Records shall be maintained in accordance with requirements prescribed by the Federal Agency or the City with respect to all matters covered by this Contract. Except as otherwise authorized by the Federal Agency, such records shall be maintained for a period of three years after receipt of final payment under this Contract.

(B) **Documentation of Costs.** All costs shall be supported by properly executed payrolls, time records, invoices, contracts, or vouchers, or other official documentation evidencing in proper detail the nature and propriety of the charges. All checks, payrolls, invoices, contracts, vouchers, orders, or other accounting documents pertaining in whole or in part to this Contract shall be clearly identified and readily accessible.

Reports and Information

At such times and in such forms as the Federal Agency or the City may require, there shall be furnished to the Federal Agency or the City such statements, records, data and information as the Federal Agency or the City may request pertaining to matters covered by this Contract.

Audits and Inspection

At any time during normal business hours and as often as the City, the Federal Agency and/or the Comptroller General of the United States may deem necessary, there shall be made available to the City, the Federal Agency and/or representatives of the Comptroller General for examination of all its records with respect to all matters covered by this Contract and will permit the City, the Federal Agency and/or representative of the Comptroller General to audit, examine and make excerpts or transcripts from such records, and to make audits of all contracts, invoices, materials, payrolls, records of personnel, conditions of employment, and other data relating to all matters covered by this Contract.

Section 7

Conflict of Interest and Lobbying

(A) **Interest of Members, Officers, or Employees of the City, Members of Local Governing Body, or Other Public Officials.** No member, officer, or employee of the City, or its designees or agents, or member of the governing body of the City, during his/her tenure of for one year thereafter, shall have any interest, direct or indirect in any contract or subcontract, or the proceeds thereof, for work to be performed in connection with the Project assisted under this Contract. Any contract in which any of the above indicated individuals becomes directly or indirectly, interested, personally or as a member of a firm, or as an officer, director, or stockholder of a corporation, shall be and become absolutely void; and any money which shall have been paid on such contract by the City may be recovered back from any or all persons interested therein, by a joint action or several actions.

(B) The Contractor agrees that he will incorporate into every contract required to be in writing the following provisions: **Interest of Contractors and Employees** - The Contractor covenants that he presently has no interest and shall not acquire any interest, direct or indirect, in the Project which would conflict in any manner or degree with the performance of this Contract, and no person having any conflicting interest shall be employed. Any interest on the part of the Contractor or his employees must be disclosed to the Federal Agency and the City. Provided, however, that this paragraph shall be interpreted in such a manner so as not to unreasonably impede any statutory requirements that opportunity be provided for employment of and participation by certain residents of a designated geographical area, if applicable.

(C) **Interest of Member or of Delegate to Congress.** No member of or Delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this Contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

(D) The Contractor by signing this document certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the Contractor, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the Contractor shall complete and submit Standard Form -LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

The above certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1332, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

(E) The parties to this Contract certify and agree that they are under no contractual or other disability which would prevent them from complying with the terms of this Contract.

Section 8

Labor Standards - Physical Improvement Projects

Where applicable, there shall be included in all construction, rehabilitation, alteration or repair contracts with private entities made possible by or resulting from this Contract, the following Labor Standards provisions;

(A) General Requirements.

(1) **Subcontracts.** The Contractor shall include in any subcontract the clauses set forth in Section 8, **Labor Standards**, in their entirety and also a clause requiring the subcontractors to include these clauses in any Tower tier subcontract which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

(2) The transporting of materials and supplies to or from the site of the Project or Program to which this Contract pertains by the Employees of the Contractor or of any subcontractor, and the manufacturing or furnishing of materials, articles, supplies, or equipment on the site of the Project or Program to which this Contract pertains by persons employed by the Contractor or by any subcontractor, shall for the purpose of this Contract, and without limiting the generality of the foregoing provisions of this Contract, be deemed to be work to which these **Labor Standards** provisions are applicable.

(3) No person under the age of eighteen years shall be employed on work covered by this Contract.

(4) In connection with the performance of work under this Contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment except as provided by Public Law 89-176, September 10, 1955 (18 U.S.C. 4082 (c) (2)) and Executive Order 11755, December 29, 1973.

(5) The Contractor will permit authorized representatives of the Federal Agency and the City to interview employees during working hours on the job.

(6) No employee to whom the wage, salary, or other **Labor Standards** provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the Labor Standards applicable under this Contract to his employer.

(B) **Safety Standards.** No Contractor or subcontractor contracting for any part of a construction contract shall require any laborer or mechanic, including apprentices and trainees, employed in the performance of the Contract to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous to his health or safety, as determined under construction safety and health standards promulgated by the Secretary of Labor. The Contractor or subcontractor comply with all the rules, regulations, and relevant orders, promulgated by the Secretary of Labor pursuant to Public Law 91-54.

(C) **Davis-Bacon Act - 29 CFR 5.5**

Refer to Section 10, Page 9

Housing and Urban Development (HUD) form-4010 (06/2009) Ref Handbook 1344.1

City of Duluth "Mini Davis-Bacon"

(D) **City of Duluth - Minimum Wage Ordinance 8940, as Amended.**

(1) On a project (as defined below) funded in whole or in part by federal and/or state funds, these local provisions shall prevail in those instances where the requirements of the local provisions are equal to or greater than similar minimum labor standards provisions as set forth in applicable federal and/or state laws and regulations.

(2) In all contracts in excess of \$2,000 for projects (as defined below), the Contractor's particular attention is called to Ordinance 8940, effective June 8, 1989, respectively coded as Article IV of Chapter 2 of the Duluth City Code, and entitled "An Ordinance Pertaining to Wages and Working Hours of Persons on Public Works in the City of Duluth", as set forth below:

(3) **Definitions.**

For the purposes of this section the following words and phrases shall have the meanings respectively ascribed to them in this section:

(a) **Basic hourly rate.** - The hourly wage paid to any employee.

(b) **Prevailing wage rate.** - The basic hourly rate plus fringe benefits prevailing in the city of Duluth as determined by the United States secretary of labor pursuant to the Davis-Bacon act, as amended; provided that whenever employer and employee organizations employing and representing a majority of a class of workers in a particular industry within the city jointly certify that the prevailing basic hourly rate plus fringe benefits of such workers differs from the amount determined by the secretary of labor, the certified rate shall be considered to be the prevailing wage rate for such class of workers in that industry.

(c) **Fringe benefits.** - Employer contribution for health and welfare benefits, vacation benefits, pension benefits, and all other economic benefits other than the basic hourly rate.

(d) **Apprentice** - An employee who is working under a training program which is approved either by the U.S. Department of Labor Bureau of Apprenticeship & Training or the Minnesota Director of Voluntary Apprenticeship; see apprentice ratios on page 22 and HUD 4010 in Section 10..

(e) **Trainee** - An employee registered with the U. S. Department of Labor Employment & Training Administration; see HUD 4010 in Section 10.

(f) **Project.** - Erection, construction, demolition, painting, remodeling or repairing of any public building, highway, sidewalk, bridge, water or gas line, sewer and sewage treatment facility or other public work performed under contract with the city.

(g) **Labor mechanic.** - All persons utilized, employed or working on a project who are doing work usually done by mechanics and laborers, including proprietors, partners, and members of cooperatives.

(4) **Wage Rates and Hours for City of Duluth Projects.**

(a) Any contract which provides for a project of estimated total cost of over \$2,000.00 shall contain a stipulation that no laborer, mechanic or apprentice-trainee employed directly upon the project work site by the contractor or any subcontractor shall be permitted or required to work at a rate of pay less than the prevailing wage rate; nor shall any such employee be permitted or required to work more than 8 hours in any work day or 40 hours in any work week unless he is paid at a rate of at least 1½ times the basic hourly rate for all hours in excess of 8 per day OR 40 per week and unless he receives fringe benefits that are at least equal to those in the prevailing wage rate; provided that whenever employer and employee organizations employing and representing a majority of a class of workers in a particular industry within the city jointly certify that the maximum number of hours that such persons may work under existing labor agreements before overtime wages must be paid differs from the hours specified in this paragraph, the maximum number of hours specified in such labor agreements shall be substituted for those specified above in applying the provisions of this paragraph to such workers.

(b) The word "or" in the state statute and the City of Duluth Code refers to the number of hours worked in any one week or, in the alternative, the number of hours worked in any one day in the week (the days in one week being totaled for reporting purposes); the law requires use of the alternative which results in the higher number of overtime hours for each employee whose time is being reported.

EXCEPTIONS: Federal government funding only and HUD (Housing and Urban Development) funding - see point "e"

In summary, if a project is solely funded with City of Duluth monies, the City allows the employees to work four ten-hour days and be paid at the regular hourly rate for those ten hours; exceeding hours must be paid at the overtime rate. An employer may not withhold overtime payment exclusively until 40 hours per week have been worked. Daily overtime must be paid as it is earned.

• The base workweek hours must be clearly indicated on each payroll. Employees may be assigned a different workweek; however, that must be clearly marked beside the employees' names.

The following are examples of how these rules apply to different situations.

TT refers to the total time worked on the day or in the week

RT refers to the hours worked at the regular rate of pay (straight time)

OT refers to the hours worked for which overtime must be paid

State Funded with or without federal funding Projects								City-only Funded Projects (4 ten-hour days)						
	Mon	Tues	Wed	Thurs	Fri	Sat	Total	Mon	Tues	Wed	Thurs	Fri	Sat	Total
TT	10	10	10	10	0	6	46	10	10	10	10	0	6	46
RT	8	8	8	8	0	6	38	10	10	10	10	0	0	40
OT	2	2	2	2	0	0	8	0	0	0	0	0	6	6

State Funded with or without federal funding Projects								City-only Funded Projects (4 ten-hour days)						
	Mon	Tues	Wed	Thurs	Fri	Sat	Total	Mon	Tues	Wed	Thurs	Fri	Sat	Total
TT	0	10	10	0	7	0	27	10	0	12	0	0	0	32
RT	0	8	8	0	7	0	23	10	0	10	10	0	0	30
OT	0	2	2	0	0	0	4	0	0	2	0	0	0	2

(c) Overtime Calculations

Minnesota Statutes Chapter 177.42, subd 4 specifies that the prevailing hours of labor may not be more than eight hours per day or more than 40 hours per week (as stated above in (b), the City of Duluth does allow for ten hours per day/40 hours per week with City funding *only*).

Minnesota Statutes Chapter 177.42, subd 5 defines the hourly basic rate as the hourly wage paid to any employee. (subd 6): The prevailing wage rate means the hourly basic rate of pay plus the contribution for health and welfare benefits, vacation benefits, pension benefits, and any other economic benefit paid to the largest number of workers engaged in the same class of labor within the area...

Minnesota Statutes Chapter 177.43, subd 1 (1) ...employees are permitted to work more hours than the prevailing hours of labor [being] paid for all hours in excess of the prevailing hours at a rate of at least 1-½ times the hourly basic rate of pay. (2) A laborer or mechanic may not be paid a lesser rate of wages than the prevailing wage rate in the same or most similar trade or occupation in the area.

An employer may pay a lower hourly rate and higher fringe benefit rate--to a bona fide plan--than stated in the wage decision providing the total of the two rates is equal to or greater than the total in the wage decision.

Overtime Calculation with Fringe Benefits Paid to Bona Fide Plans

For overtime purposes, an employer paying higher fringe benefits to a bona fide plan and paying a lower hourly rate **MUST** calculate the overtime on the higher hourly rate as stated in the contract's wage decision.

Overtime Calculation with Cash Payment of Fringe Benefits

When the fringe benefit is paid directly to an employee, the prevailing base rate and the fringe benefit rate for a specific classification are totaled to arrive at the hourly rate. *Overtime is calculated (1.5 x) the base rate with the fringe benefit amount added to that rate: base rate x 1.5 + fringe benefit rate = overtime rate.*

(d) A contractor shall not reduce a worker's private, regular rate of pay when the wage rate certified by the U. S. Department of Labor or the Minnesota Department of Labor & Industry is less than the worker's normal hourly wage [Minnesota Statute 181.03 subdivision 1(2)].

(e) Regular Time & Overtime Definitions

- **State of Minnesota** funded projects with or without federal funding *only allow for five eight-hour days per week at regular time*. Overtime is calculated at a rate not less than time and one-half (1.5) of the prevailing base rate as stated in the wage decision--OR the base rate the employee is being paid if it is higher than the required base rate--plus the straight time fringe benefit amount.
- **City of Duluth** funded projects do permit four ten-hour work days at regular time--see point 4-a, b for stipulations. Overtime is calculated at a rate not less than time and one-half (1.5) of the prevailing base rate as stated in the wage decision--OR the base rate the employee is being paid if it is higher than the required base rate--plus the straight time fringe benefit amount.
- **Federal** funded only projects allow overtime pay for hours worked in excess of 40 in a workweek at a rate not less than time and one-half (1.5) of the prevailing base rate as stated in the wage decision--OR the base rate the employee is being paid if it is higher than the required base rate--plus the straight time fringe benefit amount.
- **HUD** funded projects allow overtime pay for hours worked in excess of 40 in a workweek at a rate not less than time and one-half (1.5) of the prevailing base rate as stated in the wage decision--OR the base rate the employee is being paid if it is higher than the required base rate--plus the straight time fringe benefit amount.

(f) The minimum hourly prevailing wages are contained in each project specification. When both federal (general decision rates from the U. S. Department of Labor) and State of Minnesota prevailing wages for state funded construction projects from the Minnesota Department of Labor and Industry are used, the prime contractor and all subcontractors including trucking operations, are required to pay the higher of the two wages for all laborers and mechanics [MnDOT Contract Administration Manual, Section 5-591.320].

(g) The prime contractor and any lower-tier subcontractor shall review all wage decisions and compensate a worker according to the type of work performed and at the rate that is the greatest.

(h) State of Minnesota prevailing wages typically list two rates for each classification with two effective dates. Should any City of Duluth contract continue to and past the second effective date, that rate and fringe benefit will be in effect through the remainder of the project.

(i) All contracts for city projects shall have applicable schedules of prevailing wage rates set forth in the contract. Schedules of applicable prevailing wage rates shall be present on all project job sites and shall either be posted on the site or be on the person of any supervisor in charge of the job site.

(j) Employees on projects shall be paid at least weekly. Fringe benefits shall be paid either in cash or to an employee benefit plan that has been approved by the U.S. Department of Labor.

■ **The fringe benefit package is an integral portion of the prevailing wage. Should the prime contractor become delinquent with any fringe benefit plan administrator's requirements for monthly payment, an estimated amount due that plan plus penalties will be withheld from the monthly estimate(s). This also pertains to subcontractors; their fringe plan payment delinquency will affect the monthly estimate(s) in the same manner. See MnDOT Specification 1906 on page eight.**

See Statement of Compliance and Certified Payroll Report requirements in Section 10, HUD 4010 and web sites in Section 14, Forms.

(k) Any contractor or subcontractor working on a project shall furnish the City with **original** certified payroll reports with **original signatures** relating to the project. Such certified payroll reports shall be **submitted weekly** on U.S. Department of Labor standard forms (WH-347) or their equivalent--using the same

format--to the City of Duluth Labor Standards representative. All City of Duluth funded projects must have the base workweek hours indicated on the certified payroll form and/or beside each employee's name (should some employees be working different base workweeks).

(l) No contractor or subcontractor working on a project shall evade or attempt to evade the provisions of this section through the use of non-recognized training programs. The only employees involved in training programs that shall be allowed to work on projects covered by this section shall be apprentice-trainees as defined by this article.

(m) Any person violating the provisions of this section shall be guilty of a misdemeanor with each day of violation constituting a separate offense. In addition, if the prevailing wage rate and accompanying fringe benefit rate is not paid to employees working on a project, the City of Duluth may withhold contract payments to the prime contractor until such deficiencies are corrected. Should fringe benefits be paid to authorized Plans, the payments must be made within the demands of those Plans. Delinquencies may result in withholding of project funds to the prime contractor.

(n) This section shall not apply to contracts for projects where the total cost of the project is less than \$2,000.00; nor to materialmen who do no more than deliver materials to the work site, except that this section shall apply to employees who deliver asphalt, concrete or mineral aggregate such as sand, gravel or stone where such material is incorporated into the project by depositing the material substantially in place, either directly or through spreaders, from the transporting vehicle.

(5) **Helpers**

A helper may perform work *only* if the helper classification is specified and defined in the federal wage decision and/or State of Minnesota wage decision incorporated into the project contract. Without such a helper classification, the contractor must assign a job classification that is the "same or most similar" [Minnesota Statute 177.44, subdivision 1] and compensate the helper for the actual work performed regardless of the helper's skill level.

(5) **Apprentice Ratios**

Journeyworkers must be on site with the apprentices and their hours must match.

FUNDING SOURCE:

City of Duluth and State of Minnesota with or without Federal funding

(i) Apprentices are not permitted to work alone under any circumstances.

(ii) Working foremen are acceptable as a journeyworker PROVIDING he/she is in the same classification.

» Example: carpenter foreman and carpenter apprentice

- Ratios are determined by the trade's labor agreement.
- In the absence of ratio language, the following State of Minnesota apprenticeship ratios will be applied:
(apprentice:journeyworker) 1:1 2:4 3:7 4:10, etc.
- Employees working in excess of the allowable ratio must be paid the full journeyworker compensation.
- Out-of-ratio apprentices will be calculated beginning with the apprentice at the highest level of training and, then, to less senior apprentices in their rank order.
- Should two or more out-of-ratio apprentices have the same level of training, whomever was on the work site first will receive journeyworker pay; if the apprentices at the same level of training began work on the project site at the same time, hours worked out-of-ratio for which restitution is due will be divided among those apprentices.

Examples:

Four apprentices working unsupervised are on site. [4:0]
Ratio calls for four apprentices and ten journeyworkers [4:10]

Correction: all apprentices will receive the full journeyworker compensation as apprentices are not permitted to work alone.

Three apprentices and two journeyworkers are on site. [3:2]
Ratio calls for three apprentices and seven journeyworkers [3:7]

Two journeyworkers may accompany only one apprentice; therefore, the two highest level apprentices are paid the full journeyworker compensation. Even though this particular job has three apprentices--the second journeyworker is a mute point; a third journeyworker would also be a mute point in this example.

Correction: the two highest level apprentices are paid the full journeyworker compensation and the third lower level apprentice is considered in ratio.

H U D (CDBG) and Federal funding only

- Apprentices are not permitted to work alone unless the U. S. Department of Labor-approved agreement allows that practice.
- Working foremen are acceptable as a journeyworker PROVIDING he/she is in the same classification.
» Example: electrician foreman and electrician apprentice
- Ratios are determined by the trade's U. S. Department of Labor-approved agreement.
- In the event of the absence of ratio language in the applicable agreement, the Minnesota Department of Labor ratio of one apprentice for the first journeyworker and one apprentice for each three journeyworkers thereafter will be applied, (i.e., 1:1, 2:4, 3:7, 4:10, etc.).
- The legal apprentices are those who first came to work on the job site; in the event that all apprentices begin work on the project site at the same time, hours worked out-of-ratio for which restitution is due will be divided among the apprentices.
- Time cards will be required to substantiate the start times.
- Employees working in excess of the allowable ratio--or for which U. S. Department of Labor-apprentice agreement/certificate is not provided--must be paid the full journeyworker compensation.

Examples:

Four apprentices and one journeyworker are on site. [4:1]
Ratio calls for four apprentices and ten journeyworkers. [4:10]

The first apprentice on site is considered in ratio as one journeyworker may only accompany one apprentice [1:1]; this particular job has four apprentices.

Correction: the second through the fourth apprentices coming on site are paid the full journeyworker compensation.

Six apprentices and two journeyworkers are on site [6:2]
Ratio calls for six apprentices and sixteen journeyworkers [6:16]

The first apprentice on site is considered in ratio as two journeyworkers may only accompany one apprentice; this particular job has six apprentices--the second journeyworker is a mute point.

Correction: the second through sixth apprentices coming on site are paid the full journeyworker compensation.

(6) **Poster Boards**

The prime contractor must construct and display a poster board, which contains all required posters, is legible and is accessible to all workers from the first day of work until the project is 100% complete. Prime contractors are not allowed to place a poster board at an off-site facility location.

(7) **Trucking Issues**

a) For the purpose of sections seven and eight, the term "owner" includes all persons having an ownership interest in the trucking entity or a partnership interest in the trucking entity and has a legal and rightful title to the vehicle(s) or has an approved lease on the vehicle(s). "Operate" means the owner either physically drives the vehicle or hires another to physically drive the vehicle, yet maintains the right to direct the day-to-day operations of the vehicle.

b) **Trucking Operations Definitions:**

Independent Trucking Operator: an individual or partnership who owns or holds a vehicle under lease and who contracts that vehicle and the owner's services to an entity which provides construction services to a public works project. The individual owns or leases and drives the equipment, is responsible for the maintenance of the equipment, bears all operating costs, determines the details and means of performing the services, and enters into a legally binding agreement that specifies the relationship to be that of an independent contractor and not that of an employee.

Multiple Truck Operations: any legal business entity that owns more than one vehicle and hires the vehicles out for services to brokers or contractors on public works projects. The owners of a trucking firm may either drive the vehicles or hire employees to drive the vehicles. Employee drivers are subject to the appropriate prevailing wage rate. The owner driving a vehicle is obligated to account for the value of his/her services as a driver at the appropriate prevailing wage.

Partnerships: a legal business entity where two or more individuals hold vehicles under lease and contract those vehicles and their services to an entity which provides construction services to a public works project. The partners own or lease the equipment, are responsible for maintenance and all operating costs, drive the equipment, determine the details and means of performing the services, and enter a legally binding agreement that specifies the relationship to be that of a partner and not that of an employee. All partners are subject to the appropriate prevailing wage.

Corporation: any legal business entity that owns or leases vehicles to provide construction services to public works projects. All individuals are employees of the corporation and subject to the appropriate prevailing wage regardless of title or position.

Broker: an individual or firm who (activities include, but are not limited to):

- contracts to provide trucking services [equipment and driver] in the construction industry to users of such services, such as prime contractors and various subcontractors of the prime;
- contracts to obtain services from other trucking operations and dispatches them to various assignments;
- receives payment from the users (such as prime contractors and various subcontractors) in consideration for the trucking services provided; and
- makes payment to the providers (trucking operations so contracted with) for their services.

(8) **Specific documentation from trucking operations.**

Independent Trucking Operators

The owner/operator of a truck must submit a copy of his/her commercial driver's license (CDL), cab card, and insurance certificate for each truck the owner/operator drives on each construction project *before commencing work on that project*. These documents must be sent to the prime contractor who will then forward the material to Labor Standards, Engineering Division at the City of Duluth.

Multiple Truck Operators

Weekly certified payrolls and payment of corresponding prevailing wages plus the fringe benefit package will be required for each project where trucks are operating. This covers the owner plus all employees performing work on the project.

Partnerships

Weekly certified payrolls and payment of corresponding prevailing wages plus fringe benefit packages will be required for each project where trucks are operating. This covers all partners of the organization who perform work on the project.

Each partner performing work on a project must submit a copy of his/her commercial driver's license (CDL), cab card, and insurance certificate for the truck being operated with that weekly certified payroll. It is not necessary to repeat such supporting documentation until a different truck is used and/or certificates or licenses have expired.

Employees of the partnership are always reported on a weekly certified payroll and paid the appropriate prevailing wage plus fringe benefit package for the work being performed.

Corporations

All persons employed by the corporation are subject to receive payment of the prevailing wage plus the fringe benefit package for the work performed on a project regardless of title or position. Weekly certified payrolls must be submitted for all work performed on the project.

Brokers

Truck ownership and a **bonafide contract** between the broker and another trucking operation, a prime contractor, or a subcontractor must be identified. Paperwork must be submitted with the month end trucking report to the City of Duluth Labor Standards representative - Engineering. Certified payrolls are not required when the above documentation is provided and approved.

(10) **Month End Trucking Report - ONLY REQUIRED WITH STATE OF MINNESOTA FUNDING**

The Minnesota Department of Transportation Month End Trucking Report (Mn/DOT TP-90550 7-05) and Minnesota Department of Transportation Month End Trucking Report Statement of Compliance (Mn/DOT TP-90551 7-05) are *only required on state funded projects*.

A guide for completing the forms including definitions and the reports, themselves, may be downloaded from:

www.dot.state.mn.us/const/labor/truckinginfo.html

Payment to the prime contractor may be withheld until documentation is received and approved.

(11) **Truck Rental Rates - ONLY REQUIRED WITH STATE OF MINNESOTA FUNDING**

Truck rental rates are listed in the prevailing wage section of the project specifications.

(12) **Minnesota Rules 5200.1105 and 5200.1106**

These rules are incorporated into this supplementary general conditions by reference and are found on these web sites:

www.revisor.leg.state.mn.us/rules/?id=5200

13) **Truck Axles**

Per Minnesota Rules 5200.1100 Master Job Classifications, a truck "unit" refers to all axles including the steering axle. A tag axle is also counted as one of the axles. Examples: four rear axles plus one steering axle = five axles total
one rear axle plus one steering axle = two axles total

(14) **Non-Compliance and Enforcement**

- a) The prime contractor shall be liable for any unpaid wages to its workers or those of its lower-tier subcontractors, trucking companies/Multiple Truck Owners (MTO's) and/or Independent Truck Owner/Operator (ITOs) [MnDOT Standard Specifications for Construction, Section 1801].
- b) See Section 9, MnDOT Specification 1906 Partial Payments.

(15) **IC-134 form - Withholding Affidavit for Contractors**

The IC-134 form will be required from all Multiple Truck Operators, Partnerships, and Corporations performing trucking services on a project before the retainage or all remaining funds can be released. Web site for completing form online: www.mndor.state.mn.us

The form, itself, is found at: www.taxes.state.mn.us/forms/ic134.pdf

(16) **Owners, Supervisors, Foremen listed on certified payrolls.**

All persons working on a City of Duluth project including owners, partners, supervisors, salaried persons, and working foremen who perform laborer and/or mechanic work shall be reported on the weekly certified payroll reports including all data required of any laborer or mechanic. (ordinance 8731, 6/24/85)

(17) **Supporting documentation.**

At his/her discretion, the City of Duluth Labor Standards representative may demand proof of payment of the prevailing wage which may include copies of a payroll register, itemized time sheet and matching cancelled check, or any other supporting documents as stipulated. Payment to the prime contractor may be withheld until documentation is received and approved.

(18) **Kickbacks from Public Works employees prohibited.**

No contractor working on a project or other person shall, by force intimidation, or threat of termination of employment, cause any employee working on a project to give up any part of the compensation to which he is entitled under his contract of employment.

Section 9

**Minnesota Department of Transportation Specification 1906 Partial Payments
Process For "Withholding Contract Monies" and "Default and Termination of a Contract" 11/5/04**

Mn/DOT Specification 1906 Partial Payments describes the Commissioner's authority to withhold funds to protect the Department's interests. In addition, Specification 1808 Default and Termination of a Contract describes the Commissioner's authority to take the prosecution of the work out of the hands of the Contractor.

Additionally, on projects funded in whole or part with federal funds and in accordance with the Required Contract Provisions Federal-Aid Construction Contracts Form – 1273, Section IV, Subpart 6, "Withholding", incorporated into federal aid contracts, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance or guarantee of funds until such violations have ceased.

However, the Department must give the Contractor, and it's Sureties due notice prior to exercising these authorities. The withholding of contract funds, in accordance with Specification 1906 or the Required Contract Provisions Federal-Aid Construction Contracts Form – 1273, Section IV, Subpart 6, "Withholding", should be implemented as soon as a possible prevailing wage violation is recognized. However, Default and Termination of a Contract, in accordance with Specification 1808, should only be exercised as a "last resort" if the Contractor is not willing to comply.

Definitions

(Mn/DOT Standard Specifications for Construction 2000 Edition, Section 1103)

Commissioner: The Commissioner of the Minnesota Department of Transportation, or the chief executive of the department or agency constituted for administration of Contract work with its jurisdiction.

Contractor: The individual, firm or corporation Contracting for and undertaking prosecution of the prescribed work; the party of the second part to the Contract, acting directly or through a duly authorized representative.

Department: The Department of Transportation or the State of Minnesota, or the political subdivision, governmental body, board, commission, office, department, division, or agency constituted for administration of the Contract work within its jurisdiction.

(Form 1273 - 29 CFR, Part 5.1, Definitions)

Contracting Officer: The individual, a duly appointed successor or authorized representative who is designated and authorized to enter into Contracts on behalf of the Federal Agency and/or the City of Duluth.

Important Considerations

1. Upon completion of the work under a contract, the department should consider issuing the final voucher as soon as possible. Failure to finalize a contract expeditiously could result in subsequent claims that would prevent the department from finalizing the contract. However, before the issuance of the final voucher, the department must be able to ensure that the terms of the contract have been satisfied. Failure on the part of the department to ensure compliance could result in the Mn/DOT state aid division retaining funds from the department in accordance with *Minnesota Rules 8820.3000, subpart 5*.
2. On every contract, the department should withhold the final retainage in accordance with the following guidelines: (1) if the total amount of the contract is \$1,000,000 or more, the department should retain funds not more than \$50,000, (2) if the total amount of the contract is less than \$1,000,000, the department should retain 5% of the total contract, (3) retainage should be withheld until the department can ensure that the contractor has met the terms of the contract or until the finalization of the contract.
3. This guide specifies that the department verbally notify the bonding company early in the process. Generally, as a "rule of thumb", notifying the bonding company is usually the "last resort". However, the justification for the early notification is related to the language found in *Minnesota statute 574.31, subdivision 2*, which summarizes that if an individual or the department does not submit a claim on the payment bond within 120 days after the completion of work under the contract, the claim can be denied.

The following are general guidelines that should be followed prior to placing a Contractor in default:

- Step 1: Upon verbal or written notification that a possible prevailing wage violation exists, the Department should give written notice to the Contractor regarding the nature of the claim, along with the Department's intent to withhold monies until the claim is investigated and determined to be in compliance. Additionally, the Department should inform the Contractor that the bonding company has been verbally notified of the claim. Please be aware, the Department should ensure employee confidentiality at all times.

- Step 2: Upon a preliminary determination surrounding the financial extent of the claim, the Department should consider retaining a "reasonable" portion of one or more partial estimates in accordance with Mn/DOT's 2000 Standard Specifications for Construction, Section 1906; or on federal aid contracts, in accordance with the Required Contract Provisions Federal-Aid Construction Contracts Form – 1273, Section IV, Subpart 6, "Withholding".
- Step 3: If it is determined that the claim is valid, the Department should schedule a meeting with the Contractor and attempt to resolve the matter. If the claim is determined to be invalid, the Department should release any partial estimates that may have been held as a result of the claim. However, the Department should continue to withhold the final retainage in accordance with the above-mentioned: Important Considerations, 2.
- Step 4: If resolution cannot be obtained through a meeting, the Department should order the Contractor, in writing, to complete their obligations under the contract. The letter should clearly state the circumstances under which the Department has deemed that the Contractor has not met the terms of the contract. Additionally, the Department should include a reasonable deadline for this obligation to be completed. A copy of this letter should be forwarded to the Surety, District State Aid Engineer (DSAE), Labor Compliance Unit and the Department's Attorney.
- Step 5: In the event that the Contractor does not respond to the Department's written order, the Department should send a similar letter, requesting that the Contractor respond immediately, in writing, regarding the Contractor's intention to comply or not comply with the order. A copy of this letter should be forwarded to the Surety, District State Aid Engineer (DSAE), Labor Compliance Unit and the Department's Attorney.
- Step 6: If the Department still does not get a proper response from the Contractor, the Department should write another letter, addressed to both the Contractor and the Surety, specifying all the facts of the alleged breach, demanding that the Contractor, or its Surety, respond satisfactorily within 10 days or the Department may exercise its authority to Default and Terminate the Contract in accordance within/DOT's 2000 Specifications for Construction, Section 1808. It's important to provide sufficient detail so that the Surety understands the situation. This notification should be sent by certified mail. A copy of this letter should be forwarded to the Surety, District State Aid Engineer (DSAE), Labor Compliance Unit and the Department's Attorney.
- Step 7: If the Contractor or Surety is unresponsive after 10 days, the Department should consult with their attorney to consider proceeding with Default and Termination of the Contract.
- Step 8: Upon termination of the contract, the Department provides a written order to the Surety, requiring the Surety to bring resolution to the prevailing wage violation.
- Step 9: The Department places the Contractor on a Non-Responsible Bidder's List and rejects any future awards.

Section 10

Federal Labor Standards Provisions U.S. Department of Housing and Urban Development Office of Labor Relations
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Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A. 1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part Previous editions are obsolete Page 2 of 5 form **HUD-4010** (06/2009) ref. Handbook 1344.1 of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract in the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section (b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section (b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract; but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

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(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

(i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training

Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to, and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by

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the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in sub paragraph (1) of this paragraph.

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(3) **Withholding for unpaid wages and liquidated damages.** HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety. The provisions of this paragraph C are applicable where the amount of the prime contract exceeds \$100,000.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.

(3) The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

Section 11

Equal Opportunity Laws and Regulations

(A) In addition to Contract specifications set forth below, the Contractor shall conduct and administer this Contract in compliance with:

- (1) Title VI of the Civil Rights Act of 1964 (Pub. L. 88-352) and implementing regulations issued at 24 CFR Part 1;
- (2) Title VIII of the Civil Rights Act of 1968 (Pub. L. 90-284), as amended, and implementing regulations;
- (3) Section 109 of the Housing and Community Development Act of 1974, as amended; and the regulations issued pursuant thereto (24 CFR Section 570.601);
- (4) Section 3 of the Housing and Urban Development Act of 1968, as amended, and implementing regulations of 24 CFR Part 135;
- (5) Executive Order 11246, as amended by Executive Order 11375 and 12086 and implementing regulations at 41 CFR Chapter 60;
- (6) Executive Order 11063, as amended by Executive Order 12259 and implementing regulations at 24 CFR Part 107;
- (7) Section 504 of the Rehabilitation Act of 1973 (Pub. L. 93-112), as amended, and implementing regulations when published for effect;
- (8) The Age Discrimination Act of 1975, as amended, (Pub. L. 94-135) and implementing regulations when published for effect;
- (9) The Minnesota Human Rights Act of 1974, as amended (Chapter 363).

Equal Opportunity and Affirmative Action

(A) Contractors and Subcontractors that have a work force in excess of fifty (50) employees and a contract in excess of \$50,000.00 shall prepare and maintain an appropriate affirmative action plan in accordance with the provisions of 41 CFR 60 "Compliance Responsibility for Equal Opportunity".

(B) **Non-segregated Facilities.** The Contractor shall certify that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The Contractor covenants that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. As used in this paragraph the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, creed, religion, national origin, ancestry, age, marital status, status with respect to public assistance, and/or disability because of habit, local custom, or otherwise.

General Provisions Against Discrimination

(A) In all hiring or employment made possible by or resulting from this Contract, there:

- (1) will not be any discrimination against any employee or applicant for employment because of race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability.
- (2) affirmative action will be taken to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability. This requirement shall apply to, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; lay-off or termination; rates of pay or other

forms of compensation; and selection for training, including apprenticeship. There shall be posted in conspicuous places available to employees and applicants for employment, notices setting forth the provisions of this clause. All solicitations or advertisements for employees shall state that all qualified applicants will receive consideration for employment without regard to race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability.

(B) No person in the United States shall, on the grounds of race, color, creed, religion, national origin, age, sex, marital status, status with respect to public assistance, and/or disability, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity made possible by or resulting from this Contract. The Contractor and each employer will comply with all requirements imposed by or pursuant to the regulations of the Federal Agency effectuating Title VI of the Civil Rights Act of 1966. The Contractor will note this requirement in all solicitations or advertisements for employees. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(C) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice advising the labor union or workers' representative of the Contractor's commitments under these provisions, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(D) The Contractor hereby agrees that he will incorporate into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR Chapter 60, which is paid for in whole or in part with funds obtained pursuant to this Contract, the equal opportunity clause which is a part of these Contract Documents.

(E) The Contractor further agrees that he will be bound by the equal opportunity clause and other provisions of 41 CFR Chapter 60, with respect to his own employment practices when he participates in federally assisted construction work: Provided: That of the Contractor so participating is a State or Local Government, the above equal opportunity clause is not applicable to any agency, instrumentality, or subdivision of such government which does not participate in work on or under the Contract. Also, the Contractor will make his files available to inspection by appropriate government agencies and shall furnish those reports as may be required by said agencies.

(F) The Contractor agrees that he will assist and cooperate actively with the Federal Agency and the Secretary of Labor in obtaining the compliance of subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that he will furnish the Federal Agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that he will otherwise assist the Federal Agency in the discharge of its primary responsibility for securing compliance.

(G) The Contractor further agrees that he will refrain from entering into any contract or any contract modification subject to Executive Order 11246 of September 24, 1965, with a subcontractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order. In addition, the Contractor agrees that if he fails or refuses to comply with these undertakings, the City or the Federal Agency may take any or all of the following actions: Terminate or suspend in whole or in part this Contract; refrain from extending any further assistance to the Contractor under the Project with respect to which the failure or refusal occurred until satisfactory assurance of future compliance has been received from such Contractor and refer the case to the Department of Justice for appropriate legal proceedings.

Affirmative Action - "Construction Contracts" over \$10,000

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

<u>Timetables</u>	<u>Goals for minority participation (percent)</u>	<u>Goals for female participation (percent)</u>
From April 1, 1980 until revised	3.0	6.9

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3 (a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the City and to the Director of the Office of Federal Contract Compliance Programs; U.S. Department of Labor, ESA/OFCCP, 16th Floor, 230 South Dearborn Street, Chicago, Illinois, 60604, within 10 working days of award of any construction subcontract and/or subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the contractor and/or subcontractor; employer identification number; estimated dollar amount of the prime contract; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the Contract, the "covered area" is all work under a contract currently held with the City of Duluth, Minnesota.

Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)

1. As used in these specifications:

- a) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor; or any person to whom the Director delegates authority;
- b) "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
- c) "Minority" includes:
 - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

- (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
- (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

- a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

- b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

- c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

- d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

- e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notices of these programs to the sources compiled under 7b above.

- f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

- h. Disseminate the Contractor's EEO policy externally by including it any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

- i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitments and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

- l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

- m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

- n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of officers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, creed, religion, national origin, sex, ancestry, age, marital status, status with respect to public assistance and/or disability.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

Affirmative Action for Handicapped Workers

(applies to contracts in excess of \$2,500)

(A) The Contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant is qualified. The Contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as the following: Employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

(B) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

(C) In the event of the Contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.

(D) The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, provided by or through the contracting officer. Such notices shall state the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment, and the rights of applicants and employees.

(E) The Contractor will notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Rehabilitation Act of 1973, and is committed to take affirmative action to employ and advance in employment physically and mentally handicapped individuals.

(F) The Contractor will include the provisions of this clause in every subcontract or purchase order of \$2,500 or more unless exempted by rules, regulations, or orders of the Secretary issued pursuant to Section 503 of the Act, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era

(applies to contracts in excess of \$10,000)

(A) The Contractor will not discriminate against any employee or applicant for employment because he or she is a disabled veteran or veteran of the Vietnam era in regard to any position for which the employee or applicant for employment is qualified. The Contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified disabled veterans and veterans of the Vietnam era without discrimination based upon their disability or veterans status in all employment practices such as the following: Employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

(B) The Contractor agrees that all suitable employment openings of the Contractor which exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract and including those occurring at an establishment of the Contractor other than the one wherein the contract is being performed but excluding those of independently operated corporate affiliates, shall be listed at an appropriate local office of the State employment service system wherein the opening occurs. The Contractor further agrees to provide such reports to such local office regarding employment openings and hires as may be required.

State and local government agencies holding Federal contracts of \$10,000 or more shall also list all their suitable openings with the appropriate office of the State employment service, but are not required to provide those reports set forth in paragraphs (D) and (E).

(C) Listing of employment openings with the employment service system pursuant to this clause shall be made at least concurrently with the use of any other recruitment source or effort and shall involve the normal obligations which attach to the placing of a bona fide job order, including the acceptance of referrals of veterans and non-veterans. The listing of employment openings does not require the hiring of any particular job applicant or from any particular group of job applicants, and nothing herein is intended to relieve the Contractor from any requirements in Executive Orders of regulations regarding nondiscrimination in employment.

(D) The reports required by paragraph (B) of this clause shall include, but not be limited to, periodic reports which shall be filed at least quarterly with the appropriate local office or, where the Contractor has more than hiring location in a State, with the central office of that State employment service. Such reports shall indicate for each hiring location (1) the number of individuals hired during the reporting period, (2) the number of non-disabled veterans of the Vietnam era hired, (3) the number of disabled veterans of the Vietnam era hired, and (4) the total number of disabled veterans hired. The reports should include covered veterans hired for on-the-job training under 38 U.S.C. 1787. The Contractor shall maintain at each hiring location copies of the reports submitted until the expiration of one year after final payment under the contract, during which time these reports and related documentation shall be made available, upon request, for examination by any authorized representatives of the contracting officer of the Secretary of Labor. Documentation would include personnel records respecting job openings, recruitment and placement.

(E) Whenever the Contractor becomes contractually bound to the listing provisions of this clause, it shall advise the employment service system in each State where it has establishments of the name and location of each hiring location in the State. As long as the Contractor is contractually bound to these provisions, and has so advised the State system, there is no need to advise the State system of subsequent contracts. The Contractor may advise the State system when it is no longer bound by this contract clause.

(F) This clause does not apply to the listing of employment openings which occur and are filled outside of the 50 States, the District of Columbia, Puerto Rico, Guam, and the Virgin Islands.

(G) The provisions of paragraphs (B), (C), (D), and (E) of this clause do not apply to openings which the Contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement for that opening.

(H) As used in this clause:

(1) "All suitable employment openings" includes, but is not limited to, openings which occur in the following job categories: Production and non-production; plant and office; laborers and mechanics; supervisory and non-supervisory; technical; and executive, administrative, and professional openings as are compensated on a salary basis of less than \$25,000 per year. This term includes full-time employment, temporary employment of more than 3 days' duration, and part-time employment. It does not include openings which the Contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement nor openings in an educational institution which are restricted to students of that institution. Under the most compelling circumstances an employment opening may not be suitable for listing, including such situations where the needs of the Government cannot reasonably be otherwise supplied, where listing would be contrary to national security, or where the requirement of listing would otherwise not be for the best interest of the Government.

(2) "Appropriate office of the State employment service system" means the local office of the Federal-State national system of public employment offices with assigned responsibility for serving the area where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico, and the Virgin Islands.

(3) "Openings which the Contractor proposes to fill from within his own organization" means employment openings for which no consideration will be given to persons outside the Contractor's organization (including any affiliates, subsidiaries, and the parent companies) and includes any openings which the Contractor proposes to fill from regularly established "recall" lists.

(4) "Openings which the Contractor proposes to fill pursuant to a customary and traditional employer-union hiring arrangement" means employment openings which the Contractor proposes to fill from union halls, which is part of the customary and traditional hiring relationship which exists between the Contractor and representatives of his employees.

(I) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

(J) In the event of the Contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.

(K) The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, provided by or through the contracting officer. Such notices shall state the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified disabled veterans and veterans of the Vietnam era for employment, and the rights of applicants and employees.

(L) The Contractor will notify each labor union representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of the Vietnam Era Veterans Readjustment Assistance Act, and is committed to take affirmative action to employ and advance qualified disabled veterans and veterans of the Vietnam era.

(M) The Contractor will include the provisions of this clause in every subcontract or purchase order of \$10,000 or more unless exempted by rules, regulations, or orders of the Secretary issued pursuant to the Act, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

Section 12

Employment Opportunities - "HUD Section 3"

General

These requirements apply to the City of Duluth contracts receiving assistance under the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant (CDBG) Program.

Type of Covered Projects

24CFR570.607 (b) of the HUD CDBG Program Regulations state in part "... that employment and other economic opportunities arising in connection with housing rehabilitation, housing construction, or other public construction projects shall to the greatest extent feasible, and consistent with existing Federal, State, and local laws and regulations be given to low- and very low-income persons.

Thresholds

In accordance with the provisions of 24CFR135.3(a) (3) (ii) (A), the requirements of this Section apply to those recipients as defined at 24CFR135.5 when the amount of this contract exceeds \$200,000.

In addition, in accordance with the provisions of 24CFR135.3 (a) (3) (ii) (B), the requirements of this Section apply to any contractor or subcontractor whose contract exceeds \$100,000 as a result of assistance provided under this contract.

Requirements (Section 3 Clause)

(A) The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

(B) The parties to this contract agree to comply with HUD's regulations in 24 CFR part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.

(C) The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement, or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

(D) The Contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 135.

(E) The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligation under 24 CFR part 135.

(F) Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD-assisted contracts.

Section 13

Federal Requirements for Minority/Women Business Enterprises Contract Guidance - MPFA

General

Municipalities that receive loan funding must comply with Federal requirements concerning utilization of Minority Business Enterprises (MBE) and Women's Business Enterprises (WBE). These requirements are designed to encourage the prime contractors to utilize MBEs and WBEs whenever procurement opportunities occur.

Regulation

40 C.F.R. Section 35.3145(d) Application of other Federal Authorities, M/WBE Requirements

Executive Orders No. 11625, 12138 and 12432 - Promoting the use of M/WBEs

Section 129 of Public Law 100-590 - Small Business Administration Reauthorization and Amendment Act of 1988

Regulations detailed in the EPA's *Cross-Cutting Federal Authorities - Clean Water Act State Revolving Fund Program and Safe Drinking Water Act State Revolving Fund Program*

Implementation

The "fair share" target percentage participation proposed for this project is 3.5 percent (3.5%) for MBE and 11.5 percent (11.5%) for WBE.

If the Contractor intends to let any subcontractors for a portion of the work, the Contractor shall take affirmative steps to assure that minority and women businesses are utilized when possible as sources of supplies, equipment, construction and services. Affirmative steps shall include the following:

- a) Include qualified minority businesses on solicitation lists.
- b) Assure that minority businesses are solicited whenever they are potential sources.
- c) When economically feasible, divide total requirements into smaller tasks or quantities so as to permit maximum small and minority business participation.
- d) Where the requirement permits, establish delivery schedules, which will encourage participation by minority businesses.
- e) Use the services and assistance of the Office of Minority Business Enterprise of the Department of Commerce.

The low bidder will be required to submit to the City of Duluth documentation of his good faith efforts to meet the targeted goals of utilizing MBEs and WBEs.

Section 14 - Forms

Minnesota Department of Transportation and City of Duluth, Minnesota funded certified payroll forms

- Statement of Compliance Form
www.dot.state.mn.us/const/labor/lcuforms.html
- Certified Payroll Forms
<http://www.dol.gov/whd/forms/wh347.pdf>
use front side only

U. S. Department of Housing and Urban Development and federal government funded certified payroll forms

- Statement of Compliance Form & Certified Payroll Forms
<http://www.dol.gov/whd/forms/wh347.pdf>
(use reverse side for Statement of Compliance form)
- Fringe Benefit Form - use the second page of the MnDOT Statement
of Compliance (form 21658 8/08)
www.dot.state.mn.us/const/labor/lcuforms.html

Minnesota Department of Transportation Trucking Requirements

- Month End Trucking Report
- Month End Trucking Report Statement of Compliance
- Definitions and instructions:
www.dot.state.mn.us/const/labor/lcuforms.html

**DULUTH AIRPORT AUTHORITY
&
CITY OF DULUTH
Insurance and Indemnification Requirements
(Updated 01-28-11)**

INDEMNIFICATION CLAUSE

The Contractor shall defend, indemnify and save the Duluth Airport Authority (the "Owner") and the City of Duluth (the "City") harmless from all costs, charges, damages, expenses including reasonable attorneys' fee, and loss of any kind that may grow out of the matters covered by this Contract, and on ten (10) days' written notice from the Owner, Contractor shall appear and defend all lawsuits against said Owner and/or City growing out of such matters. The provisions of this paragraph apply to any claim for response costs, contribution, or damages which arise out of the release or threatened release of a pollutant, contaminant, or hazardous substance. Said obligation shall include but not be limited to the obligation to defend, indemnify and save harmless the Owner and the City in all cases where claims of liability against the Owner and/or City arise out of acts or omissions of the Owner and/or City which are derivative of the negligence or intentional acts or omissions of Contractor such as, and including but not limited to, the failure of Owner and/or City to supervise, the failure to warn, the failure to prevent such act or omission by Contractor and any other such source of liability. In addition, Contractor will comply with all local, state and federal laws, rules and regulations applicable to this Contract and to the work to be done and things to be supplied hereunder.

INSURANCE

- a. Contractor shall provide the following minimum amounts of insurance from insurance companies authorized to do business in the State of Minnesota, which insurance shall indemnify Contractor, the Owner, and the City from all liability above, subject to provisions of Subparagraph c. below.
 - (1) Workers' Compensation Insurance in accordance with the laws of the State of Minnesota.
 - (2) Public Liability and Automobile Liability Insurance with limits not less than **\$1,500,000** Single Limit, and twice the limits provided when a claim arises out of the release or threatened release of a hazardous substance; shall be in a company approved by the Owner; and shall provide for the following: Liability for Premises, Operations, Completed Operations, Independent Contractors, and Contractual Liability.

- (3) The Owner and the City shall be named as **Additional Insureds** on each liability policy other than the Workers' Compensation policies of the Contractor, or as an alternate, Contractor may provide Owners-Contractors Protective policy naming itself, the Owner and the City. Contractor shall also provide evidence of Statutory Minnesota Workers' Compensation Insurance. Prior to the execution of this Contract, Contractor shall provide Certificates of Insurance evidencing such coverage and certificates showing continued maintenance of such insurance shall be on file with the Owner during the term of this Contract. The Owner and the City do not represent or guarantee that these types or limits of coverage are adequate to protect the Contractor's interests and liabilities.

**An umbrella policy with a "following form" provision is acceptable if written verification is provided that the underlying policy names the Owner and the City as an additional insured.*

- (4) If a certificate of insurance is provided, the form of the certificate shall contain an unconditional requirement that the insurer notify the Owner without fail not less than 30 days prior to any cancellation, non-renewal or modification of the policy or coverages evidenced by said certificate and shall further provide that failure to give such notice to Owner will render any such change or changes in said policy or coverages ineffective as against the Owner and the City.
- (5) **The use of an "Acord" form as a certificate of insurance shall be accompanied by two forms – 1) ISO Additional Insured Endorsement (CG-2010 pre-2004) and 2) Notice of Cancellation Endorsement (IL 7002) or equivalent, as approved by the Duluth City Attorney's Office.**
- b. The insurance required herein shall be maintained in full force and effect during the life of this Contract and shall protect Contractor, its employees, agents and representatives from claims and damages including but not limited to personal injury and death and any act or failure to act by Contractor, its employees, agents and representatives in the negligent performance of work covered by this Contract.
- c. Contractor shall be required to provide insurance meeting the requirements stated herein unless Contractor successfully demonstrates to the satisfaction of the City Attorney, in the exercise of his or her discretion, that such insurance is not reasonably available in the market. If Contractor demonstrates to the satisfaction of the City Attorney that such insurance is not reasonably available, the City Attorney may approve an alternative form of insurance which is reasonably available in the market which he or she deems to provide the highest level of insurance protection to the City which is reasonably available.

**EQUAL EMPLOYMENT OPPORTUNITY (EEO) AFFIRMATIVE
ACTION POLICY STATEMENT & COMPLIANCE CERTIFICATE**

TO: City of Duluth, Minnesota PROJECT: _____

FROM: _____

(FIRM'S Name, Address, Telephone Number)

- A. Employment:** It is the policy of the above named FIRM to afford equal opportunity for employment to all individuals regardless of race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability. The FIRM will take affirmative action to ensure that we will, (1) recruit, hire and promote all job classifications without regard to race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability, except where sex is a bona fide occupational qualification; (2) base decisions on employment so as to further the principle of equal employment opportunity; (3) ensure that promotion decisions are in accord with the principles of equal employment opportunity by imposing only valid requirements for promotional opportunities; (4) ensure that all personnel actions such as compensation, benefits, transfers, layoffs, return from layoff, FIRM sponsored training, education tuition assistance, social and recreational programs will be administered without regard to race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability. The FIRM also intends full compliance with Veteran affirmative action requirements. Additionally, minority and female employees shall be encouraged to participate in all FIRM activities and refer applicants.

I have designated (name)_____ to direct the establishment of and to monitor the implementation of personnel procedures to guide the FIRM's affirmative action program. Where PROJECTS exceed \$500,000, this official shall also serve as the liaison officer that administers the FIRM's "Minority Business Enterprise Program". This official is charged with designing and implementing audit and reporting systems that will keep management informed on a monthly basis of the status of the equal opportunity area.

Supervisors have been made to understand that their work performance is being evaluated on the basis of their equal opportunity efforts and results, as well as other criteria. It shall be the responsibility of the FIRM and its supervisors to take actions to prevent harassment of employees placed through affirmative action efforts.

- B. Reports:** Unless exempted by law and regulation, the FIRM shall make available and file those reports related to equal opportunity as may be required by the City of Duluth and State and Federal compliance agencies. Requirements and Reports are defined in 41CFR60 “Compliance Responsibility for Equal Opportunity” published by the U.S. Department of Labor which is incorporated herein by reference. Additional requirements are defined in various State and Federal Civil Rights Legislation and Rules promulgated thereunder.
- C. Nonsegregated Facilities:** The FIRM certifies that it does not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The FIRM certifies that it will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The FIRM agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this certificate. As used in this Certification, the term “segregated facilities” means any waiting rooms, work area, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation for entertainment area, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom or otherwise.
- D. Affirmative Action Compliance Program:** Unless exempted by regulation and law, the FIRM if the FIRM has 50 or more employees and if the value of current contracts with the City of Duluth exceeds \$50,000 shall prepare and maintain a written affirmative action compliance program that meets the requirements as set forth in 41CFR60.
- E. Non-compliance:** The FIRM certifies that it is not currently in receipt of any outstanding letters of deficiencies, show cause, probable cause, or other such notification of non-compliance with EEO Laws and Regulations.
- F. Employment Goals - “Construction” Projects:** It shall be the goal of the FIRM if the PROJECT is of a construction nature that in all on-site employment generated that no less than 3% of the on-site workforce will be minority employees and that no less than 7% of the on-site workforce will be female employees. Further, it is the goal of the FIRM if the PROJECT is of a construction nature that in all on-site employment generated that no less than 3% of the work hours generated shall be worked by minority employees and that no less than 7% of the work hours generated shall be worked by female employees.

- G. Subcontractors:** The FIRM will for all its PROJECT subcontractors regardless of tier (unless exempted by law and regulation) that received in excess of \$2,500 will require that; (1) the subcontractor shall execute an “EEO Statement and Certification” similar in nature to this “Statement and Certification” (2) said documentation to be maintained on file with the FIRM or subcontractor as may be appropriate.

Executed this _____ day _____ 19____ by:

(Printed Name & Title)

(Signature)

NOTE: In addition to the various remedies prescribed for violation of Equal Opportunity Laws the penalty for false statements is prescribed in 18 U.S.C. 1001.

Construction Safety and Security Compliance
For
Aircraft Operations Area
Duluth International Airport
Duluth, Minnesota
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I. AIRPORT EMERGENCY NUMBERS

EMERGENCY TELEPHONE NUMBER

911

FOR

POLICE FIRE RESCUE

AIRPORT NONEMERGENCY NUMBERS

DULUTH AIRPORT AUTHORITY

Airport Office	(M – F 08:00 – 16:30)	727 – 2968 727 – 2960 (fax)
Airport Security	(24 Hours)	391 – 5631 (cell) 726 – 4984 (pager)
Executive Director	Brian Ryks	391 – 8052 (cell)
Operations Director	Brian Grefe	590 – 8606 (cell)
Airside Manager	Tom Werner	391 – 6155 (cell)
Airport Garage		727 – 6522
Electrical Vault		391 – 5697 (cell)

II. CONSTRUCTION SAFETY FOR DULUTH AIRPORT AUTHORITY

This manual provides general information to Contractors on the requirements and procedures for accident prevention, safety, security, and loss control for the Duluth Airport Authority (DAA) construction, repair, or services required by the DAA and its tenants. The DAA's safety objective is to achieve accident-free construction projects.

Contractors are charged with the responsibility for conducting their operations in a manner that will provide safe working conditions for all employees and the protection of the public and all others who may come in contact with or be exposed to this project. Nothing contained in this manual is intended to relieve any Contractor or supplier of the obligations assumed by the Contractor under contract with the DAA or as required by law.

Safety must be an integral part of each job. Full participation, cooperation, and support is necessary to ensure the safety and health of all persons and property involved in the project.

The purpose of marking, barricading, and lighting airside construction areas is to delineate hazardous areas and prevent unauthorized incursions into the area by personnel, vehicles, equipment, and aircraft during construction.

The limits of the Duluth International Airport, hereafter referred to as "the Airport," are defined as follows:

The Aircraft Operating Area (AOA), for the purpose of this document, is defined as any part of the Airport utilized for aircraft operations and includes any area inside the perimeter fence.

The Aircraft Movement Area (AMA) is defined as runways, taxiways, and other areas of the Airport that are utilized for taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. The AMA is a restricted area. All vehicle and pedestrian access is prohibited without the approval of the Airport and FAA Air Traffic Control.

The DAA reserves the right to review the Contractor's safety program/record and periodically inspect work sites for compliance.

III. SAFETY AREAS

Runways and taxiways have safety areas. The safety area dimensions at Duluth International Airport extend 1,000 feet beyond each runway end and 255 feet perpendicular to the runway centerline.

A. Design Standards

The runway and taxiway safety areas shall be:

1. Cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations.
2. Drained by grading or storm sewers to prevent water accumulation.
3. Capable under dry conditions of supporting construction and maintenance equipment, aircraft rescue, fire-fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.
- (4) Free of objects, except for objects that need to be located in the runway safety area because of their functions. These objects shall be constructed on low impact resistant supports (frangible mounted structures) to the lowest practical height with the frangible point no higher than 3 inches. Other objects, such as manholes, should be constructed at grade. In no case should their height exceed 3 inches above grade.

(5) Restricted Areas

Object Free Area (OFA), Obstacle Free Zone (OFZ), Primary Surface and Transitional Surface.

1. Runway and Taxiway Surfaces. When aircraft operations are being conducted on a runway or taxiway, construction activity is prohibited within any of the above listed areas, as defined in the FAA's Advisory Circular (AC) 150/5300-13, current edition, unless approved on a case-by-case basis by the DAA, where construction equipment and material is properly marked and lighted.

These restricted areas vary depending on runway or taxiway design group. A taxiway OFA extends out to 129.5' from the centerline for group IV aircraft and 160' for group V.

A runway primary surface extends out to 500' from a runway centerline and the transitional surface begins a 7' to 1' outward and upward slope up to 150'. Any equipment in these areas must be approved by the DAA.

When working near a runway or taxiway ask for assistance in defining these areas before work begins.

2. Approach Surfaces. When aircraft operations are being conducted near a runway, construction activity is prohibited to penetrate the surfaces, defined in AC 150/5300-13, unless approved by the DAA. The runway threshold may be relocated or displaced to eliminate the penetration.

C. Taxiways and Aprons

Construction activity may be safely permitted within safety areas of taxiways and on aprons in use provided the activity is first coordinated with the DAA, local notice to airmen (NOTAM's) are issued, marking and lighting provisions are implemented, and it is determined that the height of equipment and materials is safely below any part of the aircraft using the AOA that might overhang those areas. The taxiway centerline shall be maintained when construction activity is conducted adjacent to an active taxiway, a minimum clearance of 25 feet plus one half the wingspan of the largest predominant aircraft (currently 767-400) from the centerline of an active taxiway or apron, which is 108 feet.

IV. FLAGGERS AND OBSERVERS

All flaggers will be trained and approved by the DAA prior to working on the Airport.

A. Communications

All flaggers and observers controlling equipment crossing active aircraft areas will be required to have a cellular telephone or DAA approved radio to contact the DAA to report any problems that may affect aircraft operations. All observers and flaggers will immediately contact the DAA if any equipment or vehicle becomes disabled or is unable to yield to aircraft for any reason.

B. Crossings

If approved by the DAA, vehicle and pedestrian crossings of active runways, taxiways and high-use or congested ramp areas may be permitted if the following provisions are met:

1. The DAA is notified before any activity begins and when the activity ends every day.
2. DAA has coordinated the activity with Air Traffic Control and has advised the Engineer or Contractor when to begin crossings.
3. An airport representative is available to contact Air Traffic Control if there are any problems.
4. All involved personnel understand that all equipment and pedestrians must yield to all aircraft. **Aircraft always have the right of way.**

V. CONSTRUCTION LIMIT BOUNDARIES

A. Setback Lines

Visible setback lines will be established prior to construction activity taking place adjacent to active taxiways and aprons. All vehicles, equipment, and construction activity must stay beyond these lines unless provisions are made with DAA and Engineering personnel. Locations where setback lines will be placed is determined by the Airport's largest predominant aircraft (Boeing 767-400), and setback lines will be located at 108 feet from the taxiway or apron centerline.

At the discretion of DAA and Engineering personnel, setback lines will be delineated according to the scope and timeframe of each project. Short-term projects involving limited personnel may be delineated with spray paint and/or wooden laths. For projects involving numerous personnel and subcontractors, setback lines will be delineated with rubber-based upright delineators with rope or ribbon extended between delineators. Contractors will be responsible for maintaining setback lines in a clearly visible condition until project completion.

If approved by the DAA, construction may be permitted within the setback lines if the following provisions are met:

1. A designated observer/spotter (other than the equipment operator) is on the site to direct the operator and equipment to yield to oncoming aircraft. The observer/spotter must be able to immediately get the attention of the operator and direct equipment beyond the setback lines. Equipment must be in position to immediately respond.
2. It is determined by DAA and Engineering personnel that the height of the equipment and materials is safely below any part of the aircraft using the AOA that might overhang those areas.
3. Vehicles and equipment are under escort by DAA or Engineering personnel that are in contact with the air traffic control tower or if equipment is being directed by a DAA approved flagger or observer/spotter.

If the above-stated provisions cannot be met, construction activity will not be allowed until a taxiway/apron closure can be scheduled with Air Traffic Control.

B. Trenches, Excavations, and Stockpiled Material

Open trenches exceeding 3 inches in depth and 3 inches in width or stockpiled material will not be permitted within the limits of safety areas of operational runways. Coverings for open trenches or excavations shall be of sufficient strength to support the weight of the heaviest aircraft operating on the runway or taxiway. Lightweight barricades and/or flagging should be used to identify the limits of construction near open trenches or excavations.

C. Equipment Height

Construction activity shall be prohibited when equipment penetrates any obstacle free zone (OFZ) as defined in the FAA's AC 150/5300-13, current edition, unless a favorable airspace finding has been made by the FAA and the DAA, and approved by the DAA. Equipment must display a checkered flag during daytime use and a yellow flashing beacon during nighttime use.

D. Proximity of Construction Activity to Navigational Aids

Construction activity in the vicinity of navigational aids requires special consideration. The effect of the activity and its permissible distance and direction from the aid must be evaluated in each instance. A coordinated evaluation by DAA and the FAA is necessary. Technical involvement by FAA airports, air traffic, and airway facilities specialists is needed as well as construction engineering and management input. Particular attention needs to be given to stockpiling materials and movement and parking of equipment that may block the line of sight from the tower or interfere with electronic signals.

E. Construction Vehicle Traffic

Because each construction situation differs, the Contractor must coordinate construction vehicle traffic with the DAA.

F. Limitations of Construction

1. Open-flame welding or torch-cutting operations will be prohibited unless adequate fire and safety precautions are provided.
2. Open trenches, excavations, and stockpiled material at the construction site should be prominently marked and lighted by barricades (acceptable to the DAA and the FAA) during hours of restricted visibility and/or darkness. Under no circumstances are flare pots to be used for airport lighting.

Some temporary back filling of open trenches may be required.

3. Stockpiled material should be constrained in a manner to prevent movement resulting from aircraft blast or wind conditions. Material should not be stored near aircraft turning areas.

G. Marking and Lighting of Closed or Hazardous Areas on the Airport

When areas on the Airport are closed or present hazards due to construction activities, they should be marked and lighted according to AC 150/5340. Marking and lighting must be approved by the DAA.

If construction involves an extended closure of a runway, an illuminated cross ("X") shall be required at each end and shall be serviced and maintained by the Contractor. (The lighted cross ["X"] shall be provided by the Contractor.)

The dimensions of the safety area and obstacle free zones vary and will be stipulated in the specifications. If runway and taxiway closures are necessary, construction may be limited to nighttime, requiring 24-hour prior coordination.

All work in the AMA and safety area is to be coordinated with the DAA.

VI. AIRCRAFT SAFETY CONSIDERATIONS

The Contractor will be required to coordinate work so as to satisfy clearance requirements for arrival and departure of scheduled aircraft and maintain compliance with the FAA's AC 150/5370-2 current edition, "Operational Safety on Airports During Construction." The AC sets forth guidelines for maintaining desired levels of operational safety during construction. All construction personnel should become familiar with the contents of this AC, including Appendix 1, "Special Safety Requirements During Construction."

A. Potential Hazards

Potential hazards include the following:

1. Excavation adjacent to runways, taxiways, and aprons.
2. Mounds of stockpiles of earth, construction material, temporary structures, and other obstacles in proximity to airport operations areas and approach zones.

3. Runway surfacing projects resulting in excessive lips greater than 1 inch for runways and 3 inches for edges between old and new surfaces at runway edges and ends.
4. Heavy equipment, stationary or mobile, operating or idle near the AOA or in safety areas.
- (6) Proximity of equipment or material that may degrade radiated signals or impair monitoring of navigational aids.
6. Tall but relatively low visibility units, such as cranes, drills, and the like, in critical areas such as safety areas and approach zones.
7. Improper or malfunctioning lights or unlighted airport hazards.
8. Holes, obstacles, loose pavement, trash, and other debris on or near the AOA.
9. Failure to maintain fencing during construction to deter human and animal incursion into the AOA.
10. Open trenches alongside pavement.
11. Improper marking or lighting of runways, taxiways, and displaced thresholds.
12. Attractions for birds, such as trash, grass seeding, or ponded water on or near airports.
13. Inadequate or improper methods of marking temporarily closed airport operations areas, including improper and unsecured barricades.
14. Obliterated markings on active operation areas.

NOTE: Safety area encroachments, improper ground vehicle operations, and unmarked or uncovered holes and trenches in the vicinity of aircraft operating surfaces are the three most recurring threats to airside safety during construction.

B. Aircraft Emergency

In the event of an aircraft emergency, the Contractor's personnel and/or equipment may be required to immediately vacate the area.

VII. GENERAL SAFETY ISSUES

A. General

1. The Contractor must, at all times, conduct the work in conformance with requirements of the DAA, the FAA, and the TSA.
2. Aircraft traffic will continue to use existing runways, aprons, and taxiways of the Airport during the time that work under a contract is being performed. The Contractor shall at all times so conduct the work as to create no hindrance, hazard, or obstacle to aircraft using the Airport.
3. Runway closures, when authorized, are coordinated and approved by the DAA. The Contractor will schedule and organize the work so that a minimum of closings or crossings of runways and taxiways will be required during this project.
4. All construction-related activity taking place within any active area of the AMA requires the presence of a DAA or Engineer escort having radio communication with the FAA control tower. Spotters and/or flaggers having radio or telephone contact with the DAA may be used with the approval of the DAA. Any command or instruction given by the control tower, the DAA, the Engineer, flaggers, or spotters shall be immediately obeyed.
5. The Contractor may be working in an active AOA in which jet takeoff noise can be as high as 120 decibels. All Contractors shall comply with industry standards for personnel hearing protection when working within these areas.
6. Airport environment requires a high degree of care to control debris and dust. Spilled material on active roadways, taxiways, runways, and aprons shall be swept up immediately. The Contractor shall be aware that the AOA is subject to jet blasts, which are equivalent to wind velocities of 75 to 90 miles per hour; therefore, constant dust control measures will be required to prevent loose material from blowing across the airfield.
7. Sanitary facilities shall be provided at appropriate locations for the Contractor's employees. Public facilities at the Airport are not to be used.
8. The speed limit on all airside roadways is 25 miles per hour unless otherwise posted. The speed limit on the aprons is 15 mph. (speed limit within 50 feet of an aircraft is 5 mph.)
9. Peak hours for the AOA are from 06:00 to 23:00. Non-peak hours are defined as the period from 23:00 to 06:00.
10. All personnel operating a motor vehicle within the secured area shall have a valid, state issued drivers license.

11. Maximum convoy length shall not exceed three vehicles plus the escort vehicle. The three vehicles must be in the immediate control of the escort vehicle.
12. Use of audio earphones and headsets are prohibited on the AOA unless directly related to job requirements.
13. All Contractor vehicles and equipment operating in the AOA not being escorted must display checkered flags during daytime use and yellow flashing beacons during nighttime use. The flag should be on a staff attached to the vehicle and should be at least a 3 foot square having a checkered pattern of International Orange and White squares at least one (1) foot on each side.
14. Approved Airport, tenants or Contractor vehicles properly equipped may be used to escort up to three vehicles onto the AOA. The vehicle providing the escort must lead and is responsible for the trailing vehicle(s).

It is acceptable for a person displaying an airport-issued ID to provide pedestrian escort for vehicles; however, this is only allowed within 100 feet of the gate. Under no circumstances may a badge employee provide an escort from inside an unmarked vehicle.

15. Beacons and flags must be maintained in good working condition, and flags will be replaced if they become faded, discolored, or ragged.
16. Construction projects affecting any aircraft operation area will be inspected by DAA prior to construction personnel and cleanup equipment leaving the area.
17. All electrical wire, cable, rope, trenches, holes, or any other object or surface variation that may interfere with or be damaged by airport field mowers or other equipment must be marked and/or barricaded to clearly denote the object or area.
18. Manholes, drain inlets and junction boxes must have approved covers in place at all times or they must be barricaded to clearly denote the uncovered opening.

B. Fines and Warnings

Safety and security precautions are necessary at Airports. Failure of the Contractor to adhere to prescribed requirements may have consequences that jeopardize the health, safety or lives of customers and employees at the Airport. Therefore, if the Contractor is found to be in violation of safety, security or badging/licensing requirements, the Contractor may be shutdown or removed from the Airport.

The DAA has the option to issue warnings on an offense based upon the circumstances of the incident. Individuals involved in non-compliance violations may be required to surrender their DAA ID badges pending investigation of the matter.

Penalties for violations related to DAA procedures may include the following:

1. Warning, DAA ID badge confiscation, retraining, and a letter from the employer stating what action if any has been taken to prevent reoccurrence.
2. Project shutdown and/or removal of personnel involved from the AOA.

Project shutdown or personnel removal may be issued on a first offense.

C. Signs

All permanent signs affected by construction shall be replaced by temporary signs acceptable to the DAA. The Contractor shall submit a sign relocation plan to the DAA for approval prior to any relocation of any existing signs. When construction takes place near the AMA and at the discretion of DAA and Engineering personnel, signs stating "ACTIVE RUNWAY/TAXIWAY DO NOT ENTER" may be required.

D. Barricades and Channelizing Devices

Airside construction sites shall be barricaded and lighted to delineate the work area by using Railroad Tie Barricades with lights and flags placed at 10-foot intervals; taxiway areas shall be barricaded using low-profile lights with flags at 10-foot intervals.

Hazardous areas, those in which no part of an aircraft may enter, shall be defined by the placement of low-profile barricades with reflective markings, and flashing red beacons.

Construction areas on temporarily closed taxiways, runways, or ramp areas shall be defined by the placement of approved Type II Construction Barricades with flashing yellow beacons and shall be secured in place with sandbags as directed by the DAA. During daylight hours, rubber-based upright delineators may be used. All lights and batteries used to delineate construction and hazardous areas shall be constantly maintained by the Contractor during periods of nighttime use.

E. Lighting

Temporary light plants used in conjunction with nighttime work cannot be located in such a manner as to be an obstruction or hazard. In addition, these light plants cannot be located where the glare of the light will cause visual or physical interference to operating aircraft and the FAA Air Traffic Control tower.

When existing edge lighting are rendered inoperable on an active runway or taxiway, the Contractor must install temporary edge lights. The lights and wiring shall meet National Electrical Code (NEC) Article 300, and AC 150/5340-24 "Runway and Taxiway Edge Lighting System," latest edition, for permanent lighting. Any active runway or taxiway lights requiring temporary removal shall be replaced by a temporary installation.

A temporary connection shall be made to connect all remaining active runway or taxiway lights in a construction area where several lights may have been decommissioned. Contractor shall have prior approval by the DAA before temporarily connecting lights.

"Temporary edge lights shall be securely fastened down and the electrical power cable shall not be driven across. Airfield lighting cables operate at high voltage. They have the potential of 5000 volts and should have only qualified personnel working with them".

The Contractor **shall provide** red obstruction lights for all stationary cranes erected on the construction site. All moveable cranes shall be provided with red obstruction lights if the boom cannot be lowered during hours of darkness. The DAA will issue NOTAMs on obstruction lighting; the Contractor shall notify the Engineer if any relocation takes place.

All construction personnel that are working on the AOA during hours of darkness will wear clothing with reflective markings.

F. Pavement Markings

All existing pavement markings requiring removal shall be obliterated by means approved by the DAA.

Temporary markings consist of paint or temporary preformed marking tape (removable).

All permanent pavement markings shall be restored at project completion.

G. Haul Routes

Where haul routes cross active taxiways, traffic control with a flagger or Engineer escort approved by the DAA shall be implemented.

Traffic control is defined as a flagger or DAA approved escort by the DAA.

Haul routes crossing active taxiways will not be permitted unless authorized by the DAA.

If the Contractor's haul road crosses any area used by aircraft for taxiing, takeoff, or parking, a power broom and/or hand sweeping shall be used to keep this area clean of debris, which could damage aircraft engines or propellers. The Contractor shall be liable for any damages that occur.

Contractor's haul routes must be restored to their original condition at the completion of the project.

H. Transition Ramps

Construction projects on airside may involve overlays and/or milling operations on runway or taxiway surfaces. This operation will require the construction of temporary ramps to allow runway or taxiway use between actual work shifts during the airside non-peak hours.

I. Grade and Vegetation

Unless specified, all construction grades and vegetation must be restored to their original condition and be free of ruts and depressions. Appropriate seed shall be planted.

J. Closures/Interruptions

If any roadway or taxiway is interrupted because of the means and/or methods used by the Contractor, an alternate detour roadway or taxiway must be provided. The Contractor shall submit a plan to the Engineer for approval prior to use. All alternate routes must be properly delineated for AOA/AMA use.

K. Staging Areas and Environmental Compliance

The staging area cannot be located in high traffic areas within the AOA.

Any staging areas used must be left environmentally clean during and at completion of the construction project. This includes keeping the area clean of debris, oil spills, and other undesirable elements. Any hazardous or regulated waste material produced by the Contractor must be properly disposed of at the Contractor's expense according to all local, state, and federal regulations.

The Contractor may be required to provide test results to confirm an area has been left environmentally clean with any contamination removed.

L. Debris Hazards

Each construction project will have a procedure for regular cleanup and containment of construction material and debris. Special attention will be given to the cleaning of cracks and pavement joints. All taxiways, aprons, and runways must remain clean.

Secured waste containers with attached lids shall be required on construction sites.

Special attention should be given to securing lightweight construction material (concrete insulating blankets, tarps, insulation, etc.). Specific securing procedures and/or chain-link enclosures may be required.

Vehicle and equipment washing and clean up will not be allowed on the Airport unless approved by the DAA.

When working in an airport environment, immediate access to a power sweeper is required when construction occurs on any aircraft pavement area unless an appropriate alternative has been approved by the DAA and Engineer.

M. Airport Assistance Form

DAA has a construction "Airport Assistance Form" that may be utilized if necessary. The DAA may determine that the Contractor involved in a construction project will hinder operations, and if the contractor is not equipped or unable to rectify the problem within the established timeframe, the Airport Assistance Form will be implemented (Exhibit #1). The process for this work is as follows:

1. DAA or Engineer will initiate work;
2. Airport Maintenance will note the details involved and distribute completed copies;
3. Airport Finance will be notified of the pending cost claim;
4. The Engineer will receive notification of the action taken; and
5. Contractor is given a copy.

If anything that may affect aircraft operations, violations, or noncompliance of FAA or any other requirements is observed, the DAA must be notified.

DAA Telephone Numbers:

Office: (218) 727-2968

Airport Security: (218) 391-5631

VIII. SECURITY REQUIREMENTS

A. Airport Access and Identification (ID) Badge Requirements

1. All contractor employees working at a construction site in restricted areas of the Duluth Airport must obtain an Airport ID Badge. The badge must always be displayed on the outermost garment while inside restricted areas. Failure to do so may result in criminal and civil penalties, revocation of the badge and the individual being barred from the Airport.
2. Registration
 - a) The Engineer or sponsoring tenant must complete a construction fact sheet outlining the duration of the contract, the specific door and/or gate numbers for which access is requested, and the name of the Contractor and all subcontractors associated with the project.

Construction personnel will only access the points as specified by Construction Fact Sheet. If additional access points are required, the Engineer must coordinate with the DAA Operations Director and/or the Airport Security Office. **No access changes will be negotiated with Contractors.**
 - b) The Contractor must complete a Unescorted Access/ DAA ID Badge Request Letter and Signature Authentication Form as shown in Exhibits #2 or #3 and #4.
 - c)
 - (1) The Contractor will designate an Authorized Certifier/s on company letterhead, who is/are responsible for signing all identification badge applications, including those for sub-contractor employees. Authorized certifier must undergo the same background checks as those he/she is certifying. Sample signatures on the Signature Authentication Form must be included with the letter. This is to insure badge applications are signed only by the Authorized Certifier/s.
 - (2) If the name of the sub-contractor company does not appear on the letter issued by the Contractor, no ID badges will be issued until an amended list is received.

c) Application

- (1) An application must be completed for each individual requesting access and Airport ID badge.
- (2) Airport ID badge applications are available from the Airport Security Office located in the Main Terminal.

Telephone Number: (218) 727-2968

Fax Number: (218) 727-2960

- (3) All applications must be an original; no copies will be accepted.

d) Background checks

- (1) A favorable FBI Fingerprint Criminal History Records Check (CHRC) must be conducted on employees requesting access / Airport ID Badge for work conducted in the Security Identification Display Area (SIDA)/Secured Area. (The employment background section of the application is not applicable.) *See Exhibit #3 for costs associated with the CHRC.

A five (5) year employment background check must be conducted on employees requesting access / Airport ID Badge for all other airport restricted areas. The background verification section of the application must be completed by the applicant and verified by the Certifier or his/her representative prior to a badge being issued. The verification form must include employment history for the required number of years, and all time must be accounted for.

The Airport Security Office may audit the background check information to ensure it is complete and accurate. If any discrepancies are found, the badge will be revoked until the information has been corrected. *NOTE: Any Transportation Security Administration (TSA) fines levied against the Airport for falsification of background information will be passed on to the Contractor. Additionally, any individual who falsifies background information can be held personally responsible and is subject to civil penalties levied by the TSA.

- (2) Guidelines for submitting background information are included with this document as Exhibit #3. If the background information is not accurate or complete, the application will be returned, and an ID badge will not be issued until corrected.

- (3) To allow adequate time for processing and verifying the background information, Required CHRC / background information and application must be submitted to the Airport Security Office a minimum of two business days before the badge is to be issued.
- (4) Badge application instructions contain a list of disqualifying crimes. If an applicant has been convicted of any of these crimes within the last ten years, he/she is not eligible to obtain a badge for access to airport restricted areas. The applicant must indicate whether or not he/she has been convicted of any of the crimes listed.
- (5) A warrants check may be run on the applicant. Individuals with warrants are subject to arrest, and the badge will not be issued until the warrant(s) is/are resolved.
- (6) The application must be signed by an authorized company certifier.

e) Training

- (1) All employees requesting unescorted re required to undergo security training, pursuant to Federal Regulations. This training must be scheduled through the Airport Security Office. Training time is approximately one hour.
- (2) If project size dictates, a construction class specific to the project will be conducted. A time for this class must be coordinated with the Airport Security Coordinator at (218) 727-2968.

f) Issuance of badges

- (1) There is a \$50 fee for the initial issue of each airport ID badge.
- (2) The fee must be submitted by the Contractor only. **Fees shall** not be accepted from subcontractor companies. The DAA will periodically bill the contractor for the fees. Fees should not be paid in cash by the applicants to submit a copy of a drivers license or other picture ID.

g) ID badge renewal/replacement procedures

- (1) Replacement of Lost/Stolen badges

- (a) If a badge is lost or stolen, it must be reported to the Airport Security Office immediately (218-391-5631), so the badge can be deactivated.
- (b) A replacement application must be completed and signed by an authorized company certifier.
- (c) \$50 replacement fee must be paid.
- (d) If the badge is later found, the employee must bring in the found badge to the Airport Security Office.

(2) Renewal of Expired Badge

- (a) The Engineer must submit, in writing, a request to extend the expiration date of the badges and provide a new expiration date.
- (b) A replacement application signed by an authorized company certifier must be completed for each employee still required on the project (Exhibit #5).

(3) Replacement of Inoperable or Damaged Badge

If for any reason the ID badge becomes damaged, the badge holder shall return the badge to the Airport Security Office, and a replacement badge will be issued at no cost.

(4) Replacement of a Defaced Badge

No stickers, pins drawings, etc. may be placed on the front of the Airport ID badge. No fee will be charged to replace a badge which has been defaced or altered if the badge is returned to the Airport Security Office.

h) Termination of employee

- (1) Upon voluntary or involuntary termination of the unescorted access privileges of the Applicant, the Company is required to notify the Airport Security Office (218-391-5631) immediately and surrender the identification badge as soon as possible. If the Applicant is convicted of any of the crimes after unescorted access is granted, the conviction must be reported by the Company immediately to Airport Security and the identification badge returned within 24 hours.

The Contractor shall notify the Airport Security Office, in writing, when a subcontractor is no longer under contract. The Contractor shall collect all badges and return them to the Airport Security Office within 72 hours. Failure to return a badge will result in a \$50.00 fine per badge.

i) Escort procedures: An employee possessing a valid Airport ID badge may escort other individuals into the secure area under the following conditions:

- Individuals **under escort** must have an operational need to access the secure area.
- The employee providing the escort must remain within line of sight, and close enough to monitor the actions of the escorted person.

(1) Haul Routes

Contractor may use designated haul routes for deliveries if approved by the DAA, if the following conditions are met:

- (a) Delivery drivers are allowed to go to and from the delivery point only. Any other work or activity requires driver to be properly escorted or badged.
- (b) Spotters may be required to position along the route at intervals (from starting to ending points) to maintain a line of sight and direct the vehicles.
- (c) All delivery vehicles are properly equipped with flags and/or beacons to operate on the Airport.

If the above stated conditions cannot be met, delivery vehicles must be escorted by a vehicle properly equipped to operate on the Airport.

B. Vehicle Requirements

1. Vehicle markings

All Contractor vehicles and equipment operating in the AOA must display checkered flags during daytime use and yellow flashing beacons during nighttime use. The flag should be on a staff attached to the vehicle and should

be at least a 3 foot square having a checkered pattern of International Orange and White squares at least one (1) foot on each side.

2. Vehicle Escort

- a) Only approved Contractor vehicles may be used to escort other vehicles onto the AOA. The vehicle providing the escort must lead and is responsible for the trailing vehicle(s).

It is acceptable for a person displaying an Airport ID Badge to provide pedestrian escort for vehicles; however, this is only allowed within 100 feet of the gate.

- b) Equipment (backhoes, graders, etc.) that remain at the job site will be stored in the staging area. Staging areas located within the AOA are not for contractor employee parking unless approved by the DAA.

C. Access Points/Gates

- 1. When non-automated gates are unlocked, they must be staffed at all times by a badged employee to control access. This individual must have the ability to contact Airport Security via phone in the event of a security breach. This individual is required to check each person entering Airport restricted areas through the gate for a valid ID badge. Anyone not in compliance will be denied access.
- 2. All employees performing gate guard duties are required to attend a briefing with Airport Security to obtain instruction on their responsibilities.
- 3. If a problem is encountered, the gate guard must notify Airport Security (218-391-5631) immediately. The guard will be asked to describe the problem and give a description of the vehicle or individual involved.
- 4. While not actively being used, the gate must be kept **closed and locked**.
- 5. Access to construction sites through manual gates must be coordinated with Airport staff. **Contractor locks will be placed on gates interlocked with DAA locks ensuring DAA access at all times.**

D. Fencing

If a temporary fence is erected, displacing a portion of the airport perimeter fence, it must meet permanent fence standards, which are 6 feet of chain link with 3 strands of

barbed wire angled away from the secure area at 45 degrees, with poles cemented in place.

E. Security Violations

1. Any employee who commits a security violation shall be immediately escorted out of the restricted area and his/her ID badge will not be returned until remedial actions have been taken (retraining, etc.). Based on the nature of the violation, the DAA may permanently revoke an Airport ID badge and deny access to restricted areas. The individual may also be responsible for any TSA penalties or fees levied for the violation.
2. Construction project may be shut down and delayed at the expense of the contractor if security violations persist.
3. Security violations include the following:
 - a) Loaning an airport ID badge to another individual or using another individual's badge.
 - b) Failure to actively control a vehicle gate providing access to a secure area.
 - c) Leaving an escorted individual unattended in a secure area.
 - d) Failure to possess and properly display a valid Airport ID badge while in the secure area.
 - e) Propping open a door or gate that leads to a secure area and leaving it unattended.
 - f) Leaving a door or gate unlocked that leads to a secure area.
 - g) Allowing an unauthorized individual to follow you through a door leading to a restricted area, with the exception of individuals under approved escort.
 - h) Using the Airport ID badge to enter secure areas of the airport that are not related to the construction job.
 - i) Working with an expired badge.
 - j) Failure to use the access card when entering a security controlled gate or door.

- k) Failure to challenge or report an un-badged individual or other security violations in Airport restricted areas.

IX. GLOSSARY

Advisory Circular (AC):

Documents produced by the FAA providing guidelines. The Advisory Circular is available at Internet address www.faa.gov/circdir.htm

Aircraft Movement Area (AMA):

The taxiways and runways controlled by the FAA ATCT.

Aircraft Operating Area (AOA):

The AMA expanded to include ramps/aprons and all areas inside the airport perimeter fence.

Air Traffic Control Tower (ATC, Control Tower, or Tower):

Controls all aircraft and vehicular movement on the aircraft movement area.

Apron:

The area near the buildings where aircraft load/unload and are serviced also referred to as the ramp.

Contractor:

The entity responsible for the completion of a contract or portion of a contract.

Duluth Airport Authority (DAA):

An Authority of the city of Duluth that is responsible for the Duluth International Airport as well as Sky Harbor Airport.

Duluth International Airport (Airport) (DLH):

Located approximately 5 miles west of the city of Duluth, consisting of approximately 3,000 acres, 2 runways.

Federal Aviation Administration (FAA):

Federal agency that governs aviation and activities at civilian airports.

Foreign Object Debris (FOD):

Unwanted, dangerous items on the ramps, taxiways, and runways that could damage an aircraft.

Object Free Area (OFA):

An area centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

Obstacle Free Zone (OFZ):

The OFZ is (45m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway, and for missed approaches.

Primary Surface:

A surface longitudinally centered on a runway extending 200' beyond each end of the runway. The width varies from 250' for utility runways having only visual approaches to 1000' for precision instruments runways.

Restricted Area:

This area of the Airport refers to the acreage around the runways, protected by the secure exits from buildings, secure gates, and chain-link fences.

Safety Areas:

Runway: 9/27 and Runway 3/21 are 260 feet each side of the centerline, 1,000 feet off each end.

Taxiways: 80 feet each side of the centerline.

Security Identification Display Area (SIDA) / Secured Area:

SIDA / Secured Area means any area identified in the Airport Security Program as requiring each person to have completed a favorable FBI Fingerprint based CHRC and continuously display, on their outmost garment, an airport approved identification medium unless under an airport-approved escort.

The SIDA / Secured Area at the Duluth International Airport includes the entire area of the Main Terminal Ramp and its access points including the Airline's bag makeup areas.

Transportation Security Administration (TSA):

The Federal branch of Homeland Security responsible for oversight of airport security.

Transitional Surface:

A surface that extends outward and upward at right angles from the sides of the primary surface and the approach surface at a slope of 7 to 1.

Construction Gate Procedures

The gate that you are assigned is designed for your construction project only, it is not designated for the use of other employees. **Do not allow employees who are not working on your construction project to enter through your gate.** Law Enforcement, Fire and Ambulance Emergency vehicles are an exception; however they will usually be met and escorted by an Airport Authorized person, for direction and safety reasons.

Stop List: The Stop List provides you with the names of badge holders who lost, had revoked, or did not return their badge at the end of their employment. If you come in contact with someone who shows you a badge that is listed on the Stop List, **DO NOT** permit them to enter. Call Security or DAA Administration for clarification (218-391-5631 or 218-727-2968 extension 10). TSA Inspectors may check to see that you have a Stop List and ask you to explain your responsibilities. Become familiar with the Stop List and how to use it.

Entry Procedures:

- **Only valid SIDA / SECURE / AOA badge holders or workers can be allowed unescorted entry on to the Airport.** Insure each badge holder is displaying the badge on their outer most clothing, above the waist.
- **Each vehicle entering the Airport through your gate MUST be inspected each and every time they enter.** This inspection includes you visually inspecting the interior, exterior and cargo area to insure no prohibited items are being transported (Explosives, Improvised Explosive Devices or components, Firearms and ammunition, Incendiaries excluding matches and lighters, Hazardous materials not consistent with the individual's construction duties; or forged or altered, expired or false Airport media).
- **Contractors must provide the Duluth Airport Authority (DAA) a list of persons that will require escort.** If not on the Escort Access List, an individual must be verified through the contractor before escorted entry is allowed. The escort list is to be made available to TSA on request.
- **All persons requiring escort must be identified through a valid government issued photo ID** (driver's license, military ID, passport, etc). Entry Control Guards must physically handle the ID presented and compare it to the person presenting it.

- **The person under escort must be logged in and out daily** (see DAA Escorted Entry Control Form). These forms are to be turned into DAA Operations weekly.
- **Entry Control Guards must have a radio or cell phone** that allows them to contact Airport Security and/or 911 is an emergency exists or if an unauthorized entry is attempted.
- If at any time you have questions or concerns that are not an emergency, please contact the Director of Operations (218-590-8606) or Security Manager (218-391-7403) or Uniformed Security Officer (24/7 number is 391-5631).

X. APPENDIX

Exhibit #1

AIRPORT ASSISTANCE FORM

Date:_____ Project Number:_____

DAA Personnel Requesting Assistance _____
(Name)

(Signature)

Assistance For: _____
(Contractor/Company)

(Authorized Certifier)

Type Of Work Requested: _____

Area Where Assistance Is Needed: _____

Reason For Requesting Assistance: _____

Was This Activity Part of the Contract Work? () Yes () No

Equipment and Labor Used: _____
(Maintenance Department) _____

Start Time: _____ Completion Time: _____

Cost: _____

NOTES: _____

DISTRIBUTION: Airfield Operations, Maintenance, Finance, Engineering, and Contractor.

Exhibit #1 (Continued)

TYPE OF ASSISTANCE	COST/HOUR
EQUIPMENT	
Front End Loader	\$350
Oshkosh 18' Sweeper	\$450
Grader	\$500
Skidsteer	\$200
Labor (included in the above services)	\$125
PAVEMENT REPAIR	
Painting (pavement marking)	To be determined
Asphalting	" "
Concrete	" "
Shoulder Repair (class 5-gravel)	" "
Labor (included in the above services)	\$100
ELECTICAL ASSISTANCE	
Ditch Witch Trencher	\$250
Underground Locator	\$200
Install / Remove Temporary / Permanent Lights	\$250
Labor (included in the above services)	\$125
ESCORT	
Labor With Truck / Radio	\$100

*Billing in one-hour increments rounded to the next hour: one-hour minimum charge.

Exhibit #2

POLICY REGARDING REQUESTS FOR UNESCORTED ACCESS FOR AOA RESTRICTED AREAS

- A. Purpose: The purpose of this document is to set forth the rules and regulations at the Duluth International Airport, in compliance with FAA/TSA Security Requirements (FAR Part 1542), for tenants, contractors or other business entities seeking authorization for unescorted access privileges in the Air Operations Area (AOA) secure areas at Duluth International Airport for themselves or their employees. Such tenants, contractors and other entities shall be referred to hereafter as Company. The Duluth Airport Authority shall be referred to hereafter as DAA.
- B. Applicability: The provisions listed below are applicable to all Companies seeking unescorted access for themselves or their employee(s) inside secure areas at Duluth International Airport. No such request will be honored unless the Company has a lease, permit, service, construction or other such contract with DAA or is specifically authorized for entry by federal regulation.
- C. Designation of Certifier: For each project, contract, permit or lease, each company shall formally designate and authorize a person (known hereafter as the Certifier) to sign written requests and written certifications verifying background investigations for unescorted access privileges for themselves or their employees working inside the Airport's AOAs, as well as respond to the DAA's audits of such privileges. **The designation must be written on company letterhead, and include the name and title of the Certifier, as well as his/her business address, and shall contain a statement that a satisfactory five (5) year employment history background check has been accomplished for access to AOA secure areas.**
- D. Responsibilities: The Duluth Airport Authority (DAA) through its Executive Director and other airport staff is responsible for the overall security of the Airport. All Companies and their Certifiers are responsible for complying with the airport

security requirements contained in FAR Part 1542, this policy, and the Airport Security Program.

E. FAR Part 1540.103: “Fraud and Intentional Falsification of Records”: Federal regulations specify that no person may make, or cause to be made, any of the following:

1. Any fraudulent or intentionally false statement in any application for any security program, access medium, or identification medium, or any amendment thereto, under this part.
2. Any fraudulent or intentionally false entry in any record or report that is kept, made, or used to show compliance with this part, or exercise any privileges under this part.
3. Any reproduction or alteration, for fraudulent purpose, of any report, record, security program, access medium, or identification medium issued under this part.

F. FAR Part 1542.207 “Access Investigation”: Federal regulations require that the following minimum access investigation procedures be undertaken by a Company in order to request and obtain unescorted access privileges for itself and its employee(s) (“Applicants”) working at Duluth International Airport and to designate a “Certifier”:

1. The Company must require the Applicant/Certifier to complete a written application that includes:
 - a) The Applicant’s full name, including any aliases or nicknames;
 - b) Dates, names, phone numbers and addresses of previous employers with explanations for any gaps in employment of more than 12 months, during the previous **5 year period**.
 - c) Any convictions during the above time period of crimes listed in Section IX; and

- d) Notification that the Applicant/Certifier will be subject to employment history verification and possibly a criminal history records check.
- 2. The Company must confirm the identity of the Applicant/Certifier through the presentation of two forms of identification, one of which must bear the Applicant's/Certifier's photograph.
- 3. The company must verify the employment information of the Applicant/Certifier regarding the most recent 5 years of employment history by written documentation, by telephone interview, or in person with a representative of the prior employer(s). Written notes and/or documents concerning the name of the representative, date of verification, and the information verified must be created, maintained and presented to DAA upon request. In the event:
 - a) An Applicant/Certifier cannot satisfactorily account for and document a period of unemployment of 12 months or more; or
 - b) The Applicant/Certifier cannot support his/her statements made in the application or there are inconsistencies discovered; or
 - c) Information becomes available indicating a possible conviction for one of the disqualifying crimes listed in Section IX;

The Company will be required to request a FBI fingerprint based Criminal History Records Check (CHRC) on the individual. This request must be made through DAA for all Companies. The criminal check will be processed by the FBI through the use of fingerprint cards. There will be a \$75.00 processing fee (checks payable to the DAA) that must be submitted with the criminal history request. Cost of the fingerprinting is additional.

- G. Termination: Upon voluntary or involuntary termination of the unescorted access privileges of the Applicant, the Company is required to notify Airport Security within 8 hours by written notification and surrender the identification badge as soon as possible. If the Applicant is convicted of any of the crimes listed in Section IX after unescorted access is granted, the conviction must be reported by the Company immediately to Airport Security and the ID badge returned within 24 hours.
- H. Records: Company must keep verification records for each Applicant for 180 days after termination of unescorted access privileges. Company, through the Certifier, shall respond promptly and completely to periodic audits of persons whose access authority is to be continued.
- I. Disqualifying Criminal Offenses: An individual has a disqualifying criminal offense if the individual has been convicted, or found not guilty of by reason of insanity, any of the disqualifying crimes listed below in any jurisdiction during the last 5 years before the date of the individual's application for unescorted access authority, or while the individual has unescorted access authority. The disqualifying criminal offenses are as follows:
1. Forgery of certificates, false making of aircraft, and other aircraft registration violations;
 2. Interference with air navigation;
 3. Improper transportation of a hazardous material;
 4. Aircraft piracy (hijacking);
 5. Interference with flight crew members or flight attendants;
 6. Commission of certain crimes aboard aircraft in flight;
 7. Carrying a weapon or explosive aboard an aircraft;
 8. Conveying false information and threats;

9. Aircraft piracy outside the special aircraft jurisdiction of the United States;
10. Lighting violations involving transporting controlled substances;
11. Unlawful entry into an aircraft or airport area that serves air carriers or foreign air carriers contrary to established security requirements.
12. Destruction of an aircraft or aircraft facility.
13. Murder.
14. Assault with intent to murder.
15. Espionage.
16. Sedition
17. Kidnapping or hostage taking.
18. Treason
19. Rape or aggravated sexual abuse.
20. Unlawful possession, use, sale, distribution, or manufacture of an explosive or weapon.
21. Extortion
22. Armed or felony armed robbery.
23. Distribution of, or intent to distribute, a controlled substance.
24. Felony arson.
25. Felony involving a threat.
26. Felony involving – Willful destruction of property;
27. Importation or manufacture of a controlled substance;
28. Burglary;

- 29. Theft; Dishonesty, fraud, or misrepresentation;
- 30. Possession or distribution of stolen property;
- 31. Aggravated assault;
- 32. Bribery;
- 33. Illegal possession of a controlled substance punishable by a maximum term of imprisonment of more than 1 year.
- 34. Violence at international airports.
- 35. Conspiracy or attempt to commit any of the aforementioned criminal acts.

J. The Cost of ID Badges / Access Cards: The cost of Airport ID Badges and Access Cards issued to individuals or organizations on an initial or replacement basis is \$65.00 each. This price reflects the cost of materials (photo supplies/card stock) and labor to include training, data entry, and the making and issuing the cards. Airport ID Cards and Access Cards will be paid for at the time of issuance. Exception to this policy will be major tenants that have an established account with the Airport Authority Bookkeeping Office. ID Cards and Access Cards will be issued through the Airport Security Office. Checks can be made out to the Duluth Airport Authority (DAA) with the type of badge or card annotated in the memo section of the check. A receipt will be issued.

In the event an ID Badge or Access Card is lost, the individual will be assessed \$50.00 per item in addition to replacement cost of \$50.00 per item.

(SAMPLE)

COMPANY LETTERHEAD

Today's Date

Brian Grefe, Airport Operations Director
Duluth Airport Authority
4701 Grinden Drive
Duluth, MN 55811

Subject: Letter of Designation

Dear Mr. Grefe:

I wish to designate _____ (name) _____, _____ (title) _____, as our "Authorized Certifier" in regards to requesting unescorted access privileges for our employees at the Duluth International Airport.

 (name) 's business address is:

	Company
	address
	city, state zip
	telephone number

A background check per FAR Part 1542 requirements has been completed ensuring (name) has met the requirements. Please contact me if you require further information.

Sincerely,

President
Company

Company Name

Authorized Company Clearances: _____

Authorized Badge Color: _____

I, _____,
(Print Name) (Print Title)

have been authorized by the above company to request employee I.D. cards for security identification and access purposes at Duluth International Airport. I have reviewed the DAA Policy regarding my responsibilities and agree that in making such request, I am certifying that my company and I understand and have fully complied with the Federal Aviation Administration, The Transportation Security Administration, DAA Airport Security Program requirements, and the rules and regulations regarding background checks and verification. I also understand that I may be criminally or civilly prosecuted for providing false or fraudulent information.

Signature

City / County of _____, State or Commonwealth of

The foregoing document was acknowledged before me this _____ day of
_____ 201_

by _____
(Name of person seeking acknowledgement)

Notary Public

My commission expires: _____

CHECKLIST FOR AOA BADGE PAPERWORK.

- **PAGE 1. HAVE APPLICANT COMPLETE AND SIGN/DATE.**
- **PAGES 2 & 3. APPLICANT COMPLETES 5 YEAR WORK HISTORY. CERTIFIER AUTHENTICATES AND SIGNS OFF ON INFORMATION PROVIDED.**
- **PAGE 4. AUTHORIZED CERTIFIER ANNOTATES TIMES OF ACCESS, IF AIRFIELD DRIVING IS REQUIRED, AND SIGNS APPLICATION AUTHORIZING THE BADGE. IN ADDITION, APPLICATION MUST INDICATE SECURITY TRAINING IS CURRENT. APPLICANT MUST SIGN FOR BADGE WHEN IT IS RECEIVED.**
- **APPLICATION MUST ALSO CONTAIN:**
 - **COPY OF DRIVERS LICENSE & ONE OTHER FORM OF ID: SOCIAL SECURITY CARD, PERMIT TO CARRY A WEAPON, PILOTS LICENSE, COMPANY ID, ETC.**
 - **IF APPLICANT REQUIRES AN ACCESS CARD, THEY MUST HAVE COMPLETED AND SIGNED AN ACCESS CARD RECEIPT FORM.**

EXHIBIT #3

POLICY REGARDING REQUESTS FOR UNESCORTED ACCESS FOR THE SECURITY IDENTIFICATION DISPLAY AREA (SIDA)

- A. Purpose: The purpose of this document is to set forth the policies and procedures for the Duluth International Airport, in compliance with FAA/TSA Security Requirements (FAR Part 1542), for tenants, contractors or other business entities seeking authorization for unescorted access privileges in the Security Identification Display Area (SIDA) at Duluth International Airport for themselves and/or their employees. Such tenants, contractors and other entities shall be referred to hereafter as Company. The Duluth Airport Authority shall be referred to hereafter as DAA.
- B. Applicability: The provisions listed below are applicable to all Companies seeking unescorted access for themselves or their employee(s) in the SIDA at Duluth International Airport. No such request will be honored unless the Company has a lease, permit, service, construction or other such contract with DAA or is specifically authorized for entry by federal regulation.
- C. Designation of Certifier: For each project, contract, permit or lease, each company shall formally designate and authorize a person (known hereafter as the Certifier) to sign written requests and written certifications verifying background investigations for unescorted access privileges for themselves or their employees working inside the Airport's SIDA / Secured Area. As well as respond to the DAA's audits of such privileges. **The designation must be written on company letterhead, and include the name and title of the Certifier, as well as his/her business address, and shall contain a statement that a satisfactory FBI fingerprint based Criminal History Records Check (CHRC) has been accomplished and indicates no unfavorable information was disclosed so access may be granted to the SIDA/Secured Area.**

- D. Responsibilities: The Duluth Airport Authority (DAA) through its Executive Director and other airport staff is responsible for the overall security of the Airport. All Companies and their Certifiers are responsible for complying with the airport security requirements contained in FAR Part 1542, this policy, and the Airport Security Program.
- E. FAR Part 1540.103: "Fraud and Intentional Falsification of Records": Federal regulations specify that no person may make, or cause to be made, any of the following:
1. Any fraudulent or intentionally false statement in any application for any security program, access medium, or identification medium, or any amendment thereto, under this part.
 2. Any fraudulent or intentionally false entry in any record or report that is kept, made, or used to show compliance with this part, or exercise any privileges under this part.
 3. Any reproduction or alteration, for fraudulent purpose, of any report, record, security program, access medium, or identification medium issued under this part.
- F. FAR Part 1542.207 "Access Investigation": Federal regulations require that the following minimum access investigation procedures be undertaken by a Company in order to request and obtain unescorted access privileges for itself and its employee(s) ("Applicants") working at Duluth International Airport and to designate a "Certifier":
1. The Company must require the Applicant/Certifier to complete a written application that includes:
 - a) The Applicant's full name, including any aliases or nicknames;
 - b) Any convictions during the above time period of crimes listed in Section IX; and
 - c) Notification that the Applicant/Certifier will be subject to a FBI Criminal History Records Check (CHRC).

2. The Company must confirm the identity of the Applicant/Certifier through the presentation of two forms of identification, one of which must bear the Applicant's/Certifier's photograph.

The Company will be required to request an fingerprint based Criminal History Records Check (CHRC) on the individual. This request must be made through DAA for all companies except air carriers. The CHRC will be processed by the FBI through the use of fingerprint cards. There will be a \$75.00 processing fee (checks payable to the DAA) that must be submitted with the criminal history request. Cost of the fingerprinting is additional.

- G. Termination: Upon voluntary or involuntary termination of the unescorted access privileges of the Applicant, the Company is required to notify Airport Security within 8 hours by written notification and surrender the identification badge as soon as possible. If the Applicant is convicted of any of the crimes listed in Section IX after unescorted access is granted, the conviction must be reported by the Company immediately to Airport Security and the ID badge returned within 24 hours.
- H. Records: Company must keep verification records for each Applicant for 180 days after termination of unescorted access privileges. Company, through the Certifier, shall respond promptly and completely to periodic audits of persons whose access authority is to be continued.
- I. Disqualifying Criminal Offenses: An individual has a disqualifying criminal offense if the individual has been **convicted**, or **found not guilty of by reason of insanity**, any of the disqualifying crimes listed below in any jurisdiction during the last ten (10) years before the date of the individual's application for unescorted access authority, or while the individual has unescorted access authority. The disqualifying criminal offenses are as follows:
 1. Forgery of certificates, false making of aircraft, and other aircraft registration violations;
 2. Interference with air navigation;
 3. Improper transportation of a hazardous material;

4. Aircraft piracy (hijacking);
5. Interference with flight crew members or flight attendants;
6. Commission of certain crimes aboard aircraft in flight;
7. Carrying a weapon or explosive aboard an aircraft;
8. Conveying false information and threats;
9. Aircraft piracy outside the special aircraft jurisdiction of the United States;
10. Lighting violations involving transporting controlled substances;
11. Unlawful entry into an aircraft or airport area that serves air carriers or foreign air carriers contrary to established security requirements.
12. Destruction of an aircraft or aircraft facility.
13. Murder
14. Assault with intent to murder.
15. Espionage.
16. Sedition
17. Kidnapping or hostage taking.
18. Treason
19. Rape or aggravated sexual abuse.
20. Unlawful possession, use, sale, distribution, or manufacture of an explosive or weapon.
21. Extortion
22. Armed or felony armed robbery.
23. Distribution of, or intent to distribute, a controlled substance.
24. Felony arson.
25. Felony involving a threat.
26. Felony involving –
 - Willful destruction of property;
 - Importation or manufacture of a controlled substance;
 - Burglary;
 - Theft;
 - Dishonesty, fraud, or misrepresentation;
 - Possession or distribution of stolen property;
 - Aggravated assault;
 - Bribery;
 - Illegal possession of a controlled substance punishable by a maximum term of imprisonment of more than 1 year.
27. Violence at international airports.
28. Conspiracy or attempt to commit any of the aforementioned criminal acts.

- J. The Cost of ID Badges / Access Cards: The cost of Airport ID Badges and Access Cards issued to individuals or organizations on an initial or replacement basis is \$50.00 each. This price reflects the cost of materials (photo supplies/card stock) and labor to include training, data entry, and the making and issuing of cards.

Airport ID Cards and Access Cards will be paid for at the time of issuance. Exception to this policy will be major airport tenants that have an established account with the Airport Authority bookkeeping office. ID Cards and Access Cards will be issued through the Airport Security Office. Checks can be made out to the Duluth Airport Authority (DAA) with the type of badge or card annotated in the memo section of the check. A receipt will be issued.

In the event an ID Badge or Access Card is lost, the individual will be assessed \$50.00 per item in addition to the replacement cost of \$50.00 per item.

Authorized Company Clearances: _____

Authorized Badge Color: _____

I, _____, _____
(Print Name) (Print Title)

have been authorized by the above company to request employee I.D. cards for security identification and access purposes at Duluth International Airport. I have reviewed the DAA Policy regarding my responsibilities and agree that in making such request, I am certifying that my company and I understand and have fully complied with the Federal Aviation Administration, Transportation Security Administration, the DAA Airport Security Program requirements, and the rules and regulations regarding background checks and verification. I also understand that I may be criminally or civilly prosecuted for providing false or fraudulent information.

Signature

City / County of _____, State or Commonwealth of

The foregoing document was acknowledged before me this _____ day of
_____ 201 _____

by _____
(Name of person seeking acknowledgement)

Notary Public

My commission expires: _____

EXHIBIT #4

(SAMPLE)

CONSTRUCTION BADGE REQUEST LETTER

(COMPANY LETTERHEAD)

(To include name, address, and telephone number)

(Date)

Brian Grefe
Director of Operations
Duluth Airport Authority
4701 Grinden Dr.
Duluth, MN 55811

RE: Project Name: _____
Project No: _____

Dear Mr. Grefe:

The purpose of this letter is to advise you of *(company's name)* activities at Duluth International Airport and request authorization to apply for security identification badges. The badges will be needed until *(date project expires)*.

(Company name) is engaged in... (a brief description of your activities at Duluth International Airport to include locations on the Airport where proposed activities will occur, a point of contact, and the reason why your employees will require access to the restricted area of the Airport).

Attached is a list of all subcontractors authorized to work on this project.

To fulfill the requirements of the Duluth International Airport Security Program policies and procedures, the following individual(s) is (are) designated as certification official(s) (must be a company officer or their local management representative with the authority to bind the company) and their sample signature(s) appear on the attached, notarized document:

The individual(s) are familiar with the Airport's attached "Rules and Regulations Regarding Requests For Unescorted Access at Duluth International Airport". They will sign all applications for ID cards, act as a liaison for verification of employment history and or Criminal History Records Checks (CHRCs) for anyone whom they request access to the restricted areas of the Airport and will ensure *(company name)* employees who are issued Duluth International Airport ID badges comply with the Program. *(Company name)* will ensure a strict accounting of all ID badges is maintained, to include prompt reporting of any lost badges and return of ID badges upon termination or transfer of any employee. I understand that all Airport ID badges are, and remain, the property of the DAA and that failure on the part of my company or employees to abide by Airport rules and regulations may result in revocation of access privileges and confiscation of all outstanding ID badges.

As a condition of any such grant of access, I agree that any Transportation Security Administration fine levied against **the Airport** as a result of the actions or omissions of anyone for whom one of the certification official(s) has requested access to the restricted area **of Duluth** International Airport will be paid by *(company name)*.

I certify that I have authority to bind *(company name)* to this agreement.

Sincerely,

(Signature)
(Company officer or local manager)

CC: Project Engineer
Project File

EXHIBIT #5

4701 Grinden Drive, Duluth International Airport
Duluth, Minnesota 55811

DULUTH AIRPORT AUTHORITY
REPLACEMENT ID BADGE APPLICATION
(Please type or print legibly in ink)

Employee Information

Last Name	First Name	Mid Initial	
Social Security Number	Home Phone Number		
Home Address	City	State	Zip
Company Name		Work Phone Number	

Reason For Replacement

<input type="checkbox"/> Expired Tenant Badge	<input type="checkbox"/> Normal Wear	<input type="checkbox"/> Defaced
<input type="checkbox"/> Lost	<input type="checkbox"/> Name Change Only (Proof Required)	<input type="checkbox"/> Other _____

Authorized Company Certifier

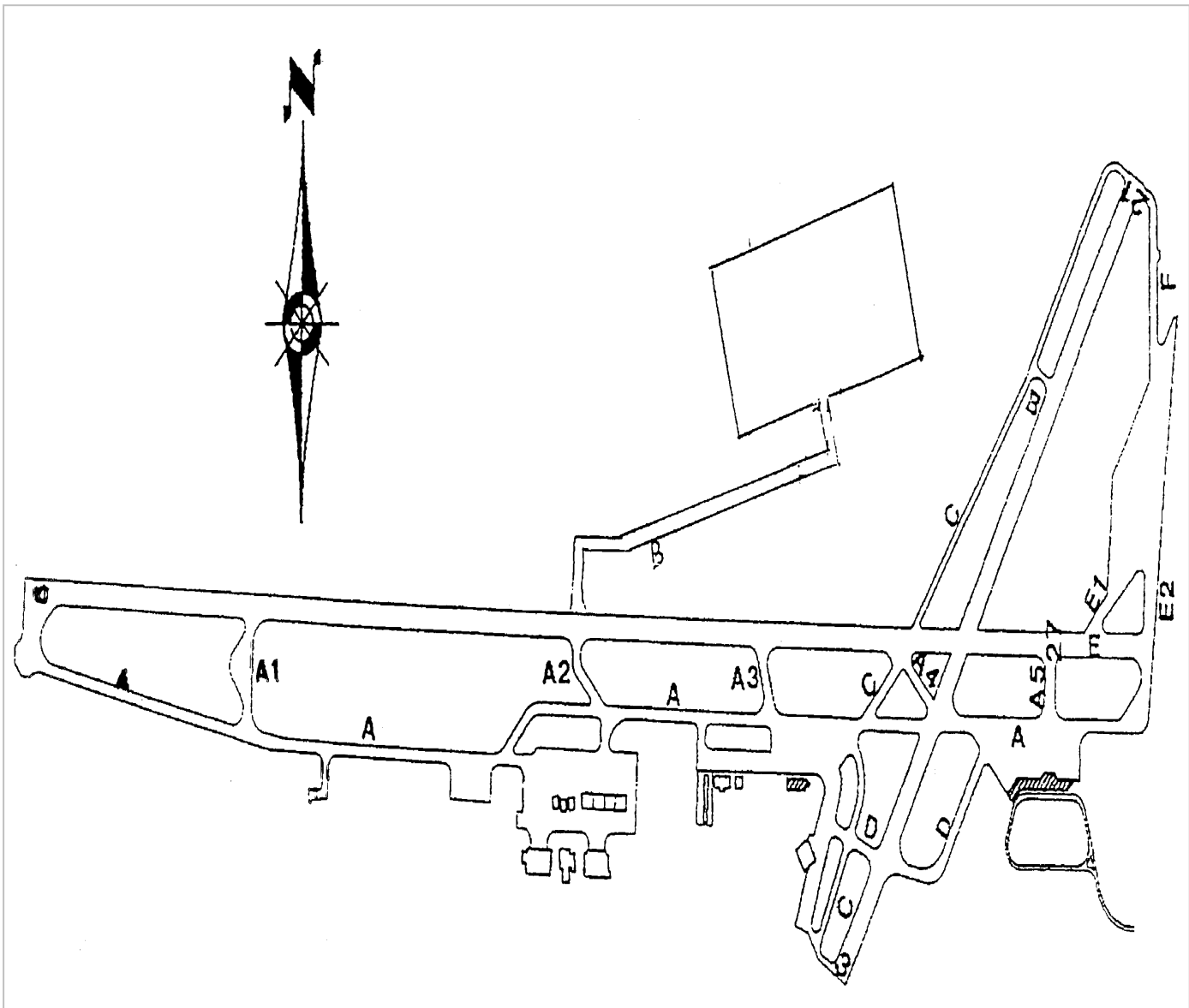
Last Name	First Name	Signature	Date
-----------	------------	-----------	------

Office Use Only

Badge Number	Lost Badge Number		
Comments			
Issued By	Date Issued	Entered By	Date Entered

Identification Badge Received By	Employ	Date
Signature		

EXHIBIT-6



AIRFIELD LIGHTING CIRCUIT ELECTRICAL SAFETY PROGRAM

Airfield lighting at the Duluth International Airport presents a unique electrical hazard that requires specialized knowledge of *series circuits*, as opposed to the more common parallel circuits on which most electricians are trained. Once trained on series circuits, qualified electricians are more capable of performing their tasks with tolerable levels of risk. To obtain and maintain this level of tolerability, however, a detailed airfield lighting electrical safety program (separate from any general electrical safety program) must be developed, implemented, and maintained so that new employees and contract electricians can work on or near the airfield lighting circuits with minimal risk of injury. The program should be updated when new hazards are introduced so that experienced electricians (in addition to new and contract electricians) will have a resource from which to gather information.

The existing electrical safety program has served the Duluth International Airport in numerous ways, but given the unique nature of airfield lighting circuits (ungrounded circuits; sophisticated, remotely-controlled constant current regulators with 3,000 volts on taxiways and 5,000 volts on runways), a specific program designed for airfield lighting is warranted. Along with such a program, a new role should be established, that of electrical safety manager (ESM). The ESM will be responsible for overseeing the development and maintenance of the airfield lighting electrical safety program.

This program is the first draft of such an airfield electrical safety program. The goals of this program are as follows:

Airport Electrical Safety Goals

- 1. Place all electrical circuits in an *electrically safe work condition* prior to any work on or near them.**
- 2. When it is not possible to place a circuit in an *electrically safe work condition* prior to working on or near the circuit, provide additional safeguards (such as voltage-rated gloves and blankets) so that an equivalent level of protection is provided.**
- 3. Provide meaningful electrical safety training for airfield maintenance employees, including contractors, newly-hired DAA maintenance employees, and experienced/qualified electricians (when new tasks/hazards are introduced).**
- 4. Provide guidance for airfield maintenance in the specific safe work practices associated with airfield lighting systems.**
- 5. Provide guidance regarding the proper personal protective equipment (PPE) to wear for various airfield lighting electrical tasks.**
- 6. To minimize airfield lighting down-time due to safety-related incidents**
- 7. To ensure that the best airfield lighting safety practices are incorporated into the Duluth Airport Authority's electrical safety program to keep pace with the ever-increasing aviation knowledge base, thus facilitating the airport's response to the rapid growth and change in the aviation industry.**

These are obtainable goals, but it is critical that airport upper management concur with them lest they not be embraced at all levels of the organization.

This electrical safety program has the following components:

Section I:	Scope & Philosophy
Section II:	Personal Responsibility
Section III:	Electrical hazards and other definitions
Section IV:	Creating an <i>Electrically Safe Work Condition</i> , including Lockout Program (Control of Hazardous Energy)
Section V:	Approaching Live Parts (Hazard Boundaries & Limits of Approach)
Section VI:	Energized Electrical Work Permit Program
Section VII:	Personal Protective Equipment
Section VIII:	Contractors and Vendors
Section IX:	Identification of Hazardous Tasks and Jobs
Section X:	Procedures
Section XI:	Program Administration
Section XII:	Training
Section XIII:	Budget
Section XIV:	Audit and Recordkeeping
Appendix A:	Annual Observation of LOTO
Appendix B:	Airfield Bulb Training

SECTION I: SCOPE and PHILOSOPHY

The basic philosophy on which this program is based is that all airfield electrical work must be performed with electrical circuits and systems in an **electrically safe work condition**. This means that the circuits are de-energized, locked out, tested dead, and in some cases, grounded. Although there will be some circumstances when this is not possible, those circumstances should be minimized, performed only when:

- A. De-energizing the circuit introduces additional hazards or,
- B. De-energizing is infeasible due to equipment design or operational limitations (such as the hazard that would be introduced to an aircraft on approach if the lighting system was inoperable).

In cases when a circuit or system will be worked on while energized, the airfield foreman must be aware of and approve the work (this is typically done via a work-permit system, although a permit is not required for tasks done routinely).

This airfield lighting electrical safety program must be read and understood by all maintenance employees at the Duluth Airport Authority who are or may be exposed to the airfield lighting circuits. Compliance with this program is a condition of employment. This includes electricians, contractors, vendors, servicing personnel, and employees other than electricians who may be exposed to the dangers of the airfield lighting circuits in the course of their normal work. Portions of the program will apply to airfield tower personnel, who must understand that their actions may endanger airfield electricians doing repairs on lighting circuits.

This program should also be read and understood by others who, although not directly exposed to the hazards of airfield lighting circuits, have a need to know about the associated hazards.

The Duluth Airport Authority's Safety Director is responsible for administering this program, although significant assistance will be provided by the SRE supervisory staff.

SECTION II: PERSONAL RESPONSIBILITY

- Each employee must take responsibility for working safely on or around electrical equipment. If you do not understand the job or task, ask your supervisor for a job briefing
- If you are designated as a *qualified electrician* (see definition below), you must know how to execute the emergency procedures to release someone from a live circuit and to perform first aid/CPR
- For all electrical work, particularly energized-electrical work, HAVE A PLAN to perform the work safely. Anticipate unexpected events.
- Use the following safety-related work practices at all times:
 - o Never break a live series circuit, as the voltage will rapidly increase, possibly up to 10,000V. Short circuits through YOU are the result. There is no overcurrent protection.
 - o Never handle cables or transformers in light base cans while there is current present. Cables or connectors can have cracked insulation that is not visible.
 - o Never enter a manhole containing exposed energized conductors without donning the proper protective equipment.
 - o Never handle cables or
- It should always be assumed that a circuit is energized until proven otherwise.
- Employees must be aware that de-energizing an electrical conductor or circuit part and making it safe to work on is, in itself, a potentially hazardous task.
- Do not work on electrical circuits or systems unless they are in an *electrically safe work condition* (de-energized, locked out, tested dead). Exceptions are permitted as allowed in this program.
- If an electrical circuit or system is not in an *electrically safe work condition*, additional precautions must be taken (e.g. voltage-rated gloves, blankets, mats).
- If a circuit is locked out, your lock should be on the lockout device.
- Only *qualified electricians* can perform high voltage work (>600V), and must always work with another *qualified electrician*.
- No bare-hand contact is to be made with exposed energized electrical conductors or circuit parts above 50 volts
- Know what constitutes a *confined space*. A confined space is defined as follows:
 - o Is large enough and so configured that an employee can bodily enter and perform assigned work; and
 - o Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits); and
 - o Is not designed for continuous employee occupancy. (from OSHA 1910.146)

SECTION III: ELECTRICAL HAZARDS and other DEFINITIONS

Electrically Safe Work Condition:

A state in which the conductor or circuit part to be worked on or near has been disconnected from energized part, locked/tagged in accordance with established standards, tested to ensure the absence of voltage, and grounded if determined necessary. Achieving an *electrically safe work condition* is the underlying principle of all electrical work. Performing work when a circuit is not rendered safe should be done only when necessary.

Hazards

The hazards associated with the airport lighting system, while unique, remain the same when discussing how they will injure and kill. Electrical hazards are:

- **Electric shock** – the primary hazard
- **Arc flash and arc blast** – typically hazardous only when working on the 480V side of the CCR or on any other non-series circuit, such as motor control centers, switchgear, and electrical distribution panels
- **Fire**

Electric Shock

To eliminate the hazards of electric shock, we need to know:

- The source of the hazard
- How the exposure could occur
- How severe the shock would be to the human body
- What action is necessary

Mitigating the Exposure to Electric Shock

- Can the circuit be de-energized?
- If not, what must be done to minimize the hazard?
- What personal protective equipment (PPE) will minimize the exposure?

Arc Flash

Arc flash is not as likely to occur on the low current series lighting circuits, but can occur on other non-lighting circuits on the airfield. This is because on non-lighting circuits, fault currents can increase significantly before over-current protective devices operate (in series lighting circuits, no such increase in current should occur, since the constant current regulator will maintain the current at its prescribed current).

Arc flash is defined as follows:

When an electric current passes through air between ungrounded conductors or between ungrounded conductors and grounded conductors, the temperatures can reach 35,000°F. Exposure to these extreme temperatures both burns the skin directly and causes ignition of clothing, which adds to the burn injury. The majority of hospital admissions due to electrical accidents are from arc-flash burns, not from shocks. Each year more than 2,000 people are admitted to burn centers with severe arc-flash burns. Arc-flashes can and do kill at distances of 10'. – Annex K, NFPA 70E

Arc Blast

Arc blast is not as likely to occur on the low current series lighting circuits, but can occur on other non-lighting circuits on the airfield. This is because on non-lighting circuits, fault currents can increase significantly before over-current protective devices operate (in series lighting circuits, no such increase in current should occur, since the constant current regulator will maintain the current at its prescribed current).

Arc blast is defined as follows:

An arc blast occurs when the tremendous temperatures of the arc cause the explosive expansion of both the surrounding air and the metal in the arc path. For example, copper expands by a factor of 67,000 times when it turns from a solid to a vapor. The danger associated with this expansion is one of high pressures, sound, and shrapnel. The high pressures can easily exceed hundreds or even thousands of pounds per square foot, knocking workers off ladders, rupturing eardrums, and collapsing lungs. The noise can exceed 160 dB. Finally, material and molten metal is expelled away from the arc at speeds exceeding 700 mph, fast enough for the shrapnel to penetrate the body. – Annex K, NFPA 70E

Fire

Electrical systems are a significant source of fire. This electrical safety program will not address this hazard directly, since fire hazards are broadly addressed in other sections of airport safety policies

Qualified Electrician

One who has the knowledge and skills related to the construction and operation of the electrical equipment and installations and has received safety training on the hazards involved.

Limited Approach Boundary

An approach limit at a distance from an exposed live part within which a shock hazard exists

Restricted Approach Boundary

An approach limit at a distance from an exposed live part within which there is an increased risk of shock, due to electrical arc over combined with inadvertent movement, for personnel working in close proximity to the live part.

Prohibited Approach Boundary

An approach limit at a distance from an exposed live part within which work is considered the same as making contact with the live part.

Flash Protection Boundary

An approach limit at a distance from exposed live parts within which a person could receive a second degree burn if an electrical arc flash were to occur.

Confined Space

- i. Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- ii. Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and
- iii. Is not designed for continuous employee occupancy. (from OSHA 1910.146)

SECTION IV: ESTABLISHING AN ELECTRICALLY SAFE WORK CONDITION INCLUDING LOCKOUT PROGRAM (Control of Hazardous Energy)

The underlying principle in all airfield electrical work, whether on airfield lighting circuits or any other system greater than 50 volts, is to place the system in an *electrically safe work condition*. This means de-energizing the system through a physical disconnect switch (as opposed to an electronic switch, push button switches, selector switches, or other shutdown means that does not physically separate the electrical supply from the part or circuit you will be working on); locking the circuit out; testing the circuit dead (de-energized), and; grounding the circuit, where appropriate.

The steps in achieving an *electrically safe work condition* are as follows:

1. Determine all possible sources of electrical supply to the equipment or circuit on which you will be working. Check applicable up-to-date drawings, diagrams, and ID tags.
2. After properly interrupting the load current, open the disconnecting device(s) for each source identified in Step 1 above
3. Wherever possible, visually verify that all blades of the disconnecting devices are fully open or that drawout-type circuit breakers are withdrawn to the fully disconnected position.
4. Apply lockout devices in accordance with the lockout program below
5. Use voltage and current detection equipment to test each phase conductor or circuit to verify they are de-energized. Only a true RMS clamp-on ammeter should be used to test a series lighting circuit dead (voltage detection devices can read zero on such circuits). **Voltage testing (or current testing) is, in itself, a hazardous activity.** You should test the circuit dead after lunch, at the start of a new shift, or any time conditions change so that energy may be present on the circuit. Each and every time you test for the presence of hazardous energy:
 - a. Test the meter on a known energized source
 - b. Test the locked out circuit for zero energy
 - c. Verify the function of the meter again on the known energized source
6. Safeguard the circuit against induced voltages. Airfield lighting circuits are subject to such induced voltages. Use local procedures to protect yourself against such voltages. When grounding is appropriate, use grounding wires with ample capacity, such as in cases where the circuit on which you are working could contact other exposed energized conductors.

Lockout Program and Procedure

A system cannot be considered in an *electrically safe work condition* unless it is locked out. The steps below must be used to ensure that the circuit on which you are working is not only de-energized but will remain de-energized until you remove your lock or otherwise relinquish control of the circuit.

Circuit lockout implies that whoever is working on the circuit has his or own lock on the power supply disconnecting means. You should never work under the protection of someone else's lock. If numerous employees are working on a circuit, multi-lock hasps or group lock boxes are available so that each employee can put his own lock on the circuit.

Employees other than electricians, such as contractors and other trades, should be included in the lockout. Only qualified persons, however, trained in the lockout program as well as any specific lockout procedures may apply a lockout.

Locks used in the lockout program must be uniquely identified and must be used for system lockout only. The lock must be linked to a particular employee or group lockbox. Keyed or combination locks are allowable, provided the key or combination is in the control of the person whom the lock is protecting.

Machine- or System-Specific Lockout Procedures

Each task, circuit, or system having one of the following characteristics requires its own, unique lockout procedure:

- a. Multiple energy sources
- b. Multiple disconnecting means
- c. Multiple crews or crafts working on the equipment
- d. Multiple locations
- e. Unique or unusual shutdown or re-start sequences
- f. A job or task that continues for more than one week

The procedures must inform the qualified person how and through what disconnecting means the energy sources can be identified, including drawings; how energy sources can be isolated; sources of stored/residual energy; must identify who might be exposed; who is in charge;

Steps to Perform in a Lockout

1. Determine if this will be an *individual employee control lockout*, a *simple lockout*, or a *complex lockout*.
 - a. **Individual Employee Control Lockout Procedure** – Permitted for a single employee when equipment with exposed conductors and circuit parts is de-energized for minor maintenance, servicing, adjusting, cleaning, inspection, and similar low-hazard activities. A lock need not be placed on the disconnecting means, provided the disconnecting means is adjacent to the conductor or equipment being worked on and is clearly visible to the employee working on it. The work cannot extend beyond one shift. Machine or equipment specific lockout procedures are not required for this type of lockout.
 - b. **Simple Lockout Procedure** – All lockouts not considered an *individual employee control lockout* or a *complex lockout* are *simple lockouts*. A simple lockout involves one or more qualified employees (trained in the lockout program) locking out one set of conductors. Machine or equipment specific lockout procedures are not required for this type of lockout.
 - c. **Complex Lockout Procedure**
 - i. Requires that a single qualified person be in charge of all energy sources and their lockout status as well as all personnel working under the protection of the lockout. The means of accounting for all personnel must be identified.
 - ii. Requires a written procedure which identifies the person in charge. The written procedure must identify how the circuit is verified dead (de-energized).
 - iii. A complex lockout procedure is required when:
 - g. There are multiple energy sources
 - h. Multiple disconnecting means
 - i. Multiple crews or crafts
 - j. Multiple locations
 - k. Particular shutdown or re-start sequences
 - l. A job or task that continues for more than one week
2. Record the Circuit or items to be locked out on the dry erase board in the vault office including all info asked for on the board. Fill out a LOTO log sheet and post on the CCR for the duration of the work and then file on the LOTO binder.
3. Determine how each source of energy is to be physically controlled. A specific lockout procedure is required for any gear that has more than one energy source, can regain energy after lockout, or cannot be locked out with one device. Refer to the specific lockout procedure. If the procedure has not been audited in the last year, review it with a knowledgeable person.
4. Open the disconnect switches or other disengaging means. Place the lockout device on the disconnecting means (e.g. circuit breaker/disconnect switch covers; rackout circuit breakers and bag them in lockable bags).
5. Place your lock and identifying tag on the locking device

6. Remove any stored voltage or other energy (e.g. capacitors, steam pressure, residual heat, springs, gravity, chemical energy)
7. Verify that all energy has been removed with the appropriate test equipment. For airport series lighting circuits, only a true RMS ammeter should be used to test for the absence of current.
8. Using the normal starting means, attempt to start the equipment to verify that no energy is available on the circuit.
9. Work on the circuit as necessary. Check for the presence of hazardous voltages at frequent intervals, particularly after lunch, at the start of a new shift, or whenever you suspect energy on the circuit.
10. Shift Changes: At no time should a locked out circuit have its protective locks removed. Shift changes should be planned so that before one or more of the off-going shift's locks are removed, someone (the supervisor is best) from the oncoming shift should place his lock on the disconnecting means.
11. Never remove someone's lock until it can be confirmed that they are not somewhere on the airfield subject to injury. If another's lock is removed, ensure they are notified before they return to work.

SECTION V: APPROACHING LIVE PARTS (HAZARD BOUNDARIES & LIMITS OF APPROACH)

All live parts greater than 50 volts must be placed in an *electrically safe work condition* before work on or around them can be done. There are exceptions, however, if it can be demonstrated by electrical supervision or airport management that de-energizing the circuit:

1. Introduces additional or increased hazards, or;
2. Is infeasible due to equipment design or operational limitations.

For example, if de-energizing a circuit places aircraft on approach or on the ground in danger, airport management or electrical supervision may decide that the risks of working on a circuit energized are worthwhile. Another example demonstrating when it may be acceptable to allow energized work is when a circuit must be tested when it is running, including voltage testing on live circuits. **Note that it should be airport management or electrical supervision that makes such a determination, and an energized electrical work permit should be obtained!**

Boundaries around energized electrical parts and circuits should be established:

- 1) When working near exposed energized electrical parts. This includes work that is done close enough to energized electrical circuits or conductors such that a person who is not knowledgeable about such circuits could be injured if he or she inadvertently touched or came near the circuit. This could include the general public, other employees on the airfield, other electricians, or contractors. Such work will not require an *energized electrical work permit* if the employees involved will not be crossing the *limited approach boundary*, which is, at a minimum, 3'6" from the energized part. If at any time employees who are not classified as *qualified electricians* will be crossing the *limited approach boundary*, an *energized electrical work permit* (see next section) must be pulled from electrical supervision, and the job must be overseen by a qualified electrician, even if no electrical work is to be done. A better alternative to this is to de-energize the circuit, but if this is not possible, boundaries must be established, a permit pulled, and a qualified electrician enlisted to oversee the job. **At no time is an unqualified person permitted beyond the limited approach boundary without a qualified electrician escorting him! Unqualified persons are never permitted beyond the *restricted approach boundary*!**
- 2) Boundaries must also be established when purposely working on or near exposed energized electrical parts. This includes all work, whether by a qualified electrician or not, done inside the *restricted approach boundary* (see definitions below). All work of this type also requires an *energized electrical work permit* (with some exceptions as noted in the next section). **Unqualified persons are never permitted beyond the *restricted approach boundary*!**

The boundaries established in the table below should be adhered to when working on or near exposed energized electrical conductors. The table is taken from NFPA 70E, Standard for Electrical Safety in the Workplace (2004) (the NFPA table goes up to values of 800 kV and should be consulted if needed for higher voltages).

<u>Voltage</u>	<i>Limited Approach Boundary¹</i>	<i>Restricted Approach Boundary</i>	<i>Prohibited Approach Boundary</i>	<i>Arc Flash Protection Boundary</i>
Less than 50	Not specified	Not specified	Not specified	See <i>Flash Protection Boundary</i> definition below
50 to 300	3'6"	Avoid contact	Avoid contact	
301 to 750	3'6"	1'0"	0'1"	
751 to 15 kV	5'0"	2'2"	0'7"	
15.1 kV to 36 kV	6'0"	2'7"	0'10"	

Table Notes

- 1) The *limited approach boundary* increases to 10' if the part being worked on can move (for example, energized rotors, wires, and other conductors that can be blown or pushed into an employee)

Limited Approach Boundary

An approach limit at a distance from an exposed live part within which a shock hazard exists. Persons who are not classified as *qualified electricians* may not breach this boundary without:

- 1) being briefed by a *qualified electrician* about the hazards of the space;
- 2) an escort by a *qualified electrician*, and;
- 3) wearing the appropriate flash protection equipment if an arc flash hazard exists.

Restricted Approach Boundary

Only *qualified electricians* may breach this boundary, and only when insulated or guarded from the energized part. The electrician must not only be qualified generally, but specifically qualified to do the task at hand. No conductive tools or parts may be brought closer than this boundary unless the electrician is insulated or guarded from shock. This boundary is an approach limit at a distance from an exposed live part within which there is an increased risk of shock, due to electrical arc over combined with inadvertent movement, for personnel working in close proximity to the live part.

Prohibited Approach Boundary

Crossing this boundary is considered the same as making contact with the live part. An electrical shock is probable simply by crossing this boundary without insulation or other protective measures.

Flash Protection Boundary

An approach limit at a distance from exposed live parts within which a person could receive a second degree burn if an electrical arc flash were to occur. The arc flash hazard while working on series airfield lighting circuits powered by a constant current regulator is minimal, since there is little bolted fault current available. For other airfield work, such as work done on the 480V supply to the constant current regulators and other non-lighting circuits, there is a significant arc flash/arc blast hazard. For voltages < 600 volts, the arc flash boundary will be at least four (4') feet (this is based on circuit interruption clearing time of 6 cycles (0.1 second) and

the available bolted fault current of 50,000 A – other clearing times will require a flash hazard analysis in accordance with NFPA 70E, section 130.3).

Observing a safe approach distance from exposed energized electrical conductors or circuit parts is an effective means of maintaining electrical safety. As the distance between a person and the exposed energized conductors or circuit parts decreases, the potential for electrical accident increases.

Unqualified persons can ensure their safety when they maintain the distances specified in the *Limited Approach Boundary* of table above. They must increase the distance if they are carrying long parts or tools (for example, if carrying a 1' pipe wrench, a plumber who happens to be working near a 120V exposed circuit should maintain a *Limited Approach Boundary* of 4'6" (3'6" + 1' (wrench) = 4'6").

Note that if this is a lighting circuit, there is no significant arc flash hazard. If this is any other type of non-lighting circuit, however, there is a possibility of arc flash, so that the arc flash boundary of 4' should be observed. Within 4' of such a circuit, all employees should be wearing flash protection gear.

SECTION VI: ENERGIZED ELECTRICAL WORK PERMIT PROGRAM

When Must an Energized Electrical Work Permit be Pulled?

All live parts greater than 50 volts must be placed in an *electrically safe work condition* before work on or around them can be done. There are exceptions, however, if it can be demonstrated by electrical supervision or airport management that de-energizing the circuit:

1. Introduces additional or increased hazards, or;
2. Is infeasible due to equipment design or operational limitations.

For example, if de-energizing a circuit places aircraft on approach or on the ground in danger, airport management or electrician supervision may decide that the risks of working on a circuit energized are worthwhile. **Note that it should be management or supervision that makes such a determination, and an energized electrical work permit should be obtained!**

Exceptions to Work Permit

Work performed on or near live parts by *qualified electricians* for testing, troubleshooting, voltage measuring, and similar tasks may be permitted without a permit, provided appropriate safe work practices and personal protective equipment is used. **Note that it should be management or supervision that allows such exceptions. These exceptions should never be allowed unless additional precautions are taken, such as using insulated gloves and other protective gear.**

Initiating an Energized Electrical Work Permit

1. Unless a task has been pre-approved as one that is allowed to be done energized without a permit, complete an *Energized Electrical Work Permit* form, items 1-11. Use the *Job Briefing and Planning Checklist* below to assist you. On some occasions, you may need input from someone outside the electrical maintenance group to complete items 1-3, since it is they who are telling you that the equipment or circuit cannot be de-energized.
2. Once complete, have the form approved by the Airside Manager.
3. If approved, establish the shock and flash protection boundaries, keeping in mind that they must be sturdy enough to keep unqualified people away. Unqualified people usually do not know what live bussing, cable, and circuits look like.
4. In addition to the shock hazards, remember the arc flash/arc blast hazards! This usually calls for arc flash clothing and protective gear whenever you are within 4' of an energized circuit < 600V. See the Personal Protective Equipment chapter of the electrical safety program for the right protective gear to wear.
5. Perform the work as outlined on the form, but plan for the unexpected.
6. After the work is complete, notify the supervisor who authorized the work

ENERGIZED ELECTRICAL WORK PERMIT

PART I: To be completed by the requestor (may or may not be an electrician)

Job/Work Order Number: _____

1. Description of circuit/equipment/job location:

2. Description of work to be done:

3. Justification of why the circuit/equipment cannot be de-energized or the work deferred until the next scheduled outage: _____

Requestor – Print

Requestor - Sign

Date

PART II: TO BE COMPLETED BY THE QUALIFIED ELECTRICIAN DOING THE WORK

4. Detailed procedure to be used in performing the above detailed work:

5. Description of the safe work practices to be employed:

6. Determine boundary distances: *limited approach; restricted approach; prohibited approach; flash:*

7. Is there an arc flash/arc blast hazard (there is no arc flash/blast hazard if the work will be done on constant current circuits; if work is done on any other circuit, including the 480V side of the CCR, there is dangerous arc flash/arc blast current available)

8. Personal protective equipment to be used:

9. Means employed to restrict the access of unqualified persons from the work area:

10. Did you complete a job briefing (when and with whom)? _____
11. Do you agree that this work can be performed safely (if not, return to requester)? _____

Electrically Qualified Person – Print

Sign

Date

PART III: APPROVALS TO PERFORM THE WORK WHILE HOT (ENERGIZED)

Airside Manager – Print

Sign

Date

Job Briefing and Planning Checklist

Identify

- ☐ Hazards
- ☐ Voltage levels
- ☐ Skills required
- ☐ Any secondary voltage sources?
- ☐ Any unusual work conditions
- ☐ Number of people needed to do the job

- ☐ Shock protection boundaries
- Is this series lighting, powered by a CCR? If so, no significant arc flash hazard
- ☐ If this is not an airfield lighting circuit, an arc flash/arc blast hazard is available

Ask

- ☐ Can the equipment be de-energized?

- ☐ Are backfeeds to the circuit possible?

Check

- ☐ Job Plans
- ☐ Single-line diagrams, as-builts, vendor diagrams

- ☐ Status board
- ☐ Safety procedures
- ☐ Vendor information/tech manual

Know

- ☐ What the job is
- ☐ Who else needs to know

- ☐ Who is in charge

Think

- ☐ About the unexpected...what if...?
- ☐ Lock-tag-test-try
- ☐ Test for voltage or current first
- ☐ Use the right tools and equipment, including protective gear

- ☐ Install and remove grounds, when required
- ☐ Install barriers and boundaries

Prepare for an emergency

- ☐ Is the standby person CPR trained?
- ☐ Is the required emergency equipment available?
- ☐ Where is the nearest telephone or communication equipment?

- ☐ Where is the fire alarm and fire extinguisher?
- ☐ Is confined space rescue available?
- ☐ What is the exact work location?
- ☐ How is the equipment shut off in an emergency?

SECTION VII: PERSONAL PROTECTIVE EQUIPMENT

General Principles

- Fire-resistant (FR) safety eyewear is required at all times
- Protective equipment is worn to protect against two major categories of electrical injury:
 - o Electrical shock – insulating gloves, mats, blankets. The primary feature of this protective equipment is that it insulates the wearer from electric shock
 - o Arc flash and arc blast – usually clothing, coveralls, hoods, etc., designed to withstand the arc flash and blast. The primary feature of this protective equipment is that it insulates the wearer from the high-energy electrical plasma, the heat, and to a lesser extent, the blast of a high-energy bolted fault. **It is critically important to protect the head, neck, and chest.**
- You must wear rubber insulating gloves where there is danger of hand and arm injury from electric shock due to contact with live parts. Gloves are categorized as follows:
 - o Class 00 up to 500V
 - o Class 0 up to 1,000V
 - o Class 1 up to 7,500V
 - o Class 2 up to 17,000V
 - o Class 3 up to 26,500V
 - o Class 4 up to 36,000V
- Insulated tools
 - o Insulated tools rated for the task being done must be used whenever working within the *restricted approach boundary*.
 - o Note that the *restricted approach boundary* must be increased by the length of tools, parts, and materials used. For example, if a two foot long pipe wrench is needed in the work zone, the restricted approach boundary must be increased by two feet.
 - o Fuse or fuse holding equipment must be insulated for the circuit voltages being worked on.
 - o Ropes and cables must be non-conductive
 - o Ladders must be non-conductive
- All protective equipment should be inspected before use. Do not use damaged gear or gear contaminated with oil or grease.
- Flame resistant clothing must be worn whenever there is a chance for arc flash or arc blast. Arc flash and arc blast, although unlikely to occur when working on lighting circuits, are frequent occurrences on other circuits, including simple 120V, 480V, and 277V circuits. Do not wear clothing that does not meet the FR requirements in the Table 2 below.
- Fibers that can melt, such as acetate, nylon, polyester, polypropylene, and spandex, shall never be worn against the skin (exception: small amounts of elastic used on underwear or socks is permitted). Fibers that can melt will greatly increase any burn injury incurred in an arc flash incident.

- When head, neck, face, and chin protection are required, ensure that the equipment is worn correctly. It is very common for electricians to leave their hoods up and their neck protection undone.
- When flame resistant (FR) clothing is worn to protect an employee, it shall cover all ignitable clothing and shall allow for movement and visibility.
- Tight-fitting clothing should be avoided. Loose-fitting clothing provides additional insulation because of air spaces.
- Flash Suits – required for some high hazard tasks (see Hazard/Risk Categories 3 and 4 in Table 1 below)
 - o Must be easy to put on and remove
 - o The entire flash suit, including the hood's face shield, must have an arc rating that is suitable for potential arc flash exposure of the task (see arc rating data in Table 3 below)
- Face shields must have an arc rating exposure suitable for the potential arc flash exposure of the task (see arc rating data in Table 3 below)
- Any outer garments such as rainwear or jackets must also be made of FR material
- Insulated soles on shoes should never be used as the sole protection against electrical shock.

Personal Protective Equipment When Working Within the Flash Protection Boundary

When inside the flash protection boundary, only fire resistant clothing and equipment can protect employees from arc flash and arc blast. Arc flash and arc blast hazards are a significant hazard for electrical work done on the airfield, including on the 480V supply side of constant current regulators, in circuit breaker panels, in switchgear, in motor control centers, and in numerous other places on the airfield. Arc flash and arc blast cause severe injuries to the head, neck, and chest area. Arc flash and arc blast occur when bolted faults generate thousands of amps, vaporizing the conductors making contact. These short-term, high current events happen very quickly, before the overcurrent protective devices operate.

For equipment and circuits less than 600V, the *flash protection boundary* should be established no closer than four (4') feet from the exposed energized part (this is based on circuit interruption clearing time of 6 cycles (0.1 second) and the available bolted fault current of 50,000 A – other clearing times will require a flash hazard analysis in accordance with NFPA 70E, section 130.3). Arc flash/arc blast boundaries do not need to be established on or around constant current airfield lighting tasks, since there is no significant bolted fault current to cause such an increase in energy.

Section X below contains common procedures done on the airfield in which arc flash and arc blast are a hazard. In each of those procedures, the protective equipment required to assist in surviving arc blast and arc flash are provided. Some other common tasks, their *Hazard/Risk Categories*, and their associated protective systems are listed below. First find the task you wish to do and the *Hazard/Risk Category* associated with it. Then determine what protective system matches the *Hazard/Risk Category*. Note that this is to protect you only against arc flash and arc blast. Insulated gloves and tools should be used to prevent against shock whenever working on or near the equipment. You will note that constant current airfield lighting work is not included because during normal constant current regulator (CCR) operation, dangerous bolted fault currents will not develop. By definition, arc flash and arc blast occur when bolted fault currents in the kA range develop. Since CCR's maintain constant current, even in ground fault conditions, arc flash and arc blast are not expected to occur in most situations.

TABLE 1

<u>Task</u> (assumes equipment is energized and work is done within the <i>flash protection boundary</i>)	Hazard/ Risk Category
Panelboards rated 240V and below	
Circuit breaker (CB) or fused switch	0
Opening hinged covers (to expose bare, energized parts)	0
Work on energized parts, including voltage testing	1
Remove/install circuit breakers or fused switches	1
Removal of bolted covers (to expose bare, energized parts)	1
Panelboards or Switchboards Rated > 240V and up to 600V	
CB or fused switch operation with covers on	0
CB or fused switch operation with covers off	1
Work on energized parts, including voltage testing	2*
600V Class Motor Control Centers (MCC)	
CB or fused switch or starter operation with enclosure doors closed	0
Reading a panel meter while operating a meter switch	0
CB or fused switch or starter operation with enclosure doors open	1

Task (assumes equipment is energized and work is done within the <i>flash protection boundary</i>)	Hazard/ Risk Category
Work on energized parts, including voltage testing	2*
Work on control circuits with energized parts 120V or below, exposed	0
Work on control circuits with energized parts > 120V, exposed	2*
Insertion or removal of individual starter “buckets” from MCC	3
Application of safety grounds, after voltage test	2*
Removal of bolted covers (to expose bare, energized parts)	2*
Opening hinged covers (to expose bare, energized parts)	1
600V Class Switchgear (with power circuit breakers or fused switches)	
CB or fused switch operation with enclosure doors closed	0
Reading a panel meter while operating a meter switch	0
CB or fused switch or starter operation with enclosure doors open	1
Work on energized parts, including voltage testing	2*
Work on control circuits with energized parts 120V or below, exposed	0
Work on control circuits with energized parts > 120V, exposed	2*
Insertion or removal (racking) of CBs from cubicles, doors open	3
Insertion or removal (racking) of CBs from cubicles, doors closed	2
Application of safety grounds, after voltage test	2*
Removal of bolted covers (to expose bare, energized parts)	3
Opening hinged covers (to expose bare, energized parts)	2
Other 600V Class Equipment (277V through 600V)	
Removal of bolted covers (to expose bare, energized parts)	2*
Opening hinged covers (to expose bare, energized parts)	1
Work on energized parts, including voltage testing	2*
Application of safety grounds, after voltage test	2*
Cable trough or tray cover removal or installation	1
Miscellaneous equipment cover removal or installation	1
Insertion or removal	2*
Motor Starters - NEMA E2 (fused contactor): 2.3 kV through 7.2 kV	
Contactors operation with enclosure doors closed	0
Reading a panel meter while operating a meter switch	0
Contactors operation with enclosure doors open	2*
Work on energized parts, including voltage testing	3
Work on control circuits with energized parts 120V or below, exposed	0
Work on control circuits with energized parts > 120V, exposed	3
Insertion or removal (racking) of starters from cubicles, doors open	3
Insertion or removal (racking) of starters from cubicles, doors closed	2
Application of safety grounds, after voltage test	3
Removal of bolted covers (to expose bare, energized parts)	4
Opening hinged covers (to expose bare, energized parts)	3
Metal Clad Switchgear, 1 kV and above	
CB or fused switch or starter operation with enclosure doors closed	2
Reading a panel meter while operating a meter switch	0

Task (assumes equipment is energized and work is done within the <i>flash protection boundary</i>)	Hazard/ Risk Category
CB or fused switch or starter operation with enclosure doors open	4
Work on energized parts, including voltage testing	4
Work on control circuits with energized parts 120V or below, exposed	2
Work on control circuits with energized parts > 120V, exposed	4
Insertion or removal (racking) of starters from cubicles, doors open	4
Insertion or removal (racking) of starters from cubicles, doors closed	2
Application of safety grounds, after voltage test	4
Removal of bolted covers (to expose bare, energized parts)	4
Opening hinged covers (to expose bare, energized parts)	3
Opening voltage transformer or control power transformer compartments	4
Other Equipment 1 kV and Above	
Switch operation, doors closed	2
Work on energized parts, including voltage testing	4
Removal of bolted covers (to expose bare, energized parts)	4
Opening hinged covers (to expose bare, energized parts)	3
Outdoor disconnect switch operation (hookswitch operated)	3
Outdoor disconnect switch operation (gang-operated, from grade)	2
Insulated cable examination, in manhole or other confined space	4
Insulated cable examination, in open area	2

This table is derived from NFPA70E, Table 130.7(C)(9)(a)

Notes

2* - means that a double-layer switching hood and hearing protection are required for this task in addition to the other Hazard/Risk Category 2 requirements

TABLE 2

	Protective Systems for Hazard/Risk Category				
	0	1	2	3	4
<u>Protective Clothing and Equipment</u>					
<u>Non-melting or untreated natural fiber</u>					
a. T-shirt (short sleeve)			X	X	X
b. Shirt (long sleeve)	X				
c. Pants (long)	X	X ⁴	X ⁶	X	X
<u>Fire Resistant (FR) Clothing</u>					
a. Long-sleeve shirt		X	X	X ⁹	X
b. Pants		X ⁴	X ⁶	X ⁹	X
c. Coverall		₅	₇	X	₅
<u>Fire Resistant (FR) Protective Equipment</u>					
a. Flash suit jacket (multilayer)					X
b. Flash suit pants (multilayer)					X
c. Hard hat		X	X	X	X
d. Eye protection (safety glasses or safety goggles)	X	X	X	X	X
e. Face and head area protection					
1. Arc-rated face shield or flash suit hood			X ⁸		
2. Flash suit hood				X	X
3. Hearing protection (ear canal inserts)			X ⁸	X	X
f. Leather gloves (note 2)			X	X	X
g. Leather work shoes			X	X	X

Notes (table derived from NFPA 70E Table 130.7(C)(10))

2. Leather gloves must be worn in some cases, even if insulated voltage-rated gloves are not worn underneath
4. Regular weight untreated denim cotton blue jeans are acceptable in lieu of FR pants. The FR pants used for Hazard/Risk Category 1 shall have a minimum arc rating of 4
5. If desired, use FR coveralls instead of FR shirt and pants
6. If the FR pants have a minimum arc rating of 8, long pants of non-melting or untreated natural fiber are not required beneath the FR pants
7. If desired, use FR coveralls with a minimum arc rating of 4 over non-melting or untreated natural fiber pants and T-shirt
8. A faceshield with a minimum arc rating of 8, with wrap-around guarding to protect not only the face, but also the forehead, ears, and neck (or alternatively, a flash suit hood) is required
9. Alternate is to use two sets of FR coveralls (the minimum with an arc rating of 4 and outer coverall with a minimum arc rating of 5) over non-melting or untreated natural fiber clothing, instead of FR coveralls over FR shirt and FR pants over non-melting or untreated natural fiber clothing

TABLE 3

Hazard/Risk Category	Clothing Description (typical number of clothing layers given in parentheses)	Required Minimum Arc Rating of the Personal Protective Equipment cal/cm ²
0	Non-melting, flammable materials (i.e. untreated cotton, wool, rayon, or silk, or blends of these materials) with a fabric weight at least 4.5 oz/yd ² (1 layer)	n/a
1	FR shirt and FR pants or FR coverall (1 layer)	4
2	Cotton underwear – conventional short sleeve and brief/shorts, plus FR shirt and FR pants (1 or 2 layers)	8
3	Cotton underwear plus FR shirt and FR pants plus FR coverall, or cotton underwear plus two FR coveralls (2 or 3 layers)	25
4	Cotton underwear plus FR shirt and FR pants plus multilayer flash suit (3 or more)	40

This table is from NFPA 70E, table 130.7(C)(11)

- clothing, tools, barricades
- vault safety boards (see long list in other document)

SECTION VIII: CONTRACTORS and VENDORS

All contractors and vendors performing electrical work, on the airfield, must review this procedure and confirm that their policies and procedures are at least as stringent. Contractors will be given a copy of this program via email for their review in advance of the projected start date. No electrical work will be authorized to commence without the contents of this section being adhered to.

Upon completion of review, by all employees working on the airfield or in the electrical vault, the contractor must provide a letter of compliance. The contents of the letter will include the following:

A.. Assurance that all employees who will work on the airfield or in electrical vault have read and understand the procedures outlined in this program.

B. Assurance that all employees will comply with the procedures explained in this program.

C. Any request to deviate from the policies and procedures in this program will be done in writing to the DAA Safety Manager explaining the need to deviate and control measures that will be put in place to ensure a safe operation.

SECTION IX: IDENTIFICATION OF HAZARDOUS TASKS AND JOBS

This section lists jobs and tasks on the airfield that present significant electrical hazards.

- A. Placing a Circuit in an *Electrically Safe Work Condition* and Testing for the Presence of Hazardous Energy, including Circuit **Lockout**
- B. Hot Re-Lamping
- C. Re-Lamping with Circuits De-Energized
- D. Constant Current Regulator (CCR) Maintenance with CCR Energized
- E. Electrical Work in 30' Pit
- F. Ground Fault Detection Using the CCR
- G. Jumpering Circuits
- H. Continuity Testing of Series Lighting Circuits
- I. Manual Meggering® of Series Lighting Circuits
- J. Output Voltage Measurements on CCR
- K. Work at Heights from Bucket Truck
- L. Switching Leads from One CCR to Another

In the following section, procedures are written for each of these tasks

SECTION X: PROCEDURES

A. Placing a Circuit in an *Electrically Safe Work Condition* and Testing for the Presence of Hazardous Energy, including Circuit Lockout

Purpose

One of the most common causes of airfield lighting injuries is failing to test a circuit for energy before breaking the circuit. **Every time** a circuit is broken, it should be tested for the presence of hazardous energy. In a series lighting circuit, testing is a straightforward process, but it is unique and therefore presents hazards to inexperienced electricians and contractors. Series circuits can register zero or near-zero levels of voltage on sections of the circuit, so that the only sure way to verify the presence of hazardous energy is via the use of a true RMS ammeter.

Most airfield lighting maintenance tasks, including series circuits and other more traditional electrical machinery and distribution systems, should be performed under the protection of a circuit lockout. A lockout is one element in placing an electrical system in an ***electrically safe work condition*** (a state in which the conductor or circuit part to be worked on or near has been disconnected from energized parts, locked in accordance with the DAA lockout program, tested to ensure the absence of voltage, and grounded if determined necessary).

If a circuit cannot be worked in an *electrically safe work condition*, then an *Energized Electrical Work Permit* must be pulled (see Section VI).

Qualifications and Number of Employees to be Involved: Qualified electricians only – a minimum of two.

Hazards

- 1) 5 kV shock hazard should an electrician begin working on an airfield lighting circuit after mistakenly testing for the presence of energy by using a voltage testing device instead of a true RMS clamp-on ammeter or by otherwise not properly testing for the presence of hazardous energy.
- 2) 5 kV shock hazard to SRE employees and contract electricians from incomplete execution of circuit lockout

Limits of Approach:

Limited Approach Boundary:	5'0"
Restricted Approach Boundary:	2'2" for 5 kV circuits
Prohibited Approach Boundary:	0'7" for 5 kV circuits

Flash Protection Boundary: Typically 4' for voltages under 600V, but not applicable for lighting circuits, since constant current at 6-20 amps does not generate significant bolted fault current)

Safe Work Practices:

1. **Never remove or override a lockout** without positively verifying the whereabouts of all crew members, including contract personnel.

2. The electrician performing the work must have received specific training on how to perform the tasks, including the machine- or circuit-specific shutdown, lockout, and testing for the presence of current tasks.
3. A second, qualified electrician who is trained in emergency procedures must be standing by for any work on systems greater than 600V.
4. No one other than a qualified electrician is permitted within the *limited approach boundary* (5'), which exists until the circuit is verified dead (de-energized). If an unqualified person needs to come within the *limited approach boundary*, he or she should be advised of the hazards and continuously escorted by a qualified person. At no time should the unqualified person be allowed within the *restricted approach boundary* (2'2" for 5 kV circuits).
5. No un-insulated body parts are permitted past the *restricted approach boundary* (2'2" for 5 kV circuits).
6. No un-insulated tools or materials (e.g. replacement parts) that are in contact with an un-insulated part of the electrician's body are permitted within the *restricted approach boundary* (2'2" for 5 kV).
7. If it is possible for you to contact exposed energized parts before you verify that the circuit is dead (de-energized), wear voltage-rated insulated gloves and other insulating materials when inside the *restricted approach boundary*. (2'2" for 5 kV). For protection up to 7.5 kV, Class 1 gloves should be worn. Insulating gloves should be covered with leather outer-gloves.
8. **DANGER: Do not use a voltage meter as the primary means of testing a series lighting circuit for the presence of hazardous energy! A true RMS clamp-on ammeter must be used.** A series lighting circuit may indicate low and zero volts at numerous points in the circuit, even though the full electrical energy of the circuit is present.
9. All tools used prior to the circuit being verified dead (de-energized) must be insulated.
10. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.
11. If working in confined or enclosed spaces such as manholes or vaults, ensure there are no other exposed energized conductors in the vicinity.
12. Never work under a contractor's lockout procedure unless you have verified the lockout yourself and have placed your lock on the lockout devices.

Personal Protective Equipment Needed

1. Voltage-rated gloves with leather protective covers if exposed to energized conductors prior to testing the circuit dead (de-energized).
2. Fire-resistant safety glasses
3. Non-melting/untreated natural fiber t-shirt (long sleeve)
4. Non-melting/untreated natural fiber long pants

Insulating Tools and Equipment: All tools should be insulated if, prior to verifying the circuit dead, they are exposed to energized electrical conductors.

Special Precautionary Techniques: Beware of stored energy in capacitors in REIL's and beacons. Beware of secondary sources of voltage such as control voltage.

Electrical Diagrams: In many cases, multiple sources of electrical power are available in a circuit, including stored energy in capacitors (REILs and beacons), control voltage (typically 120 VAC or 48 VDC), and induced voltages from other circuits. For complex systems, it is

critical that accurate as-built drawings be consulted when placing a circuit in an *electrically safe work condition*.

Equipment Details: Electricians should be trained on the equipment they will be placing in an *electrically safe work condition*.

Other Reference Documents or Materials: none

Steps to Take When Placing a Circuit in an *Electrically Safe Work Condition*, including Locking it Out

1. Plan your work and work your plan. Expect the unexpected
2. De-energize the circuit using the normal shutdown procedure. To qualify as an *electrically safe work condition*, a physical disconnect mean must be used. Electronic circuitry cannot be used as a lockout means. Circuit breakers, disconnect switches, and pulled fuses are examples of disconnecting means that provide a physical break of the electrical circuitry.
3. Use accurate technical manuals or as-built drawings to de-energize machinery or circuits. Even simple machines and circuits may have multiple sources of energy such as control voltage and capacitors. Verify that the system will not have stored energy once shut down, such as charged capacitors, compressed springs, fluids under pressure, etc.
4. Protect against induced voltages (*how is this achieved on the airfield?*)
5. Some circuits require that stored or residual energy be dissipated. For example, capacitors must be discharged, springs disconnected, and flywheels allowed to coast to a stop. Using the procedure recommended by the manufacturer of the equipment or in accordance with other best practices, discharge the stored energy.
6. Place your lock and tag that identifies you on the disconnecting device (energy isolating device). In many cases, numerous locks and locking devices may be required to isolate all power sources.
7. If this is a group project, each person working on the system or equipment should place his or her lock and identifying tag on a group hasp or in a group lock box. Do not work under the protection of another's lock.
8. Always do the three steps below when using your test equipment on a circuit:
 - a. Test your meter on a known source to verify that it is functioning properly.
 - b. Test your meter on the circuit on which you will be working. **THIS IS A HAZARDOUS STEP!** You must not assume that the circuit is dead. Disconnect switches and circuit breakers can and do fail, leaving hazardous energy on the circuit.
 - c. After testing the circuit dead, re-test your meter on the known source again to verify that it is working.

9. If the circuit can be re-energized inadvertently via contact with adjacent circuits (such as falling wires) or via induced voltages, connect grounding rods or cables to the circuit being worked on (or otherwise protect the circuit) so that no potential can be created between you and the circuit).
10. Perform the work on the circuit. If you are leaving the site and must remove your lock, someone should place his or her lock and identifying tag on the lockout devices before you remove yours to ensure the continuity of the lockout.
11. Prior to clearing the lockout, verify that all personnel (including contractors) are clear of any danger.
12. Remove the locks and tags from the energy isolating devices.
13. Restart the system in accordance with the manufacturer's instructions, verify that the system is operating within allowable specifications.

B. Hot Re-Lamping

Purpose

Re-lamping airfield lights while the system is energized is a frequent cause of injury and death on airfields around the world. Additionally, physical damage to the fixtures occurs when they are re-lamped while energized. Hot re-lamping is usually done when the need to correct a lighting deficiency is urgent.

If de-energizing a lighting system will endanger an aircraft on approach or on the ground, or if it is operationally unsafe or infeasible to de-energize a lighting circuit, it may be worked on energized (*hot re-lamping*). The hazards discussed here also include the simple cleaning tasks on glass lenses, since the use of cleaning fluids will greatly increase the electrical shock hazard as body resistance will be lowered. If a lighting circuit will be worked in an energized state, additional precautions should be used to compensate for the increased risk.

Because the re-lamping is done without having the system in an *electrically safe work condition*, the practice should be eliminated, if possible, or at least minimized.

Qualifications and Number of Employees to be Involved: Qualified electricians only with specific training in this procedure – a minimum of two electricians due to work on energized circuits

Hazards: Secondary shock hazards up to 200V and primary-to-secondary short circuits, exposing electricians to voltages as follows:

1. On taxiways – 3 kV, with up to 6 kV if an electrician mistakenly attempts to break an energized circuit
2. On runways – 5 kV, with up to 10 kV if an electrician mistakenly attempts to break an energized circuit.

Limits of Approach:

Limited Approach Boundary:	5'0"
Restricted Approach Boundary:	2'2"
Prohibited Approach Boundary:	0'7"
Flash Protection Boundary:	Not applicable (constant current at 6-20 amps – no significant bolted fault current)

Safe Work Practices:

1. Prior to starting the work, a determination must be made as to why this re-lamping procedure must be done with the circuit energized. A supervisor should make the determination that the task must be done while energized.
2. An energized electrical work permit should be issued, time permitting
3. The electrician performing the work must have received specific training on how to perform the hot re-lamping task
4. A second, qualified electrician who is trained in emergency procedures must be standing by
5. No one other than a qualified electrician is permitted within the *limited approach boundary* (5'). If an unqualified person needs to come within the *limited approach boundary*, he or she should be advised of the hazards and continuously escorted by a qualified person. At no

- time should the unqualified person be allowed within the *restricted approach boundary* (2'2").
6. No un-insulated body parts are permitted past the *restricted approach boundary* (2'2").
 7. No un-insulated tools or materials (e.g. replacement parts) that are in contact with an un-insulated part of the electrician's body are permitted within the *restricted approach boundary* (2'2").
 8. Class 1 voltage-rated gloves (for protection up to 7.5 kV) must be worn when inside the *restricted approach boundary* (2'2"). These insulating gloves should be covered with leather outer-gloves.
 9. The secondary side of the lamp should be tested to verify that a primary-to-secondary short does not exist. A VOM or DMM capable of testing up to the maximum expected voltage (3 kV on taxiways, 5 kV on runways) must be used.
 10. All tools must be insulated.
 11. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.
 12. No energized electrical work may be done without proper illumination.
 13. No conductive jewelry or clothing may be worn
 14. If working in confined or enclosed spaces such as manholes or vaults, ensure there are no other exposed energized conductors in the vicinity.

Personal Protective Equipment Needed

1. Class 1 voltage-rated gloves (for protection up to 7.5 kV) with leather protective covers;
2. Fire-resistant safety glasses
3. Non-melting/untreated natural fiber t-shirt (long sleeve)
4. Non-melting/untreated natural fiber long pants

Insulating Tools and Equipment: All tools should be insulated

Special Precautionary Techniques: None

Electrical Diagrams: If time permits, refer to available hardcopy or computer-based as-builts or blueprints, if necessary.

Equipment Details: The lamp is typically a 200V bulb, but is powered via a lighting transformer whose primary can be 5 kV.

Other Reference Documents or Materials: none

Steps to Take When Doing Hot Re-Lamping

1. Plan your work and work your plan. Expect the unexpected
2. Determine why the lamp needs to be replaced while energized and communicate this reason to your supervisor.

3. Obtain an Energized Electrical Work Permit (see Section VI). If there is not enough time to pull a permit, verbally review the steps of the permit with the supervisor, obtaining verbal approvals and confirmations on each step.
4. Proceed to the lamp that must be replaced. You must be a qualified electrician and must have received training in this procedure.
5. You must be accompanied by another qualified electrician.
6. Prior to breaching the *restricted approach boundary* (2'2"), inspect your Class 1 insulated gloves and put them on (do not use the gloves if they are ripped or damaged). Cover the gloves with leather outer gloves.
7. Repair the lamp, remaining aware of the possibility of the high voltage hazards associated with primary to secondary shorts.
8. Do not remove your gloves until you are finished working inside the *restricted approach boundary*.

C. Re-lamping Circuits while De-Energized but with CCR NOT Locked Out

Purpose

Re-lamping airfield lights is typically done without the power supply (the constant current regulator (CCR)) locked out due to the infeasibility of such a lockout. It is infeasible because for most re-lamping tasks, electricians on the airfield would need to lock out the CCR in the vault and then drive long distances to the airfield to do the re-lamping. The electrician would then need to drive back to the vault, clear the lockout, and drive back to the lamp to ensure that it is working.

By definition, performing work on electrical circuits without a system lockout means that the circuit is **NOT** in an *electrically safe work condition*. As such, **significant hazards remain with this task**. Therefore, additional precautions must be taken to provide a level of protection equivalent to an *electrically safe work condition*. An electrician who does not maintain control of the circuit on which he works by placing his or her own lock on the CCR disconnect is placing himself at additional risk.

Note: Although it is rarely possible to do re-lamping tasks with the circuit in an *electrically safe work condition* (that is, with the CCR locked out by the electrician doing the re-lamping), it remains the preferred method of doing re-lamping tasks. When re-lamping is done with the circuit in an *electrically safe work condition*, this procedure need not be followed. Only the procedure to place the circuit in an *electrically safe work condition* need be followed.

Qualifications and Number of Employees to be Involved

1. Qualified electricians only – a minimum of two - with specific training on this procedure.
2. If a tower employee will be overseeing the CCR while an electrician is working on the circuit it supplies, the tower employee must be trained on this procedure.

Hazards

Secondary shock hazards up to 200V and primary-to-secondary short circuits, exposing electricians to voltages as follows:

1. On taxiways – 3 kV, with up to 6 kV if an electrician mistakenly attempts to break an energized circuit
2. On runways – 5 kV, with up to 10 kV if an electrician mistakenly attempts to break an energized circuit.

Limits of Approach:

Limited Approach Boundary:	5'0"
Restricted Approach Boundary:	2'2"
Prohibited Approach Boundary:	0'7"
Flash Protection Boundary:	Not applicable (constant current at 6-20 amps – no significant bolted fault current)

Safe Work Practices:

1. Because you will not have direct control over the power source of the lighting circuit on which you will be working, you must complete this task as quickly and safely as possible. Planning is essential.
2. Establish radio contact with the person overseeing the CCR in the vault or tower. A headset or other hands-free device should be used. Radio communications should be constant.
3. If the CCR cannot be locked out, it is preferable to do re-lamping tasks by de-energizing the CCR from the vault, as opposed to the tower. Tower personnel are not trained electricians and may have numerous other airfield tasks to consider including aircraft on approach and on the ground
4. A second, qualified electrician who is trained in emergency procedures is standing by during the re-lamping task.
5. No one other than a qualified electrician is permitted within the *limited approach boundary* (5'). If an unqualified person needs to come within the *limited approach boundary*, he or she should be advised of the hazards and continuously escorted by a qualified person. At no time should the unqualified person be allowed within the *restricted approach boundary* (2'2").
6. No un-insulated body parts are permitted past the *restricted approach boundary* (2'2").
7. No un-insulated tools or materials (e.g. replacement parts) that are in contact with an un-insulated part of the electrician's body are permitted within the *restricted approach boundary* (2'2").
8. Class 1 voltage-rated gloves (for protection up to 7.5 kV) must be worn when inside the *restricted approach boundary* (2'2"). These insulating gloves should be covered with leather outer-gloves.
9. The secondary side of the lamp should be tested to verify that a primary-to-secondary short does not exist. A VOM or DMM capable of testing up to the maximum expected voltage (3 kV on taxiways, 5 kV on runways) must be used.
10. All tools must be insulated.
11. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.
12. No energized electrical work may be done without proper illumination.
13. No conductive jewelry or clothing may be worn
14. If working in confined or enclosed spaces such as manholes or vaults, ensure there are no other exposed energized conductors in the vicinity.

Personal Protective Equipment Needed

1. Class 1 voltage-rated gloves (for protection up to 7.5 kV) with leather protective covers;
2. Fire-resistant safety glasses
3. Non-melting/untreated natural fiber t-shirt (long sleeve)
4. Non-melting/untreated natural fiber long pants

Insulating Tools and Equipment: All tools should be insulated

Special Precautionary Techniques

1. If the CCR cannot be locked out, it is preferable to do re-lamping tasks by de-energizing the CCR from the vault, as opposed to the tower. Tower personnel are not trained electricians and may have numerous airfield tasks to consider.
2. Establish hands-free radio communications with the vault or tower so that constant contact can be maintained during the procedure

Electrical Diagrams: If time permits, refer to available hardcopy or computer-based as-builts or blueprints, if necessary.

Equipment Details: The lamp is typically a 200V bulb, but is powered via a lighting transformer whose primary can be 5 kV.

Other Reference Documents or Materials: none

Steps to Take When Doing Re-Lamping of De-Energized Circuits without CCR Lockout

1. Plan your work and work your plan. Expect the unexpected
2. This procedure should only be done if it is infeasible to lock out the constant current regulator (CCR). If possible, do the re-lamping tasks by de-energizing the CCR and locking it out with your own lock. If this is not feasible, continue with the steps below.
3. Establish radio contact with the person overseeing the shutdown of the CCR in the vault or tower (using another trained, qualified electrician in the vault is preferable to using tower personnel). A headset or other hands-free device should be used. Radio communications should be constant.
4. Proceed to the lamp that must be replaced. You must be a qualified electrician and must have received training in this procedure.
5. You must be accompanied by another qualified electrician.
6. Prior to breaching the *restricted approach boundary* (2'2"), inspect your Class 1 insulated gloves and put them on (do not use the gloves if they are ripped or damaged). Cover the gloves with leather outer gloves.
7. Test the circuit for the presence of current using a true RMS ammeter. If no current is detected, proceed with the re-lamping task. Be aware that because the CCR is not locked out, power could inadvertently be turned on at any time. Test the circuit for the presence of current each time you return to the task after walking away from it.

8. Repair the lamp, remaining aware of the possibility of the high voltage hazards associated with primary to secondary shorts.
9. When repair is complete, step outside the *restricted approach boundary* and ask the tower or vault to energize the circuit. Visually confirm that the lamp is lit.
10. Ask the tower or vault to de-energize the CCR
11. Do not remove your gloves until you are finished working inside the *restricted approach boundary*.
12. When outside the *restricted approach boundary*, inform the vault or tower that it is safe to re-energize the circuit. Visually verify that the lamp

D. Constant Current Regulator Maintenance with CCR Energized

Purpose

Basic maintenance on constant current regulators (CCR) presents 480 volt, 120 volt, and 48 VDC **shock, arc flash, and arc blast** hazards.

For most maintenance tasks, the CCR cabinet remains completely closed with no exposed electrical conductors. Calibration is typically done from control panels on or around the outside of the CCR. This procedure does not apply to those tasks if they are done with the CCR in an *electrically safe work condition*.

There are some tasks, however, that expose electricians to energized conductors inside the CCR cabinet. This procedure applies to those tasks that are done on or around CCR's when energized conductors are exposed.

The procedure for output voltage measurement tests on the CCR is a separate procedure. See item J later in this section.

Qualifications and Number of Employees to be Involved: Qualified electricians only with specific training in CCR maintenance

Hazards:

- 1) 480 VAC shock hazard from supply voltage in CCR
- 2) 120 VAC and 48 VDC shock hazard from control voltage
- 3) Arc flash and arc blast hazards

Limits of Approach:

	<u>480 VAC</u>	<u>120 VAC/48 VDC</u>
Limited Approach Boundary	5'	3'6"
Restricted Approach Boundary	1'	Avoid contact
Prohibited Approach Boundary	0'1"	Avoid contact
Flash Protection Boundary	4'	4'

Safe Work Practices:

1. Prior to starting the work, a determination must be made as to why this re-lamping procedure must be done with the circuit energized. A supervisor should make the determination that the task must be done while energized.
2. An energized electrical work permit should be issued, time permitting
3. The electrician performing the work must have received specific training on how to perform the hot re-lamping task
4. A second, qualified electrician who is trained in emergency procedures must be standing by
5. Exposed energized conductors are hazardous during even the simplest procedures, such as opening cabinet doors and voltage testing. Personal protective equipment must be worn as noted in the table below.
6. No one other than a qualified electrician is permitted within the *limited approach boundary* (5'). If an unqualified person needs to come within the *limited approach boundary*, he or she should be advised of the hazards and continuously escorted by a qualified person. At no time should the unqualified person be allowed within the *flash protection boundary*(4').
7. Do not cross the flash protection boundary without wearing the protective equipment as noted in the table below.
8. No un-insulated body parts are permitted past the *restricted approach boundaries*.
9. No un-insulated tools or materials (e.g. replacement parts) that are in contact with an un-insulated part of the electrician's body are permitted within the *restricted approach boundaries*.
10. Class 00 voltage-rated gloves (for protection up to 500V) must be worn when inside the *restricted approach boundary* (1'). These insulating gloves should be covered with leather outer-gloves.
11. All tools must be insulated when working on energized electrical equipment.
12. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.
13. No energized electrical work may be done without proper illumination.
14. No conductive jewelry or clothing may be worn
15. If working in confined or enclosed spaces such as manholes or vaults, ensure there are no other exposed energized conductors in the vicinity.

Personal Protective Equipment Needed

The table below addresses the hazards of working on the live supply side of a CCR, where there are high bolted fault currents available (as opposed to low fault currents available on the lighting side of the airfield lighting system). With high bolted fault currents come arc blast and arc flash hazards necessitating the use of personal protective equipment to protect electricians. **Note that even some simple tasks such as opening cabinets to expose live conductors are hazardous.** For these simple tasks, **dangerous** arc flash/arc blast potential exists, so that arc flash protective equipment must be worn.

For exposure to the voltages and conditions below, wear the protective equipment outline in the column below:

<u>120 VAC/48 VDC</u>	<u>480 VAC</u> - Removal of bolted covers - Work on energized parts - Applying grounds - Insert/remove parts, equip	<u>480 VAC</u> - Removal of hinged covers - Cable trough/tray removal or installation - Equipment cover removal or installation
<p><u>Note 1:</u> assumes no exposure to the live 480 V circuit</p> <ol style="list-style-type: none"> 1. Untreated cotton long pants 2. Fire Resistant (FR) long-sleeved shirt 3. FR pants (if arc flash rating of FR pants > 8, long pants need not be worn below FR pants) 4. FR coveralls can replace FR pants and shirt (as long as arc rating is > 4) 5. FR hard hat 6. FR safety glasses 	<ol style="list-style-type: none"> 1. Untreated cotton long pants 2. Fire Resistant (FR) long-sleeved shirt 3. FR pants (if arc flash rating of FR pants > 8, long pants need not be worn below FR pants) 4. FR coveralls can replace FR pants and shirt (as long as arc rating is > 4) 5. FR hard hat 6. FR safety glasses or goggles 7. Arc rated face shield or flash hood (minimum arc rating of 8) 8. Hearing protection (in ear canal) 	<ol style="list-style-type: none"> 1. Untreated cotton long pants 2. Fire Resistant (FR) long-sleeved shirt 3. FR pants (if arc flash rating of FR pants > 8, long pants need not be worn below FR pants) 4. FR coveralls can replace FR pants and shirt (as long as arc rating is > 4) 5. FR hard hat 6. FR safety glasses

Insulating Tools and Equipment: All tools should be insulated

Special Precautionary Techniques: There are numerous CCR types on the airfield, so refer to the specific CCR tech manual for guidance

Electrical Diagrams: Refer to the CCR technical manual to ensure that all energy sources are properly considered.

Equipment Details: There are numerous CCR types on the airfield, so refer to the specific CCR tech manual for guidance

Other Reference Documents or Materials: none

Steps to Take When Performing Maintenance on an Energized CCR

1. Plan your work and work your plan. Expect the unexpected
2. Determine why the CCR needs to be maintained while energized and communicate this reason to your supervisor. This procedure should only be done if it is infeasible to lock out the constant current regulator (CCR). If possible, do the maintenance tasks by de-energizing the CCR and locking it out with your own lock. If this is not feasible, continue with the steps below
3. Obtain an Energized Electrical Work Permit (see Section VI). If there is not enough time to pull a permit, verbally review the steps of the permit with the supervisor, obtaining verbal approvals and confirmations on each step.
4. Proceed to the CCR to be worked on. You must be a qualified electrician and must have received training in this procedure.
5. You must be accompanied by another qualified electrician if the work is done while the CCR is energized
6. Prior to breaching the *flash protection boundary (4')*, don the flash protective equipment as noted in the table above. Simply opening CCR panels to expose 480V conductors presents an arc flash/arc blast hazard. Note that for some of the 480 V exposures, a flash hood and hearing protection is required in addition to other fire resistant gear. Arc flash protective equipment, including FR coveralls, an FR hardhat, ear canal hearing protection, and an FR arc-rated face shield or flash hood with a minimum arc flash rating of 8 (see the table above), should be provided in each of the vaults
7. Prior to breaching the *restricted approach boundary (1')*, inspect your Class 00 insulated gloves and put them on (do not use the gloves if they are ripped or damaged). Cover the gloves with leather outer gloves.
8. Repair/maintain the CCR in accordance with the manufacturer's instructions.
 - a. When performing the short circuit test across the leads, the CCR must be placed in an *electrically safe work condition* before removing the leads and hooking up the short circuit wiring
 - b. When performing the open circuit test, the CCR must be placed in an *electrically safe work condition* before removing the CCR leads.
9. Do not remove your gloves until you are finished working inside the *restricted approach boundary*.
10. Do not remove the arc flash protective gear until all energized conductors are covered by the CCR cabinet.

E. Electrical Work in 30' Pit- NOT APPLICABLE AT THIS TIME

Purpose

Some necessary electrical work is done in a 30' pit on the airfield, including pulling wire and installing circuits and equipment

Qualifications and Number of Employees to be Involved: Only electricians who have had specific training related to electrical tasks in this 30' pit, including confined space entry training.

Hazards: Confined spaces; energized electrical work in a confined space.

Confined space hazards. A confined space is defined as follows:

- i. Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- ii. Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and
- iii. Is not designed for continuous employee occupancy. (from OSHA 1910.146)

Limits of Approach:

Limited Approach Boundary:	5'0"
Restricted Approach Boundary:	2'2"
Prohibited Approach Boundary:	0'7"
Flash Protection Boundary:	4' - If tasks consist only of constant current circuitry, arc flash personnel protective equipment may not be necessary.

Safe Work Practices:

1. Prior to starting the work, a determination must be made as to why any work must be done with the circuit energized. Circuits to be considered include those circuits to be worked on as well as adjacent circuits to which an electrician might be exposed. A supervisor should make the determination that the task must be done while energized.
2. An energized electrical work permit should be issued, time permitting
3. Refer to the _____ AIRPORT/_____ Airport Confined Space Entry Procedure. A hazardous gas detector (sniffer) should be placed into the pit prior to entry. Readings should be logged until they are stable and within allowable limits. Ventilation should be provided into the pit during the electrical maintenance tasks. Sniffer readings should be taken continuously and logged at regular intervals to ensure that the sniffer is continuing to function. , but the sniffer is not left behind while work is being done. Ventilation is available during the task, but if the gas detector does not remain in the space, a hazard may develop while the work is being done.

4. No one other than a qualified electrician is permitted within the *limited approach boundary* (5'). If an unqualified person needs to come within the *limited approach boundary*, he or she should be advised of the hazards and continuously escorted by a qualified person. At no time should the unqualified person be allowed within the *flash protection boundary*(4').
5. Do not cross the flash protection boundary without wearing arc flash protective equipment . Such equipment will not be necessary if only airfield lighting circuits are in the pit.
6. No un-insulated body parts are permitted past the *restricted approach boundaries*.
7. No un-insulated tools or materials (e.g. replacement parts) that are in contact with an un-insulated part of the electrician's body are permitted within the *restricted approach boundaries*.
8. Voltage-rated gloves must be worn when inside the *restricted approach boundary* (1'). And when working on energized electrical equipment. Insulating gloves should be covered with leather outer-gloves.
9. All tools must be insulated when working on energized electrical equipment.
10. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.
11. No energized electrical work may be done without proper illumination.
12. No conductive jewelry or clothing may be worn

Personal Protective Equipment Needed

The table below addresses the hazards of working near energized electrical circuits with potentially high fault currents (as opposed to low fault currents available on the lighting side of the airfield lighting system). With high bolted fault currents come arc blast and arc flash hazards necessitating the use of personal protective equipment to protect electricians. **Note that even some simple tasks such as opening cabinets to expose live conductors are hazardous.** For these simple tasks, dangerous arc flash/arc blast potential exists, so that arc flash protective equipment must be worn.

For exposure to the voltages and conditions below, wear the protective equipment outline in the column below:

<u>120 VAC/48 VDC</u>	<u>480 VAC</u> - Removal of bolted covers - Work on energized parts - Applying grounds - Insert/remove parts, equip	<u>480 VAC</u> - Removal of hinged covers - Cable trough/tray removal or installation - Equipment cover removal or installation
<p><u>Note 1:</u> assumes no exposure to the live 480 V circuit</p> <ol style="list-style-type: none"> 1. Untreated cotton long pants 2. Fire Resistant (FR) long-sleeved shirt 3. FR pants (if arc flash rating of FR pants > 8, long pants need not be worn below FR pants) 4. FR coveralls can replace FR pants and shirt (as long as arc rating is > 4) 5. FR hard hat 6. FR safety glasses 	<ol style="list-style-type: none"> 1. Untreated cotton long pants 2. Fire Resistant (FR) long-sleeved shirt 3. FR pants (if arc flash rating of FR pants > 8, long pants need not be worn below FR pants) 4. FR coveralls can replace FR pants and shirt (as long as arc rating is > 4) 5. FR hard hat 6. FR safety glasses or goggles 7. Arc rated face shield or flash hood (minimum arc rating of 8) 8. Hearing protection (in ear canal) 	<ol style="list-style-type: none"> 1. Untreated cotton long pants 2. Fire Resistant (FR) long-sleeved shirt 3. FR pants (if arc flash rating of FR pants > 8, long pants need not be worn below FR pants) 4. FR coveralls can replace FR pants and shirt (as long as arc rating is > 4) 5. FR hard hat 6. FR safety glasses

Insulating Tools and Equipment: All tools should be insulated when working on or near energized conductors.

Special Precautionary Techniques: In addition to electrical precautions, adhere to confined space precautions

Electrical Diagrams: Refer to as-built drawings

Equipment Details: None

Other Reference Documents or Materials: Constant current regulator technical manual

Steps to Take When Working in the 30' Pit

1. Plan your work and work your plan. Expect the unexpected
2. If energized electrical work is being considered, determine why the circuit needs to be worked on while energized and communicate this reason to your supervisor. This procedure should only be done if it is infeasible to lock out the circuit. If possible, do the maintenance tasks by de-energizing the circuit and locking it out with your own lock. If lockout is not feasible, continue with the steps below.
3. Obtain an Energized Electrical Work Permit (see Section ___ below). If there is not enough time to pull a permit, verbally review the steps of the permit with the supervisor, obtaining verbal approvals and confirmations on each step. You must be accompanied by another qualified electrician if the work is done while in the pit is energized
4. Prior to breaching the *flash protection boundary* (4'), don the flash protective equipment as noted in the table above. Simply opening CCR panels to expose 480V conductors Obtain a Confined Space Entry Permit (see the _____ AIRPORT/_____ Airport Confined Space Entry Program).
 - a. Calibrate the air testing equipment prior to dropping it into the pit
 - b. Obtain air quality readings from the readouts on the sniffer. When acceptable, proceed into the space. If acceptable readings cannot be obtained, introduce ventilation until acceptable readings are obtained. Once acceptable air readings are obtained, enter the pit.
 - c. The sniffer should continuously monitor the space and alarm if and when the air quality deteriorates. EXIT THE PIT IMMEDIATELY UPON HEARING A SNIFFER ALARM OR IF YOU FEEL FAINT OR NAUSEOUS!
 - d. Ensure that the rescue and buddy system procedures are in place
5. Presents an arc flash/arc blast hazard. Note that for some of the 480 V exposures, a flash hood and hearing protection is required in addition to other fire resistant gear. Arc flash protective equipment, including FR coveralls, an FR hardhat, ear canal hearing protection, and an FR arc-rated face shield or flash hood with a minimum arc flash rating of 8, should be provided.
6. Prior to breaching the *restricted approach boundaries*, inspect your insulated gloves and put them on (do not use the gloves if they are ripped or damaged). Cover the gloves with leather outer gloves.
7. Perform the required electrical maintenance tasks in the pit.
8. Do not remove your gloves until you are finished working inside the *restricted approach boundary*.
9. Do not remove the arc flash protective gear until all energized conductors are covered by the CCR cabinet.
10. Exit the pit immediately upon finishing the tasks.

F. Ground Fault Detection Using the CCR

Purpose

In some cases when the situation is urgent, the constant current regulator (CCR) is used to locate single ground faults. This presents a hazard to employees in the vault and on the airfield who are trying to locate the ground faults visually. Because there are safer methods by which to locate ground faults, using the CCR to locate them should be avoided as much as possible. Ground faults should be located by less hazardous techniques such as via the automated Megger® test system or by using volt-ohm-milliammeters (VOM) or digital multimeters (DMM). If one of these tests indicates the presence of a ground, but the ground fault cannot be found by inspecting the circuit visually, the ground can be located by using the CCR and a test setup.

Qualifications and Number of Employees to be Involved:

1. Qualified electricians— a minimum of two in the vault - with specific training on this procedure.
2. Electricians on the airfield to observe specific sets of lights during the test

Hazards:

- 1) 5 kV shock hazard in the vault due to the CCR output being grounded (via a 45 Watt isolation transformer and light fixture). Electricians must stay away from the immediate vicinity of the grounded lamp setup.
- 2) 5 kV shock hazard in the field should electricians locate the open circuit and begin working on it before the CCR is de-energized from the vault.

Limits of Approach:

Limited Approach Boundary:	5'0"
Restricted Approach Boundary:	2'2"
Prohibited Approach Boundary:	0'7"
Flash Protection Boundary:	Not applicable (constant current at 6-20 amps – no significant bolted fault current)

Safe Work Practices:

1. Determine whether it is possible to locate ground faults using one of the safer methods employing a Megger®, volt-ohm-milliammeter (VOM), or digital multimeter (DMM). If not, proceed with the steps below.
2. A second, qualified electrician who is trained in emergency procedures is standing by in the vault during the test.
3. No one other than a qualified electrician is permitted within the *limited approach boundary* (5'). If an unqualified person needs to come within the *limited approach boundary*, he or she should be advised of the hazards and continuously escorted by a qualified person. At no time should the unqualified person be allowed within the *restricted approach boundary* (2'2").
4. No un-insulated body parts are permitted past the *restricted approach boundary* (2'2").
5. No un-insulated tools or materials (e.g. replacement parts) that are in contact with an un-insulated part of the electrician's body are permitted within the *restricted approach boundary* (2'2").
6. Class 1 voltage-rated gloves (for protection up to 7.5 kV) must be worn when inside the *restricted approach boundary* (2'2"). These insulating gloves should be covered with leather outer-gloves.
7. All tools must be insulated.
8. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.
9. No energized electrical work may be done without proper illumination.
10. No conductive jewelry or clothing may be worn
11. If working in confined or enclosed spaces such as manholes or vaults, ensure there are no other exposed energized conductors in the vicinity.

Personal Protective Equipment Needed

- 1) Non-melting/untreated natural fiber t-shirt (long sleeve)
- 2) Non-melting/untreated natural fiber long pants
- 3) Fire resistant (FR) safety glasses

Insulating Tools and Equipment: All tools should be insulated

Special Precautionary Techniques

1. An electrician will need to work on the airfield itself to detect grounds by observing whether or not lights are on or off. This electrician **must not** attempt to conduct repairs on the circuit without first placing the circuit in an *electrically safe work condition*. Refer to the procedures for *Hot Re-Lamping* and *Re-Lamping with Circuits De-Energized* above

Electrical Diagrams: If available, a basic diagram depicting the lighting circuit being tested will assist with ground fault location.

Equipment Details: The lamp is typically a 200V bulb, but is powered via a lighting transformer whose primary can be 5 kV.

Other Reference Documents or Materials: Constant current regulator technical manual

Steps to Take When Doing Re-Lamping of De-Energized Circuits without CCR Lockout

1. Plan your work and work your plan. Expect the unexpected
2. Determine whether it is possible to locate ground faults using one of the safer methods employing a Megger®, volt-ohm-milliammeter (VOM), or digital multimeter (DMM). If not, proceed with the steps below.
3. Obtain permission to use the energized CCR to locate ground faults.
4. There must be two qualified electricians in the vault during this procedure.
5. Before rigging the test setup, place the CCR in an *electrically safe work condition*. Typically, a 45 watt isolation transformer and light fixture are connected between one of the regulator outputs and ground.
6. Clear the lockout and stand well clear of the test setup. If the test lamp lights, there is at least one ground fault on the circuit.
7. With the regulator energized, electricians on the airfield can locate the ground fault by observing the pattern of lamps that are lit or not lit. This test may be done numerous times to locate multiple ground faults. The test setup should be switched from one CCR output lead to another to verify that multiple ground faults do not exist.
8. Once the ground faults are located in the field, place the CCR in an *electrically safe work condition* prior to repairing the grounded equipment.
9. Once the circuit is in an *electrically safe work condition*, repair the ground by checking the cable, connector kits, splices, etc.

When repairs are complete and field electricians are clear of the equipment, re-test the circuit using steps 3-8 above. Specific training should be provided for grounded output test used to locate ground faults. Electricians should be advised of the need to stay away from the grounded test setup in the vault, since the CCR may generate high voltages as it attempts to overcome the resistance of any high resistance faults.

F. Jumpering Circuits

Purpose

Airfield lighting must sometimes be re-aligned using jumpers. The task requires both knowledge of the specific airfield circuits being jumpered, as well as a familiarity with the hazards of series circuits to avoid incidents related to improper disconnection of a series lighting circuit.

Qualifications and Number of Employees to be Involved:

Qualified electricians only – a minimum of two whenever working with voltages greater than 600V - with specific training on this procedure.

Hazards:

- 1) 5 kV shock hazard from disconnecting the wrong airfield lighting cable
- 2) 5 kV shock hazard while working with splices and other non-standard connections
- 3) Shock and arc flash/blast hazards while working in vaults (vaults contain numerous and varied circuit types, including lighting and non-lighting circuits).
- 4) Confined space hazards
 - a. Confined space hazards – Airfield spaces through which jumpering is done may need to be classified as *permit-required confined spaces*. A confined space is defined as follows:
 - i. Is large enough and so configured that an employee can bodily enter and perform assigned work; and
 - ii. Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and
 - iii. Is not designed for continuous employee occupancy. (from OSHA 1910.146)

Limits of Approach:

Limited Approach Boundary:	5'0" (may increase if circuit voltages encountered > 72.5 kV)
Restricted Approach Boundary:	2'2" (may increase if other circuit voltages encountered > 15 kV)
Prohibited Approach Boundary:	0'7" (may increase if other circuit voltages encountered > 15 kV)
Flash Protection Boundary:	Not applicable if only series circuits are encountered. If other non-lighting circuits exist in manholes, pits, or vaults, flash protection boundaries <u>will</u> be necessary. The voltage levels of the non-lighting circuits and the alignment of the space in which the jumpering is done will dictate the flash protection equipment required.

Safe Work Practices:

1. If spaces where the jumpering is to be done are classified as confined spaces, do not enter until the atmosphere in the space is tested clean. Refer to the DAA Confined Space Entry Program.
2. A second, qualified electrician who is trained in emergency procedures is standing by during all tasks.
3. Use only approved connector kits, splices, and glues
4. No one other than a qualified electrician is permitted within the *limited approach boundary* (5'). If an unqualified person needs to come within the *limited approach boundary*, he or she should be advised of the hazards and continuously escorted by a qualified person. At no time should the unqualified person be allowed within the *restricted approach boundary* (2'2").
5. No un-insulated body parts are permitted past the *restricted approach boundary* (2'2").
6. No un-insulated tools or materials (e.g. replacement parts) that are in contact with an un-insulated part of the electrician's body are permitted within the *restricted approach boundary* (2'2").
7. Class 1 voltage-rated gloves (for protection up to 7.5 kV) must be worn when inside the *restricted approach boundary* (2'2"). These insulating gloves should be covered with leather outer-gloves.
8. All tools must be insulated when working on or near energized parts. No un-insulated tools inside the *restricted approach boundary*.
9. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.
10. No energized electrical work may be done without proper illumination.
11. No conductive jewelry or clothing may be worn
12. If working in confined or enclosed spaces such as manholes or vaults, ensure there are no other exposed energized conductors in the vicinity.

Personal Protective Equipment Needed

Depends on the flash hazards present in the manholes, vaults, and other spaces in which the jumpering is done. For example, if non-lighting cables carrying more than 1 kV must be handled, flash suits will be required. If any of the pits/manholes/vaults contain any exposed circuitry or bussing, flash protection will be required. At a minimum:

- 1) Non-melting/untreated natural fiber t-shirt (long sleeve)
- 2) Non-melting/untreated natural fiber long pants
- 3) Fire resistant (FR) safety glasses

Insulating Tools and Equipment: All tools should be insulated

Special Precautionary Techniques

1. Electrical: exposed energized conductors; high voltage cables; different types of electricity requiring different measuring devices (series circuits, parallel circuits, high-voltage circuits)
2. Confined space hazards (hazardous atmospheres, entrapment, engulfment)

Electrical Diagrams: As-built diagrams should be made available to field electricians performing the work.

Equipment Details: Use only approved connector kits and splices

Other Reference Documents or Materials: None

Steps to Take When Jumpering Circuits

1. Plan your work and work your plan. Expect the unexpected. Use as-built drawings to determine the circuits to be jumpered and the paths that will be taken. Obtain approved connector kits, splices, insulated tools, and safety equipment. If non-lighting circuits will be encountered, arc flash/arc blast protective equipment will be needed.
2. Place the circuits to be jumpered in an *electrically safe work condition*. There must be two qualified electricians working the tasks whenever working with voltages greater than 600V or when working with exposed energized conductors.
3. If entering any confined space, obtain a Confined Space Entry Permit (see the DAA Confined Space Entry Program).
 - a. Calibrate the air testing equipment prior to dropping it into the pit
 - b. Obtain air quality readings from the readouts on the sniffer. When acceptable, proceed into the space. If acceptable readings cannot be obtained, introduce ventilation until acceptable readings are obtained. Once acceptable air readings are obtained, enter the pit.
 - c. The sniffer should continuously monitor the space and alarm if and when the air quality deteriorates. EXIT THE PIT IMMEDIATELY UPON HEARING A SNIFFER ALARM OR IF YOU FEEL FAINT OR NAUSEOUS!

- d. Ensure that the rescue and buddy system procedures are in place
- 4. If any exposed conductors will be encountered during the jumpering work, arc flash/arc blast protective gear may be required. If working in pits, vaults, voids, or other tight enclosures, ensure that there are no other exposed conductors.
- 5. Using the proper testing equipment, verify that the circuits to be jumpered are dead (de-energized).

Leave any confined spaces immediately after completing the jumper

G. Continuity Testing of Series Lighting Circuits

Purpose

Continuity testing of airfield lighting circuits is done regularly. In all cases, the circuit is de-energized and locked out.

Qualifications and Number of Employees to be Involved:

1. Putting the circuit in an *electrically safe work condition*: Qualified electricians only
2. Other electricians may perform the actual continuity testing but must have received training on this procedure.

Hazards:

5 kV shock hazard should an electrician fail to de-energize the circuit prior to conducting a continuity test.

Limits of Approach:

Since this procedure is done with circuit in an *electrically safe work condition*, limits of approach are not applicable. **Note, however, that if adjacent electrical hazards exist, limits of approach for those hazards must be calculated and adhered to**

Protective Clothing and Equipment Required

Not needed if circuit is in an *electrically safe work condition*

Safe Work Practices:

1. Ensure that the test equipment is designed for and capable of testing the circuits being worked on
2. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.
3. If working in confined or enclosed spaces such as manholes or vaults, ensure there are no other exposed energized conductors in the vicinity.

Insulating Tools and Equipment: Not needed if circuit is in an *electrically safe work condition*

Special Precautionary Techniques: None

Electrical Diagrams: As-built diagrams should be made available to field electricians performing the work.

Equipment Details: None

Other Reference Documents or Materials: None

Steps to Take When Doing Continuity Tests on Airfield Lighting Circuits

1. Plan your work and work your plan. Expect the unexpected. Use as-built drawings to determine the circuits to be tested.
2. Place the circuits to be tested in an *electrically safe work condition*.
3. If entering any confined space, obtain a Confined Space Entry Permit (see the DAA Confined Space Entry Program).
4. If any exposed conductors will be encountered during the testing work, arc flash/arc blast protective gear may be required. If working in pits, vaults, voids, or other tight enclosures, ensure that there are no other exposed conductors.
5. Using the proper testing equipment, verify that the circuits to be test are dead (de-energized).
6. Perform the continuity testing in accordance with the test equipment manufacturer's instructions.

H. Manual Meggering® of Series Lighting Circuits

Purpose

Manual Meggering® of airfield lighting circuits is done regularly. In all cases, the circuit is de-energized and locked out.

Qualifications and Number of Employees to be Involved:

1. Putting the circuit in an *electrically safe work condition*: Qualified electricians only
2. Other electricians may perform the actual Meggering® but must have received training on this procedure.

Hazards:

5 kV shock hazard should an electrician Megger® the circuit while energized

Limits of Approach:

Since this procedure is done with circuit in an *electrically safe work condition*, limits of approach are not applicable. **Note, however, that if adjacent electrical hazards exist, limits of approach for those hazards must be calculated and adhered to**

Protective Clothing and Equipment Required

Not needed if circuit is in an *electrically safe work condition*

Safe Work Practices:

1. Ensure that the test equipment is designed for and capable of testing the circuits being worked on
2. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.
3. If working in confined or enclosed spaces such as manholes or vaults, ensure there are no other exposed energized conductors in the vicinity.

Insulating Tools and Equipment: Not needed if circuit is in an *electrically safe work condition*

Special Precautionary Techniques: None

Electrical Diagrams: As-built diagrams should be made available to field electricians performing the work.

Equipment Details: None

Other Reference Documents or Materials: None

Steps to Take When Doing Manual Meggering® on Airfield Lighting Circuits

1. Plan your work and work your plan. Expect the unexpected. Use as-built drawings to determine the circuits to be tested.
2. Place the circuits to be tested in an *electrically safe work condition*.
3. If entering any confined space, obtain a Confined Space Entry Permit (see the DAA Confined Space Entry Program).
4. If any exposed conductors will be encountered during the testing work, arc flash/arc blast protective gear may be required. If working in pits, vaults, voids, or other tight enclosures, ensure that there are no other exposed conductors.
5. Using the proper testing equipment, verify that the circuits to be test are dead (de-energized).
6. Perform the Meggering® in accordance with the test equipment manufacturer's instructions.

I. Output Voltage Measurements on CCR

Purpose

Airfield lighting electricians sometimes need to take output voltage measurements on constant current regulators (CCR) to troubleshoot an overheating or erratically operating CCR or to determine why a CCR is not maintaining design output current. CCR's develop high voltages that can cause severe injury and electrocution. Consequently, potential voltage transformers must be used to obtain voltage measurements.

Qualifications and Number of Employees to be Involved: Qualified electricians only - a minimum of two – trained in this procedure

Hazards:

1. High voltage electrical shock hazards from contact across the output terminals of CCR's.
2. Arc flash and arc blast hazards if maintenance is performed with cabinet doors or panels removed

Limits of Approach:

Limited Approach Boundary:	5'0"
Restricted Approach Boundary:	2'2"
Prohibited Approach Boundary:	0'7"
Flash Protection Boundary:	Not applicable if cabinet doors remain closed and panels remain on, since only constant currents at 6-20 amps – no significant bolted fault current are expected for this task. If panel covers are off or CCR doors are open, the flash protection boundary should be established at four (4') feet.

Protective Clothing and Equipment Required

Only the basic protective clothing in #1-3 below is needed if circuit is in an *electrically safe work condition* and observations are done outside the restricted approach boundary. **Note that if the CCR cabinet is open, however, electricians are exposed to arc flash and arc blast hazards.** Refer to the CCR Maintenance procedure earlier in this section if CCR cabinets are to remain open during the test procedure.

- 2) Non-melting/untreated natural fiber t-shirt (long sleeve)
- 3) Non-melting/untreated natural fiber long pants
- 4) Fire resistant (FR) safety glasses

Safe Work Practices:

1. Use a voltage measurement transformer recommended by the CCR manufacturer. Typically this is a transformer with a 40:1 ratio and a primary voltage rating of 4800 volts.

2. **Never attempt to measure the voltage across the output terminals of a CCR without the load connected!** If an open circuit exists, voltages as high as 10 kV can be reached before an open circuit shutdown occurs.
3. Use only true RMS current measurement equipment to verify whether or not a series circuit is dead (de-energized).
4. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.
5. If working in confined or enclosed spaces such as manholes or vaults, ensure there are no other exposed energized conductors in the vicinity.

Insulating Tools and Equipment: Voltage measurement equipment must be insulated. Other equipment need not be insulated if circuit is in an *electrically safe work condition* and the *restricted approach boundary* is not breached.

Special Precautionary Techniques: The CCR can reach dangerous voltages (up to 10 kV) before protective features operate. Ensure the CCR is in an *electrically safe work condition* prior to attaching the potential voltage measurement transformer. Use a transformer having a 40:1 ratio and a primary voltage rating of 4800 volts.

Electrical Diagrams: None

Equipment Details: Review the specific voltage measurement procedure in the CCR technical manual

Other Reference Documents or Materials: None

Steps to Take When Taking Output Voltage Measurements on a CCR

1. Plan your work and work your plan. Expect the unexpected. Use the technical manual for the specific CCR on which you are working, since many CCR's are different.
2. Prior to starting the CCR output voltage measurement procedure, ensure that all lamps in the circuit supplied by the CCR are working (this is to ensure more accurate measurements of output voltage).
3. Place the CCR is in an *electrically safe work condition*. This includes keeping the CCR cabinet doors closed and panels on. If cabinet doors are to remain open or cabinet panels are to remain off during the test, arc flash/arc blast protective clothing must be worn if approaching within 4' of the CCR (see the CCR Maintenance procedure earlier in this section).
4. With the CCR in an *electrically safe work condition*, attach the output measurement transformer.
5. Re-energize the CCR and increase the brightness to the highest step.
6. Record the voltage measured and multiply it by the current associated with the brightness step of the CCR.

J. Work at Heights from Bucket Truck

Purpose

On occasion, electricians work from a bucket truck on series street lighting circuits around the airfield. Re-lamping airfield lights is typically done without the power supply (the constant current regulator (CCR)) locked out due to the infeasibility of such a lockout. It is infeasible because for most re-lamping tasks, electricians on the airfield would need to lock out the CCR in the vault and then drive long distances to the airfield to do the re-lamping. The electrician would then need to drive back to the vault, clear the lockout, and drive back to the lamp to ensure that it is working.

By definition, performing work on electrical circuits without a system lockout means that the circuit is NOT in an *electrically safe work condition*. As such, **significant hazards remain with this task**. Therefore, additional precautions must be taken to provide a level of protection equivalent to an *electrically safe work condition*. An electrician who does not maintain control of the circuit on which he works by placing his or her own lock on the CCR disconnect is placing himself at additional risk.

Note: Although it is rarely possible to do re-lamping tasks with the circuit in an *electrically safe work condition* (that is, with the CCR locked out by the electrician doing the re-lamping), it remains the preferred method of doing re-lamping tasks. When re-lamping is done with the circuit in an *electrically safe work condition*, this procedure need not be followed. Only the procedure to place the circuit in an *electrically safe work condition* need be followed.

Qualifications and Number of Employees to be Involved: Qualified electricians only - a minimum of two – trained in this procedure

Hazards:

- 1) Fall-from-heights while working from bucket
- 2) 5 kV electrical shock hazard from series circuit being worked on
- 3) Shock hazard from secondary side (lamps)

Limits of Approach:

Limited Approach Boundary:	5'0"
Restricted Approach Boundary:	2'2"
Prohibited Approach Boundary:	0'7"
Flash Protection Boundary:	Not applicable (constant current at 6-20 amps – no significant bolted fault current)

Personal Protective Equipment Needed

1. Class 1 voltage-rated gloves (for protection up to 7.5 kV) with leather protective covers;
2. Fire-resistant safety glasses
3. Non-melting/untreated natural fiber t-shirt (long sleeve)
4. Non-melting/untreated natural fiber long pants

Safe Work Practices:

1. Refer to the DAA Fall Protection Program prior to commencing work.
2. Fall protection equipment must be worn and attached to the anchor inside the bucket at all times before raising the bucket, even if being raised to a height less than six (6') feet. This is to prevent you from being thrown from the bucket.
3. Use a full body harness only. Do not use a back belt – serious injuries can result if you fall and are arrested by a back belt.
4. If possible, all work from the bucket truck should be done with circuits in an *electrically safe work condition*.
5. Use only true RMS current measurement equipment to verify whether or not a series circuit is dead (de-energized).
6. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.
7. Because you will not have direct control over the power source of the lighting circuit on which you will be working, you must complete this task as quickly and safely as possible. Planning is essential.
8. Establish radio contact with the person overseeing the CCR in the vault. A headset or other hands-free device should be used. Radio communications should be constant.
9. A second, qualified electrician who is trained in emergency procedures is standing by during the re-lamping task.
10. No one other than a qualified electrician is permitted within the *limited approach boundary* (5'). If an unqualified person needs to come within the *limited approach boundary*, he or she should be advised of the hazards and continuously escorted by a qualified person. At no time should the unqualified person be allowed within the *restricted approach boundary* (2'2").
11. No un-insulated body parts are permitted past the *restricted approach boundary* (2'2").
12. No un-insulated tools or materials (e.g. replacement parts) that are in contact with an un-insulated part of the electrician's body are permitted within the *restricted approach boundary* (2'2").

13. Class 1 voltage-rated gloves (for protection up to 7.5 kV) must be worn when inside the *restricted approach boundary* (2'2"). These insulating gloves should be covered with leather outer-gloves.
14. The secondary side of the lamp should be tested to verify that a primary-to-secondary short does not exist. A VOM or DMM capable of testing up to the maximum expected voltage must be used.
15. All tools must be insulated.
16. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.
17. No energized electrical work may be done without proper illumination.
18. No conductive jewelry or clothing may be worn
19. If working in confined or enclosed spaces such as manholes or vaults, ensure there are no other exposed energized conductors in the vicinity.

Insulating Tools and Equipment: Required

Special Precautionary Techniques: Refer to the DAA Fall Protection Program. Fall protection equipment must be worn at all times, properly attached to the anchor in the bucket.

Electrical Diagrams: If available, use as-built drawings to confirm which lighting circuits are supplied by a specific CCR

Equipment Details: None

Other Reference Documents or Materials: None

Steps to Take When Performing Lamp Replacement from the Bucket Truck

1. Plan your work and work your plan. Expect the unexpected. Because you will not have direct control over the power source of the lighting circuit on which you will be working, you must complete this task as quickly and safely as possible. Planning is essential.
2. If possible, place the CCR powering the lighting circuit in an *electrically safe work condition*. If this is not possible, establish radio contact with the person overseeing the CCR in the vault or tower. A headset or other hands-free device should be used. Radio communications should be constant. A second, qualified electrician who is trained in emergency procedures is standing by during the re-lamping task.
3. Inspect your fall protection equipment. Put it on and attach it to the anchor in the bucket truck only if it is free of defects.

4. Prior to breaching the *restricted approach boundary* (2'2"), inspect your Class 1 insulated gloves and put them on (do not use the gloves if they are ripped or damaged). Cover the gloves with leather outer gloves.
5. Test the circuit for the presence of current using a true RMS ammeter. If no current is detected, proceed with the re-lamping task. Be aware that because the CCR is not locked out, power could inadvertently be turned on at any time. Test the circuit for the presence of current each time you return to the task after walking away from it.
6. Repair the lamp, remaining aware of the possibility of the high voltage hazards associated with primary to secondary shorts.
7. When repair is complete, step outside the *restricted approach boundary* and ask the electrician in the vault to energize the circuit. Visually confirm that the lamp is lit.
8. Ask the vault to de-energize the CCR
9. Do not remove your gloves until you are finished working inside the *restricted approach boundary*.
10. When outside the *restricted approach boundary*, inform the vault that it is safe to re-energize the circuit.
11. Lower the bucket to the ground before removing fall protection harness.

K. Switching Leads from One CCR to Another

Purpose

This task is done rarely, but there are instances where the leads from one constant current regulator (CCR) are switched to a backup CCR or to an adjacent CCR. The task is easily and safely accomplished when both CCR's are placed in an *electrically safe work condition*, but is hazardous if done improperly or if cable leads are improperly handled or identified.

Qualifications and Number of Employees to be Involved: Qualified electricians only - a minimum of two – trained in this procedure

Hazards:

1. Up to 10 kV shock hazard if leads are disconnected while the CCR is still energized (open circuit protective devices often do not function until voltage levels reach 10 kV)
2. 5 kV shock hazard from handling groups of cables that are not de-energized (such as those in the patch panel or behind the CCR's)

Limits of Approach:

Limited Approach Boundary:	5'0"
Restricted Approach Boundary:	2'2"
Prohibited Approach Boundary:	0'7"
Flash Protection Boundary:	Not applicable (constant current at 6-20 amps – no significant bolted fault current)

Personal Protective Equipment Needed

2. Class 1 voltage-rated gloves with leather covers
3. Fire-resistant safety glasses
4. Non-melting/untreated natural fiber t-shirt (long sleeve)
5. Non-melting/untreated natural fiber long pants

Safe Work Practices:

1. Place the CCR in an *electrically safe work condition* prior to switching leads
2. A second, qualified electrician who is trained in emergency procedures is standing by during the re-lamping task.
3. Class 1 voltage-rated gloves (for protection up to 7.5 kV) must be worn due to the nature of the task. Numerous cables must be handled behind the regulator and inside the patch panel when performing this task.

4. No one other than a qualified electrician is permitted within the *limited approach boundary* (5'). If an unqualified person needs to come within the *limited approach boundary*, he or she should be advised of the hazards and continuously escorted by a qualified person. At no time should the unqualified person be allowed within the *restricted approach boundary* (2'2").
5. No un-insulated body parts are permitted past the *restricted approach boundary* (2'2").
6. No un-insulated tools or materials (e.g. replacement parts) that are in contact with an un-insulated part of the electrician's body are permitted within the *restricted approach boundary* (2'2").
7. At no time should an electrician reach blindly into a can or other enclosure that may contain energized equipment.

Insulating Tools and Equipment: Not required if the CCR is in an *electrically safe work condition*

Special Precautionary Techniques:

1. De-energize the CCR before disconnecting the lead
2. Wear Class 1 voltage-rated gloves due to the potentially-energized cables that must be handled in patch panels and behind regulators

Electrical Diagrams: none

Equipment Details: None

Other Reference Documents or Materials: Refer to the cable tags on leads and other information provided in patch panels or other sources of cable path information.

Steps to Take When Switching the Leads on a CCR

1. Plan your work and work your plan. Expect the unexpected.
2. Place **BOTH** CCR's in an *electrically safe work condition*.
3. Don voltage-rated gloves prior to handling any cables.
4. Using an RMS clamp-on ammeter, verify that the circuit is dead before removing/switching leads.
5. Using cable tags, diagrams inside patch panels, and other sources of information, ensure that the leads to be switched are correct.
6. Switch the leads.
7. Re-energize the CCR's.

SECTION XI: PROGRAM ADMINISTRATION

- This program will be reviewed with SRE employees annually. At that time the program will be reviewed and changed to reflect changes in procedures due to safety or updated equipment.
- PPE inspection will be conducted in July annually as part of the overall review of the program. This does not preclude the pre-use inspections that must be conducted prior to using the PPE.
- Policies
 - Standards to use as references
 - Abandoned cables and conduit – marking and other decommissioning procedures
 - Excavation policy
 - Enforcement and discipline- refer to appendix C of this program

SECTION XII: TRAINING

- Safety Training Requirements
 - o Must include all hazards encountered, what types of injuries can occur, and how they affect the body
 - o May be done via classroom, on-the-job training, or both
- Training protocol for qualified electricians
 - o Must include general and task-specific safe work practices
 - o Must include training on specific equipment and tasks
 - o Must be trained in the hazards and protective equipment related to shock hazards and arc flash and arc blast hazards.
 - o Must be trained on how to determine nominal voltage
 - o Must be trained on how to test a circuit dead
 - o Must be trained how to recognize energized conductors
 - o Must be trained how to establish and work within approach boundaries
 - o Must include emergency procedures, including how to release someone from a live circuit as well as first aid/CPR
- Lockout Training
 - o Required for all personnel who are directly or indirectly exposed to the hazards of an improperly executed circuit lockout
 - o *Qualified electricians* must be trained on:
 - The contents of this program (when implemented, upon hire, or when transferred into the group).
 - The specific lockout procedures for each piece of equipment requiring its own lockout procedure (annually)
 - o Other persons exposed but not directly affected by a lockout must be trained on this program when the program is implemented, upon hire, or when transferred into the group. **Tower personnel should be trained on the basic components of the program.**
- Contractors must be trained to an equivalent or better level

SECTION XIII: BUDGET

- startup costs
 - o insulated tools cost
 - o gloves cost
 - o other protective equipment costs
- maintenance costs
 - o insulated tools cost
 - o gloves cost
 - o other protective equipment costs

SECTION XIV: AUDITS AND RECORDKEEPING

- **LOTO annual observations** will be conducted in July. Each employee whose duties require that they lock out equipment will be observed and recorded using the form in appendix A of this program. LOTO observation records will be maintained by the ASM in a separate file.
- **Airfield bulb training records** will be maintained in the SRE training file by the ASM.



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

**Subject: AIRPORT SAFETY
SELF-INSPECTION**

Date: 04/23/04

AC No: 150/5200-18C

Initiated by: AAS-300 **Change:**

1. PURPOSE. This Advisory Circular (AC) provides information to airport operators on airport self-inspection programs and identifies items that airport operators should include in such a program.

2. FOCUS. Development of a self-inspection program in accordance with this AC represents an acceptable means of compliance with the 14 Code of Federal Regulations (CFR) Part 139 (Part 139) requirements.

3. CANCELLATION. Advisory Circular 150/5200-18B, Airport Safety Self-Inspection, dated 5/2/88, is cancelled.

4. RELATED READING MATERIAL.

a. 14 CFR Part 139, Certification of Airports. While Part 139 requirements are mandatory for a holder of a Part 139 Airport Operating Certificate, the regulation contains many safety practices that the Federal Aviation Administration recommends for use at all airports.

b. 14 CFR Part 77, Objects Affecting Navigable Airspace.

c. Current editions of the following advisory circulars:

- (1) AC 150/5200-33, Hazardous Wildlife Attractants on or near Airports
- (2) AC 150/5210-21, Airport Certification Manual (ACM). This reference is pertinent for certificated airports only.
- (3) AC 150/5210-20, Ground Vehicle Operations on Airports.
- (4) AC 150/5200-28, Notices to Airmen (NOTAMs) for Airport Operators.
- (5) AC 150/5200-30, Airport Winter Safety and Operations.
- (6) AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport.
- (7) AC 150/5230-4, Aircraft Fuel Storage, Handling, and Dispensing on Airports.
- (8) AC 150/5300-13, Airport Design.
- (9) AC 150/5340-1, Standards for Airport Markings.
- (10) AC 150/5340-18, Standards for Airport Sign Systems.
- (11) AC 150/5340-21, Airport Miscellaneous Lighting Visual Aids.
- (12) AC 150/5340-24, Runway and Taxiway Edge Lighting System.

- (13) AC 150/5340-26, Maintenance of Airport Visual Aid Facilities.
- (14) AC 150/5370-2, Operational Safety on Airports During Construction.
- (15) AC 150/5370-10, Standards for Specifying Construction of Airports.

d. Obtain the latest version of the free Advisory Circular publications from the FAA on its Web site at www.faa.gov/arp/. In addition, these ACs are available by contacting the U.S. Department of Transportation, Subsequent Distribution Office, SVC-121.23, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785. All FAA ACs are listed in the Advisory Circular Checklist, AC 00-2.1, which is available on the internet. The Checklist also explains how to obtain the circulars.

5. BACKGROUND.

a. While some hazardous airport conditions develop virtually instantaneously, others are gradual. It is important that the airport operator have an airport safety self-inspection program that monitors specific airport conditions in order to identify unsatisfactory conditions for prompt corrective actions. A number of airport operators have some form of a safety self-inspection program. The programs vary in scope and effectiveness from verbal instructions and unscheduled and unrecorded inspections to very comprehensive inspection programs with multiple daily schedules and widely distributed responsibilities.

b. At airports certificated under 14 CFR Part 139, the self-inspection program is a key component of an airport operator's airport certification program and required under §139.327. An effective self-inspection program enables an airport operator to operate in compliance to Part 139 standards on a day-to-day basis. In accordance with Part 139, all airports must have an Airport Operating Certificate if serving—

(1) Scheduled or unscheduled passenger operations of an air carrier with aircraft having a seating capacity of more than 30 passengers, or

(2) Scheduled passenger operations with aircraft having a seating capacity of more than 9 and less than 31 passengers.¹

One of the requirements of Part 139 is that the operator of each certificated airport regularly conduct a daily safety self-inspection to ensure that prompt corrective action is taken to eliminate unsafe conditions on the airport. The specific requirements of the self-inspection program at each certificated airport are addressed in the airport certification manual.

c. This AC suggests components, responsibilities, and items for regularly scheduled, continuous surveillance, periodic condition and special inspections, and checklists for use during any of these airport safety self-inspections. This guidance can be modified as necessary to meet local situations. The information and guidance in this publication serve as a basis by which airports operators may develop their own safety self-inspection programs.

6. RESPONSIBILITIES.

a. **Safety Self-Inspection.** Self-inspection is a primary responsibility of the airport owner, operator, or a duly authorized representative. It is customary to assign the job of assuring overall airport ground safety to the airport manager or operations supervisor. Primary attention should be given to such operational items as pavement areas, safety areas, markings, signs, lighting, aircraft rescue and fire fighting, fueling operations, navigational aids, ground vehicles, obstructions, public protection, wildlife

¹ Part 139 is only applicable in the State of Alaska to airport operators serving scheduled or unscheduled passenger operations of an air carrier with aircraft having a seating capacity of more than 30 passengers.

hazard management, construction, and snow and ice control. Inspection of areas that have been assigned to individual air carriers, fixed base operators, or other tenants can be made the responsibility of the user. However, at Part 139 airports, the FAA will hold the certificate holder ultimately responsible for operating the airport safely.

b. Recommended Inspection Frequency.

(1) **Regularly scheduled inspection.** The airport should be inspected at least daily during times when aircraft activity is minimal in order to create the least impact on airport operations. Part of this inspection should be done during the hours of darkness at those airports that serve air carriers after dark.

(2) **Continuous surveillance inspection.** Those activities and facilities that have been identified to require continuous surveillance should be inspected any time personnel are in the air operations area. Hazardous conditions can occur at any time and in a short period of time.

(3) **Periodic condition inspection.** Periodic condition inspection of activities and facilities can be conducted on a regularly scheduled basis but less frequently than daily. The time interval could be weekly, monthly, or quarterly, depending on the activity or facility.

(4) **Special inspection.** Special inspections of activities and facilities should be conducted after receipt of a complaint or when an unusual condition or unusual event occurs on the airport, such as a significant meteorological event or an accident or incident. Special inspections should also be conducted at the end of construction activity to ensure that there are no unsafe conditions present related to the construction activity. A special inspection should be conducted prior to construction personnel leaving the airport in the event that corrective actions are necessary. Special inspections should be documented on the appropriate portions of the regularly scheduled inspection checklist.

c. Inspection Records. An effective safety self-inspection program includes procedures for reporting and correcting deficiencies. This means that the airport operator should have a work order system in place so that deficiencies can be corrected in an expeditious manner.

(1) The operator should issue a Notice to Airmen (NOTAM), as appropriate, through the appropriate Flight Service Station (FSS) reporting deficient conditions that could have an immediate and critical impact on the safety of aircraft operations. When corrective actions have been taken, the NOTAM should be cancelled. At Part 139 airports, other similar systems and procedures may be used if approved by the FAA.

(2) For even the smallest airport, it is desirable to use a safety self-inspection checklist that constitutes a written record of conditions noted, and acts as a check on follow-up actions taken. The scheduled use of a dated checklist will assure the regularity and thoroughness of safety inspections and follow-up. The checklist can be an important administrative tool for airport management. It can provide a snapshot of the condition of the airport, indicating trends, defining problem areas, indicating systems that are beginning to deteriorate and helping to define budgetary requirements. It is most desirable to use a format (see examples, Appendices 1–5) in which each inspected area of the airport complex is positively noted. Retain the checklist until indicated actions are completed. Airports certificated under Part 139 must retain the regularly scheduled inspection checklist for 12 months. Airports may use additional, specialized materials and forms, such as maintenance work orders, NOTAMs, fire station and first aid reports, etc. Some airport operators use computerized versions specifically designed to meet their self-inspection requirements. There are several vendors that have developed these computer programs that can use laptops and Personal Data Assistants (PDAs). However, the regularly scheduled inspection checklist should be the basic log documenting that safety inspection responsibilities are being met.

d. Follow-up. The airport operator should follow up on complaints or requests for corrective action and on all deficient items or problem areas noted during the daily inspection. Determine which problems

require immediate attention and treat those with highest priority, including developing appropriate NOTAM notification.

7. INSPECTION TECHNIQUES.

Inspectors should vary the pattern of the inspection. Fixed inspection patterns, while easy to learn, do not provide for an adequate inspection. The use of such fixed inspection patterns can lead to complacency and to the possibility of missing items that are in need of correction. When conducting an inspection on a runway and when there is time to do only one pass on that runway, inspection personnel, whenever practical, should drive towards the direction of landing aircraft with high intensity flashing beacon and headlights on day and night. This practice will enable self-inspection personnel to see approaching aircraft and improve visibility of the vehicle to pilots. However, it is recommended that a runway inspection be done in both directions. Inspection personnel should also drive the stub taxiways between the runway and parallel taxiway as these areas are commonly overlooked.

8. KNOWLEDGE AND EQUIPMENT FOR SELF-INSPECTION.

a. Airport personnel who conduct safety self-inspections (referred to as inspectors in this AC) should receive training in at least the following areas:

b. Inspectors should know the location and types of airport facilities, airport rules and regulations and, at Part 139 airports, be familiar with the FAA-approved Airport Certification Manual.

- (1) Airport familiarization, including airport signs, marking, and lighting;
- (2) Airport Emergency Plan (if the airport has one);
- (3) Notice to Airmen (NOTAM) notification procedures;
- (4) Procedures for pedestrians and ground vehicles in movement areas and safety areas;
- (5) Airport inspection procedures and techniques; and
- (6) Discrepancy reporting procedures.

c. Inspectors should know the FAA Advisory Circular standards applicable to the airport and have access to copies for reference. Some applicable standards can be found in the FAA Advisory Circulars listed in paragraph 3c. (This is not an all-inclusive list.). They can also be found on the Internet at www.faa.gov.

d. Inspectors should have a vehicle equipped with:

(1) a two-way ground control radio capable of communicating with the Airport Traffic Control Tower on controlled airports and on the Common Traffic Advisory Frequency (CTAF) or UNICOM at uncontrolled airports (or at controlled airports when the tower is closed);

(2) a beacon for nighttime (or inclement weather conditions) inspections; and

(3) either a beacon or checkered flag for daytime inspections.

e. Inspectors should know and use correct radio communication phraseology, procedures and techniques, as specified in the Aeronautical Information Manual. If the airport operator uses airport police to do all or part of the self-inspection, the police should use aviation terminology and not 10-4 codes.

f. Inspectors should be supplied with checklists covering the various inspection areas (sample airport safety self-inspection checklists are contained in Appendices 1–5). While format of checklists vary, it is important to develop a checklist that is useful for the airport and its operation. If certain

inspectors will be responsible for only certain items, separate checklists pertinent to those areas may be developed. A sketch of the airport should accompany the checklist so that the location of problems can be marked for easy identification.

g. Inspectors should review the most recently completed checklist from the previous inspection cycle prior to beginning the inspection.

h. If construction is in progress, inspectors should be familiar with the safety plan for the project.

i. If the airport is certificated under Part 139, inspectors should be familiar with the airport certification manual requirements concerning training and self-inspection.

9. COMPONENTS OF A SAFETY SELF-INSPECTION PROGRAM. A successful safety self-inspection program has four components:

a. A regularly scheduled inspection of physical facilities (which must be conducted daily at airports certificated under Part 139 or in accordance with the FAA-approved airport certification manual). If the airport serves air carriers after dark, there should also be a nighttime inspection of lighting;

b. Continuous surveillance inspection of certain airport activities, such as fueling operations, construction, airfield maintenance;

c. A periodic condition inspection program for such things as surveying approach slopes, obstructions, etc.; and

d. Special condition inspections during unusual conditions or situations, such as changing weather or days of unusually high number of aircraft operations.

10. REGULARLY SCHEDULED INSPECTION.

The regularly scheduled inspection consists of specific observations of airport physical facilities on at least a daily basis. This inspection should concentrate on the areas described in this section, which are also included in Appendix 1. If deficiencies exist, the inspector should indicate the deficient item and identify its location on a airport sketch, providing dimensions and depths, as necessary. If appropriate, the inspector should take photographs to document the condition.

a. Pavement Areas. The condition of pavement surfaces is an important part of airport safety. Pavement inspection should be conducted daily before flight operations commence to ensure pavement surfaces are clear. As a minimum, a daily inspection should be performed of all paved areas that are the responsibility of the airport operator or as specified in the FAA-approved Airport Certification Manual. During the pavement inspection, the inspector should:

(1) Check the pavement lips—the area between full-strength pavement and shoulders or paved shoulders and safety areas—to assure that they are no greater than necessary to allow water to drain off the pavement. A lip height no greater than 1 1/2 inches is usually sufficient to allow proper drainage. (At airports certificated under Part 139, pavement lips shall not exceed 3 inches as stated in § 139.305.)

(2) Determine if there are any cracks wide enough to cause directional control problems for an aircraft. Report and monitor these cracks.

(3) Determine if there are any holes that could cause directional control problems for an aircraft. (At airports subject to Part 139, any hole that cannot be covered by a 5-inch circle, and the side slope at any point in the hole that exceeds 3 inches in depth and is 45 degrees or greater, is a discrepancy. If the hole cannot be covered by a 5-inch circle but the side slope at any point in the hole that exceeds 3

inches in depth or is less than 45 degrees, it may be a discrepancy if it is determined to be a surface variation that could impair directional control of an air carrier aircraft.)

(4) Check the condition of pavement areas for cracks, scaling, spalling, bumps, low spots, and for debris that could cause foreign object damage to aircraft.

(5) Check for vegetation growth along runway and taxiway edges that may impede drainage from the pavement surface.

(6) Check for vegetation growth in cracks.

(7) Report and monitor any cracks, holes, variations and vegetation that can cause loss of aircraft directional control or may cause pavement damage, including damaged caused by damming or ponding water.

b. Safety Areas. The inspector should know the dimensions of the runway and taxiway safety areas at the airport. At airports certificated under Part 139, the dimensions of the safety areas should be documented in the airport certification manual. During the safety area inspection, the inspector should:

(1) Determine if there are any hazardous ruts, depressions, humps or variations from the normal smooth surface.

(2) Check to ensure no object is located in a safety area, except objects that must be in the safety areas because of their functions (such as runway lights, signs, or navigational aids). These objects must be constructed on frangibly mounted structures of the lowest practical height. At Part 139 airports, the frangible point must be no higher than 3 inches above grade.

(3) Determine if the base for any equipment in safety areas is at grade level (especially during the winter thaw) and equipment and NAVAIDs mounted on frangible couplings.

(4) Check to ensure that manhole and handhole covers are at grade level and can support vehicles and aircraft. Check to ensure that mounts for light fixtures are at grade level.

(5) Check for surface variation and other damage caused by rodents or other animals.

(6) Report any objects that are not frangible or not at grade level. Also report extraneous equipment and objects, such construction equipment, and surface variations that would cause damage to an aircraft or impede emergency response vehicles. At airports certificated under Part 139, issue a NOTAM regarding objects in the safety area contrary to § 139.309 (see § 139.339)

c. Markings. Airport markings provide important information to pilots during takeoff, landing, and taxiing. To avoid confusion and disorientation, airport markings should be in compliance with FAA marking standards specified in AC 150/5340-1, Standards for Airport Markings. (Compliance with these standards is mandatory for operators of airports certificated under Part 139 and for airport operators that have accepted Federal funds for runway and taxiway construction/rehabilitation.) The inspector should know the appropriate markings required at the airport. During the marking inspection, the inspector should:

(1) Check markings for correct color-coding, peeling, blistering, chipping, fading, and obscurity due to rubber buildup.

(2) Check to see if all runway hold position markings are clearly visible.

(3) During and after construction projects, check new markings for compliance with FAA marking standards.

(4) If the markings have glass beads, check markings during periods of darkness to determine if the reflectivity of glass beads is adequate at night.

(5) Report and monitor any nonstandard marking or markings that are obscured, faded or deteriorating.

d. Signs. Signs provide important information to pilots while taxiing. To avoid pilot confusion and disorientation, airport signs should be in accordance with FAA sign standards specified in AC 150/5340-18, Standards for Airport Sign Systems. (Compliance with these standards is mandatory for operators of airports certificated under Part 139 and for airport operators that have accepted Federal funds for runway and taxiway construction/rehabilitation.) The inspector should know the appropriate sign standards and specifications at the airport and at a Part 139 certificated airport, ensure signs comply with the FAA-approved Sign Plan.

(1) Check signs to ensure they are easy to read, in accordance with color standards, retro-reflective, and that all lighted signs are working and not obscured by vegetation, dirt, snow, etc.

(2) Check signs to ensure they are frangibly mounted and concrete bases are properly maintained at grade level.

(3) Check to see that sign panels are not missing or damaged, that they have the correct legend and arrow orientation, and that they are not cracked or broken.

(4) During and after construction projects, check new signs for compliance to FAA sign standards and, at Part 139 airports, in accordance with the FAA-approved Sign Plan.

(5) During periods of darkness, check signs to ensure they are properly illuminated. Ensure mandatory instruction signs are illuminated with the associated runway lighting system. Check signs for correct operations; that they are on the correct circuits, they do not flicker and that they follow the intensity setting of the runway or taxiway lights.

(6) Report and monitor any nonstandard sign or any sign that is not functioning, is faded or damaged. At airports certificated under Part 139, issue a NOTAM regarding any malfunctioning holding position sign or ILS critical are sign, as specified under § 139.339

e. Lighting. At night and during periods of low visibility, lighting is important for safe airport operations. Lights come in different shapes, sizes, colors, and configurations and can be located either in the pavement or along its edges. Inspection of lighting is best accomplished during periods of darkness in order to evaluate lighting systems when they provide the primary visual aid for pilots. The inspection should concentrate on the lighting owned by the airport operator. However, the inspector should observe any lighting owned or operated by others and report any observed problems immediately to the appropriate responsible owner. During the lighting inspection, the inspector should:

(1) Check to ensure that the following are operable, if installed, and that vegetation or deposits of foreign material do not obscure the light fixture.

(i) Runway and taxiway edge lights;

(ii) Apron edge lights;

(iii) Runway centerline and touchdown zone lights;

(iv) Taxiway centerline lights or centerline reflectors;

(v) Runway threshold/end lights; and

(vi) Runway guard lights (both elevated and in-pavement, if installed).

(2) Check that the following are operable, if installed:

(i) Ramp lights and floodlights used in construction to ensure they are properly shielded);

- (ii) Obstruction lights; and
- (iii) Lighting in fuel storage areas.
- (3) Report all fixtures missing and lights that are not working or appear dim.
- (4) Report any missing or broken light fixture lenses.
- (5) Ensure that runway and taxiway lights and runway threshold lights are the proper color and are oriented correctly.
- (6) Check that lights function properly through the manual or radio control features, and that photocell controls function properly.
- (7) Check the lights for proper alignment, aiming and correct changes in intensity, for correct height, erosion around the bases and the height of frangibility.

f. Navigational Aids (NAVAIDs). The inspection of NAVAIDs should concentrate on the visual navigational aids owned by the airport operator. However, the inspector should observe any navigational aids owned or operated by others, such as the FAA, and report any observed problems immediately to the NAVAID owner. During the inspection of NAVAIDs, the inspector should:

- (1) Determine if the segmented circle is clear of vegetation and that it can be seen easily from the air.
- (2) Determine if the airport rotating beacon is visible and working properly.
- (3) Check the wind cone(s) to ensure that it swings freely, the cone fabric is not faded or frayed, and, if lighted, that all lights are operating.
- (4) Determine if the Runway End Lights (RENs, formerly known as Runway End Identifier Lights) are flashing in proper sequence and mounted on frangible couplings.
- (5) Check Visual Glide Slope Indicators (VASIs, PLASIs, or PAPIs) to ensure that their lights are working and mounted on frangible couplings.
- (6) Determine if the Approach Lighting systems are functioning properly.
- (7) Report and monitor any NAVAID that is malfunctioning, inoperable or misaligned, damaged or missing.

g. Obstructions. The inspection of obstructions should concentrate on a visual check of construction underway on or near the airport that could affect aircraft operations. This also includes checking for any vegetation, especially, trees, that may penetrate the Part 77 surfaces. During the inspection of obstructions, the inspector should:

- (1) Check to ensure that construction equipment, especially tall cranes being used at construction sites, are not an obstruction. If construction is found and thought to create an obstruction, the airport operator should determine if proper notification to FAA, such as is required through Part 77 or Airport Layout Plan review, has been provided.
- (2) Determine if obstructions are properly marked and lighted.
- (3) Direct any person proposing construction near a public-use airport meeting the notice requirements contained in Part 77, Objects Affecting Navigable Airspace, to the Air Traffic Division or Airports District Office immediately if their construction has not been reported to the FAA.
- (4) Report and monitor any obstruction light that is missing, inoperative or damaged, and any object that appears to be an obstruction and is not properly marked or lit.

h. Fueling Operations. The daily inspection on aircraft fueling operations should concentrate on a quick inspection for the most common problems concerning compliance with local fire safety codes at fuel storage areas and with mobile fuelers. The inspection should also include security, fire protection, general housekeeping, and fuel dispensing facilities and procedures. A more detailed fueling operation inspection should be scheduled quarterly (see Quarterly Fueling Operations under Periodic Condition Inspection). During the daily inspection of aircraft fueling operations, the inspector should:

- (1) Determine if the fueling operator is permitting any unsafe fueling practices or is in violation of local fire code, such as failure to bond aircraft with the mobile fuelers during fueling operations or fueling personnel smoking while fueling aircraft.
- (2) Check to ensure that the appropriate signs for the fuel farm are installed and that all gates are locked except when the facility is occupied by an authorized user.
- (3) Report and monitor any unsafe fueling practices and violation of local fire codes. At Part 139 airports, report any noncompliance with fuel fire safety procedures specified in the FAA-approved Airport Certification Manual.

i. Snow and Ice. The inspector should be familiar with the airport's snow and ice removal procedures and guidance provided in AC 150/5200-30, Airport Winter Safety and Operations. At Part 139 certificated airports, the inspector should be familiar with the airport's FAA-approved Snow and Ice Control Plan. During the snow and ice control inspection, the inspector should:

- (1) Determine if any lights and signs are obscured by snow or damaged by snow removal operations.
- (2) Check to ensure that snow banks and drifts next to the runway and taxiways provide clearance for aircraft wing tips, engines, and propellers.
- (3) Check to ensure that snow is not piled across the runway threshold or across runway/runway intersections.
- (4) Check to be sure that no foreign objects are left on the pavement from snow removal operations.
- (5) Check to ensure that snow removal operations have not blocked any taxiways or access routes dedicated for aircraft rescue and fire fighting equipment.
- (6) Check to ensure that snow is not accumulated or piled in the critical areas for electronic NAVAIDs.
- (7) Check for and report slippery pavement conditions in terms of either braking action or MU values. If a friction measurement device is available, issue the appropriate numbers obtained from the equipment. (Do not attempt to correlate friction measurement numbers with braking action reports.)
- (8) Report and monitor any snow and ice accumulation that has been missed by the snow and ice removal operation, and any dangerous condition created by such operations, such as obscured signs or lights. At airports certificated under Part 139, issue a NOTAM regarding snow, ice, slush or water on the movement area or loading ramps, and parking areas, as specified under § 139.339.

j. Construction. The inspector should be familiar with the airport's construction safety procedures and guidance provided in AC 150/5370-2, Operational Safety on Airports During Construction. At Part 139 certificated airports, the inspector should be familiar with the airport's FAA-approved Construction Safety Plan. During the construction inspection, the inspector should:

- (1) Determine if stockpiled material and construction materials are properly stored to keep them from being moved by wind, jet blast, or prop wash, and is not left in safety areas or movement area.

(2) Check all construction adjacent to movement areas to ensure areas are identified with conspicuous marking and lighting.

(3) Determine if construction equipment (such as bulldozers, cranes, etc.) are marked and lighted and parked clear of the safety areas.

(4) Ensure construction barricades are properly positioned to define the limits of construction and hazardous areas and, if barricades are lighted, check to ensure lights are working properly and are positioned correctly.

(5) Check to ensure that debris and foreign objects are continuously being picked up around construction areas.

(6) Check for open trenches in the safety areas or adjacent to movement areas.

(7) Check operation of lighting in areas adjacent to construction daily before the construction crews depart for the day. In particular, ensure that mandatory instruction signs remain lit with the associated runway lights, even on taxiways that have been closed for construction.

(8) Check NOTAMs daily during construction projects to ensure they accurately reflect the conditions on the airport.

(9) Verify that closed taxiways or runways are properly marked and lighted.

(10) Report and monitor any dangerous condition created by construction activity, including damage to signs, lights, markings and NAVAIDS or equipment and supplies left in movement areas and safety areas.

k. Aircraft Rescue and Fire Fighting. During the inspection of aircraft rescue and fire fighting (ARFF) capabilities, the inspector should:

(1) Check the status of ARFF response, including the availability of equipment, fire fighters and extinguishing agent. At Part 139 airports, ensure that such ARFF capabilities comply with the FAA-approved Airport Certification Manual and that the airport's ARFF Index is still appropriate for air carrier aircraft served.

(2) Ensure alarm and emergency notification communication systems are operable.

(3) Determine the adequacy of available fire extinguishing agents.

(4) Check for construction or maintenance activity on the movement area that could affect ARFF response routes. Ensure that the ARFF Department has been notified if construction or maintenance activity could affect emergency response routes.

(5) Report and monitor any ARFF vehicle, equipment or extinguishing agent that is not available or inoperative; any ARFF personnel that are not available; and any changes to aircraft that may require a change to ARFF capabilities. At Part 139 airports, notify the FAA if ARFF vehicles is inoperative and cannot be replaced immediately, as specified under § 139.319(g) and issue a NOTAM regarding non-availability of any rescue and firefighting capability, as specified under § 139.339.

l. Public Protection. During the public protection inspection, check gates, fencing, locks, and other safeguards are in place and functioning properly to prevent inadvertent entry to movement areas by unauthorized persons and vehicles and offer protection from jet blast. Report and monitor any safeguards that are damaged or missing. In accordance with the airport's security plan, report unauthorized persons or vehicles in the movement area (airports regulated by the Transportation Security Administration may have additional requirements for reporting and responding to unauthorized persons and vehicles).

m. Wildlife Hazard Management. During the wildlife hazard inspection, the inspector should check for evidence of birds or animals on the runways, taxiways, aprons, and ramps or other signs that

wildlife problems may have developed - such as large flocks of birds on or adjacent to the airport. Wildlife hazards found during the daily self-inspection should be properly documented. All dead wildlife found and all wildlife aircraft strikes should be reported to the FAA on the FAA Form 5200-7, Bird/Other Wildlife Strike Report. This form may be obtained from the FAA Internet site, at www.faa.gov. Additionally, the inspector should check fencing and gates for wildlife accessibility and should ensure that wildlife control equipment is available and operational.

11. CONTINUOUS SURVEILLANCE INSPECTION. Continuous surveillance inspection consists of general observation of activities for compliance with regulations, procedures, etc., as well as abnormalities with physical facilities that are readily apparent. This is performed any time inspection personnel are on the air operations area. Continuous surveillance of airport physical facilities and activities should cover at least the areas described in this section, which are also included in Appendix 2.

a. Ground Vehicles. During the continuous surveillance inspection of ground vehicles, the inspector should:

(1) Determine if vehicle drivers are following the airport's procedures and arrangements for the orderly operations of ground vehicles (including mowing machines or other maintenance vehicles in the safety areas). Extra attention should be paid to ground vehicle activity during construction, winter operations, and other special events.

(2) Report and monitor any vehicle operator that is not complying with the airport's vehicle procedures and arrangements.

(3) Report any ground vehicle accident observed and any ground vehicle signs and markings that are damaged, missing or obscured.

b. Fueling Operations. The inspector should:

(1) Emphasize fire and explosion hazards inherent in aircraft refueling.

(2) Ensure proper bonding is being used, deadman controls are not blocked, and no smoking prohibitions are being observed, and aircraft are not being fueled inside hangars.

(3) Check for proper parking of mobile fuelers to ensure these vehicles are at least 10' apart and 50' from buildings.

(4) Check for fuel leaks or spills in the fuel storage area and around mobile fuelers.

(5) Determine if the fuel farm is free of flammable materials, including litter and vegetation.

(6) Report and monitor any of unsafe fueling conditions discussed above and other obvious violations of local fire code and airport fuel fire safety procedures.

c. Snow and Ice. During the continuous surveillance inspection of snow and ice removal operations, the inspector should check snow or ice covered pavements and report and monitor any surfaces where snow and ice may affect the safety of aircraft operations. In addition, the inspector should monitor snow and ice removal NOTAMS to ensure they remain current and issue timely corrections, as necessary. If the airport uses other means to notify tenants of snow and ice removal operations, e.g., faxed or electronic messages, the inspector should also monitor this information for accuracy. Check to ensure that snow or ice on pavement surfaces does not affect the safety of aircraft operations and that NOTAMS are current.

d. Construction. The Inspector should check construction projects to ensure that the contractor is following the construction safety plan. During the continuous surveillance inspection of construction activity, the inspector should check for, and report, any of the following conditions:

- (1) Unauthorized use of runways, taxiways, and aprons by construction personnel and equipment.
- (2) Conditions that may result in runway incursions and other irregularities. This includes ensuring that construction areas are delineated appropriately with barricades, cones, markings, etc.
- (3) Construction equipment is not operated in ILS/MLS critical areas unless coordination with FAA has been accomplished.
- (4) Perimeter gates are left open and unattended, unlocked or construction vehicles and personnel are not following access and escort procedures.
- (5) Construction vehicles not properly marked or missing appropriate flags and/or beacons.
- (6) Foreign object debris on haul roads adjacent to movement areas that can be tracked onto taxiways, aprons, and ramp areas.
- (7) Confusing or missing signs, markings or lighting that could potentially confuse or mislead pilots.
- (8) Barricades and lighting are in place and operational.

e. Public Protection. Pay special attention to public protection during construction and special events. During the continuous surveillance inspection of safeguards used to protect the public, the inspector should check for, and report, any of the following conditions:

- (1) Unauthorized personnel, vehicles, and animals, particularly in areas aircraft passengers and the general public are present on the air carrier ramp and other portions of the movement area, i.e, remote aircraft parking locations.
- (2) Inoperable or blocked gates, particularly those that would impede access by aircraft rescue and fire fighting equipment.
- (3) Open or unlocked gates and missing or damaged signs posted to prevent unauthorized access to the airfield.
- (4) Damaged or missing jet blast fences.

f. Wildlife Hazard Management. During the continuous surveillance inspection of wildlife hazards, the inspector should check for, and report, any of the following conditions:

- (1) Birds or animals, such as dogs, deer, etc., on or adjacent to the runways, taxiways, aprons, and ramps to determine if there is a potential wildlife hazard problem.
- (2) Potential hazard created by birds on or adjacent to the airport.
- (3) Wildlife strikes and carcasses found on the runways. Report these on FAA Form 5200-7, Bird/Other Wildlife Strike Report. This form may be obtained from the FAA Internet site at www.faa.gov.

g. Foreign Object Debris (FOD). The inspector should continuously check for, and remove any FOD in movement areas, aircraft parking areas and loading ramps.

12. PERIODIC CONDITION INSPECTION. Periodic condition inspections consist of specific checks of physical facilities on a regularly scheduled basis (but less frequently than daily). Checks may require use of equipment (e.g., Walker Bar to measure VASI glide slope angles or transit to survey approach slopes, or continuous friction measurement equipment) or checking specific features of physical facilities. Periodic inspection of airport physical facilities and activities should cover at least the areas described in this section, which are also included in Appendix 3.

a. Pavement Areas. The inspector should check pavement surfaces for rubber buildup, polishing, or other items affecting friction.

b. Markings. The inspector should:

(1) Check pavement markings to ensure they are correct and clearly visible. Markings on concrete and faded asphalt should be outlined with a black border.

(2) Determine if markings are visible at night, especially examine for rubber buildup in the touchdown zone areas.

c. Signs. The inspector should check signs faces for peeling and for fading or faded colors.

d. Quarterly Fueling Inspections. Airports certificated under Part 139 are required to establish fire safety standards for safe fueling operations and conduct quarterly inspections of the fueling facilities. The inspection procedures in this section are based on the NFPA 407 fire code for airport fueling operations, which is one of the more common fire codes in effect at certificated airports. The fire safety standards for fueling operations should be listed in the Airport Certification Manual (ACM) and the quarterly inspections should be conducted for compliance to the fueling fire safety standards listed in the ACM. Sample quarterly inspection checklists for fuel storage areas and mobile fuelers are included in Appendix 5. Typical fire safety standards to inspect quarterly are listed below. Airports certificated under Part 139 are required to maintain a record of this inspection for at least 12 months.

(1) **Fuel storage areas and loading/unloading stations.** The inspector should:

(i) Check fuel storage areas for adequate fencing and security to prevent unauthorized access or tampering.

(ii) Check for “No Smoking” signs that are clearly visible.

(iii) Check fuel storage areas for materials such as trash or vegetation that could contribute to the spread of fire. Also check for equipment, functions or activities that could be ignition sources.

(iv) Note if fueling equipment appears to be in good operating condition and free of fuel leaks.

(v) Check piping for reasonable protection from damage by vehicles if piping is above ground.

(vi) Check fuel storage areas for at least two accessible and serviceable fire extinguishers. Where the open hose discharge capacity of the equipment is more than 200 gallons per minute, at least one wheeled extinguisher with at least 125 lbs of agent is also required.

(vii) Check for explosion proof equipment, switches and wiring that is reasonably protected from heat, abrasion or impact, which could cause an ignition source.

(viii) Check for piping, filters, tanks and pumps being electrically bonded together and interconnected to an adequate grounding rod.

(ix) Check for a serviceable bond/ground wire with clip at each loading/unloading facility for grounding tankers and mobile fuelers.

(x) Check loading stations for deadman control features.

(xi) Look for a boldly marked emergency cutoff capable of stopping all fuel flow with one physical movement. The emergency cutoff should be located outside the probable fuel spill area near the route that normally is used to leave the spill area or to reach the fire extinguishers.

(2) **Mobile fuelers.** At least once every 3 months, inspect all fuel trucks to ensure they meet fire safety standards. The inspector should:

(i) Note if mobile fuelers appear to be in good operating condition and free of fuel leaks.

(ii) Check mobile fuelers for parking at least 50 feet from a building and at least 10 feet from each other. Note: Some airports have a mobile fueller maintenance building that is approved by the local fire marshal.

(iii) Check for flammability decals on all sides. Lettering should be at least 3 inches high. Also check for hazardous materials placards on all sides. The Hazmat number for Jet A trucks should be #1863 and #1203 for 100LL trucks.

(iv) Check the cab for a "No Smoking" sign and the presence of smoking equipment. Ashtrays and cigarette lighters are not to be provided.

(v) Check for two fire extinguishers, accessible from each side of the mobile fueller. Fire extinguishers should be charged, sealed and tagged from the last fire extinguisher inspection. Check dry chemical extinguishers to ensure they are only B-C rated. ABC rated multi-purpose dry chemical extinguishers are not to be used on mobile fuelers as they are highly corrosive to aircraft and can cause significant damage to aircraft engines.

(vi) Check emergency fuel cutoffs to ensure they are boldly marked and operable. There should be an emergency fuel cutoff accessible from each side.

(vii) Check electrical equipment, switches, wiring and tail light lens covers for explosion proof construction and reasonable protection from heat, abrasion or impact which could be an ignition source.

(viii) Check for serviceable bonding wires and clamps.

(ix) Check nozzles for deadman control feature.

(x) Check the vehicle exhaust system for exhaust leaks and for adequate shielding if it extends under the fuel tank portion of the vehicle.

e. **Navigational Aids.** Periodically check the aiming of REILs and Visual Glide Slope Indicators owned by the airport.

f. **Lighting.** The inspector should:

(1) Determine that power generator and circuit resistance tests are being conducted.

(2) Ensure lights with adjustable optical systems are checked for proper aiming.

g. **Obstructions.** The inspector should:

(1) Check to ensure there are no overhead power lines in the aircraft parking areas.

(2) Annually survey trees and other structures near the airport that could affect glide path angles, approach light lanes, or be an obstruction to Part 77 surfaces.

h. **Aircraft Rescue and Fire Fighting.** The inspector should:

(1) Periodically determine if the aircraft rescue and fire fighting equipment is capable of meeting response times, if it is required under Part 139.

- (2) Ensure that recurrent training and hot-fire drills are being conducted as required by Part 139.
- (3) Check to ensure the availability of adequate entry tools.

13. SPECIAL CONDITION INSPECTIONS. Special condition inspections occur after receipt of a complaint or as triggered by an unusual condition or event. A special inspection should be conducted after an accident or incident. Depending upon circumstances, special condition inspections may include the inspection of any of the specific facilities or activities under the other three components. A special condition inspection of airport physical facilities and activities should cover at least the areas described in this section, which are also included in Appendix 4.

a. Pavement Areas. After a rain or thunderstorm, the inspector should check the pavement areas for ponding and edge damming.

b. Markings and Signs. The inspector should:

- (1) Determine if markings are visible at night especially when the pavement is wet following a rain.
- (2) After construction or maintenance operations, ensure that pavement markings are correct.

c. Safety Areas. The inspector should:

- (1) Ensure that the storm sewer system is checked to verify that inlets are not clogged and drainage channels are free of debris. Note any standing water.
- (2) Ensure all inlet covers are in place and sewer covers are at grade level.
- (3) Conduct a special inspection before reopening a runway or taxiway following any construction or maintenance that has been performed in or around that safety area.
- (4) Any time an aircraft has left the pavement and entered a safety area, check to ensure that no ruts or holes have been made by the aircraft tires or by personnel and equipment during the recovery operation.
- (5) Check for construction and maintenance activities to ensure that no hazardous conditions have been created (equipment left in safety areas, unacceptable pavement lips created by ground alteration work, ruts from mowing equipment, etc.).
- (6) Inspect engineered materials arresting system (EMAS), if installed, for damage and for deterioration.
- (7) Physically drive or walk the safety areas to check for any discrepancies.

d. Snow and Ice. Several special inspections may be needed during a winter storm until the airport is back to a normal operation. The inspector should:

- (1) Check to ensure that all foreign objects have been picked up after snow and ice removal operations.
- (2) If a friction measurement device is available, issue the appropriate numbers obtained from the equipment. Do not attempt to correlate friction measurement numbers with braking action reports. If a friction measurement device is not available, issue to Air Traffic braking action reports.
- (3) Conduct a special sign inspection after snowstorms for signs that may have been damaged by plows or by snow thrown by blowers.

e. Construction. The inspector should:

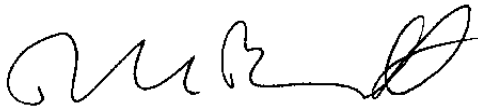
- (1) Ensure that construction areas are barricaded and lighted properly.

- (2) Check construction equipment to ensure that they are parked within the pre-arranged areas.
- (3) Conduct night inspections to ensure that barricades, warning lighting, and reflectors are adequate to keep aircraft away from the construction area.
- (4) Check the location of construction material and stockpiles to ensure that they are outside of safety areas and do not block any signs.
- (5) Check any movement areas adjacent to construction areas or movement areas traversed by construction vehicles to ensure there is no FOD present.
- (6) Check movement areas around construction sites for potentially confusing marking, lighting, and signs that could cause pilot confusion or result in a runway incursion.

f. Surface Movement Guidance and Control Systems (SMGCS).

- (1) For operations below 1,200 feet runway visual range, the inspector should conduct an initial inspection of stop bar lights, runway guard lights, clearance bar lights, taxiway centerline lights, and taxiway edge lights installed on the low visibility routes in accordance with the airport's SMGCS plan.
- (2) SMGCS lighting systems that are not electronically monitored should be periodically inspected every 2 to 4 hours for during operations below 1,200 feet to 600 feet. For operations below 600 feet, these inspections should take place every 2 hours. Such inspections should be detailed in the airport's SMGCS plan.

14. CONDITION REPORTING. Alert users of the airport to any unsafe conditions that exists and that could affect their operations. Ensure appropriate NOTAMS are issued for unsafe conditions that are identified during an inspection but cannot be corrected immediately. After reporting NOTAMS to the Flight Service Station, follow-up to ensure that the NOTAMS were processed and transmitted.



David L. Bennett
Director, Office of Airport Safety and Standards

APPENDICES 1–4**SUGGESTED AIRPORT SAFETY SELF-INSPECTION CHECKLISTS**

An airport safety self-inspection checklist should cover the condition of the facilities and equipment on the airport for it to be a part of a good safety inspection program. The checklist should be developed so that it is useful for the airport and its operation. A sketch of the airport is highly recommended to readily identify the location of problems found during the daily inspection.

The suggested checklists consist of a listing of facilities and equipment and a series of conditions that are inspected.

The blank squares indicate the conditions to be evaluated for each facility. A check (✓) in one of these squares would indicate that the condition of the facility and equipment was found to be satisfactory. On the other hand, an “x” in one of these squares would indicate that the condition of the facility and equipment was found to be unsatisfactory.

When an unsatisfactory condition is found:

1. An “x” for each applicable square should be entered;
2. A note provided in the Remark/Action Taken section;
3. The location of the condition should be identified in the airport sketch; and
4. Appropriate follow-up action including NOTAMs should be initiated. Corrective action should be documented on either the self-inspection checklists or on a separate work order system.

These checklists are ideal for electronic conversion to PDAs and laptop computers.

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APPENDIX 1

AIRPORT SAFETY SELF-INSPECTION CHECKLIST

DATE: _____ DAY: _____

✓ Satisfactory

X Unsatisfactory

Day Inspector/Time: _____ Night Inspector/Time: _____

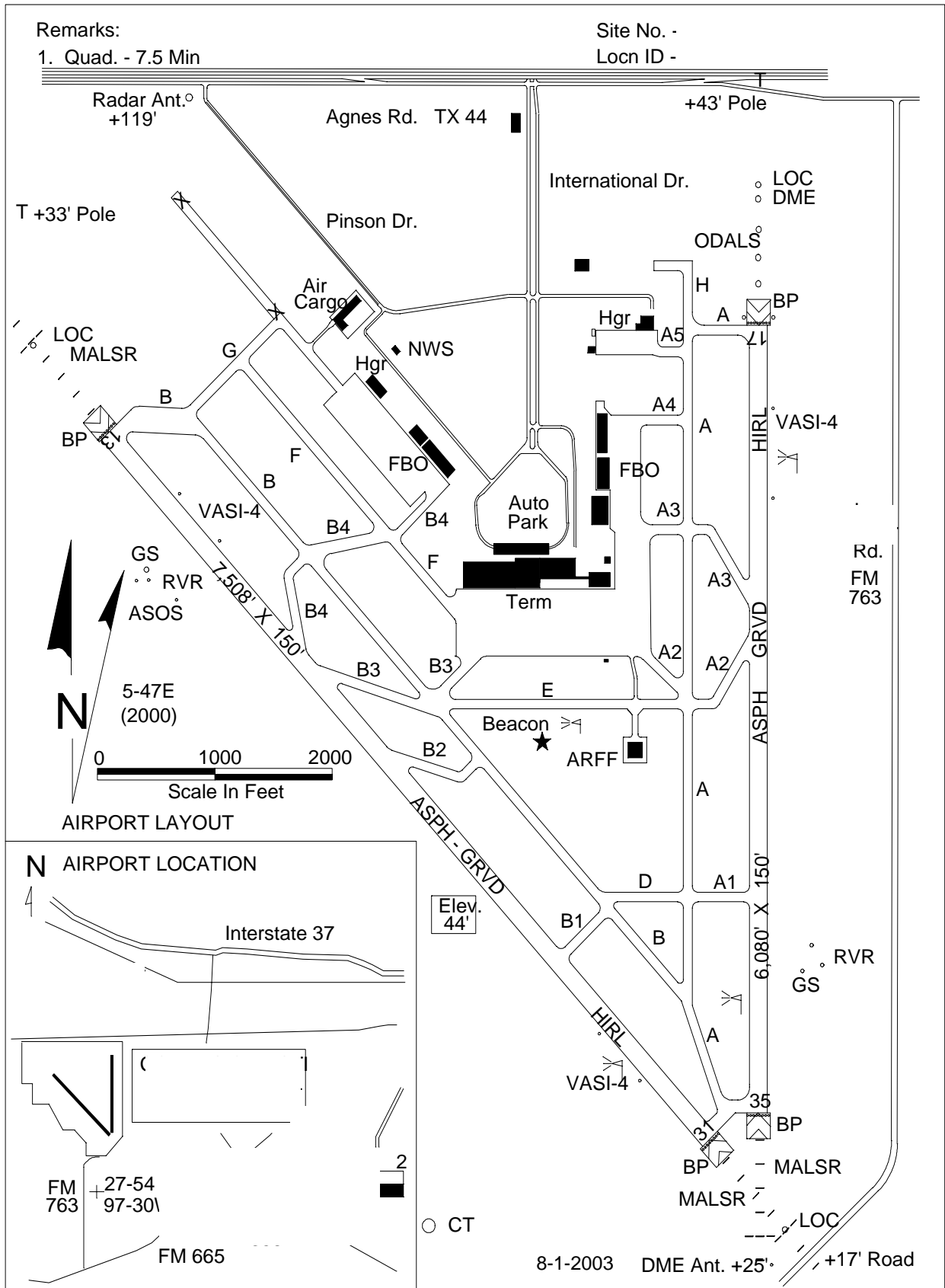
FACILITIES	CONDITIONS	D	N	REMARKS	RESOLVED BY (Date/Initials)
Pavement Areas	Pavement lips over 3"				
	Hole – 5" diam. 3" deep				
	Cracks/spalling/heaves				
	FOD: gravel/debris/sand				
	Rubber deposits				
	Ponding/edge dams				
Safety Areas	Ruts/humps/erosion				
	Drainage/construction				
	Support equipment/aircraft				
	Frangible bases				
	Unauthorized objects				
Markings	Clearly visible/standard				
	Runway markings				
	Taxiway markings				
	Holding position markings				
	Glass beads				
Signs	Standard/meet Sign Plan				
	Obscured/operable				
	Damaged/retroreflective				

FACILITIES	CONDITIONS	D	N	REMARKS	RESOLVED BY (Date/Initials)
Lighting	Obscured/dirty/operable				
	Damaged/missing				
	Faulty aim/adjustment				
	Runway lighting				
	Taxiway lighting				
	Pilot control lighting				
Navigational Aids	Rotating beacon operable				
	Wind indicators				
	RENs/VGSI systems				
Obstructions	Obstruction lights operable				
	Cranes/trees				
Fueling Operations	Fencing/gates/signs				
	Fuel marking/labeling				
	Fire extinguishers				
	Frayed wires				
	Fuel leaks/vegetation				
Snow & Ice	Surface conditions				
	Snowbank clearances				
	Lights & signs obscured				
	NAVAIDs				
	Fire access				

FACILITIES	CONDITIONS	D	N	REMARKS	RESOLVED BY (Date/Initials)
Construction	Barricades/lights				
	Equipment parking				
	Material stockpiles				
	Confusing signs/markings				
Aircraft Rescue and Fire Fighting	Equipment/crew availability				
	Communications/alarms				
	Response routes affected				
Public Protection	Fencing/gates/signs				
	Jet blast problems				
Wildlife Hazards	Wildlife present/location				
	Complying with WHMP				
	Dead birds				

Comments/Remarks: _____

Airfield Map on Reverse Side



APPENDIX 2

CONTINUOUS SURVEILLANCE CHECKLIST

<div style="text-align: right;"> <input checked="" type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory </div>			
DATE: _____		DAY: _____	
TIME: _____		INSPECTOR: _____	
FACILITIES	CONDITIONS	√	REMARKS/ACTIONS TAKEN
Ground Vehicles	Rules/Procedures Followed		
Fueling Operations	Fire/Explosion Hazards		
	Signing/No smoking		
Snow & Ice	Surface Conditions		
Construction	Safety Plan		
	Runway Incursions		
	Runway & Taxiway Use		
	FOD		
Public Protection	Unauthorized Persons		
	Unauthorized Vehicles		
	Gates clear		
Wildlife Hazards	Birds/Animals		
Miscellaneous	Pedestrians in Movement Areas		
	Passenger Load/Unload		
	Debris in Movement Area		
Additional Remarks			

Airfield Map on Reverse Side

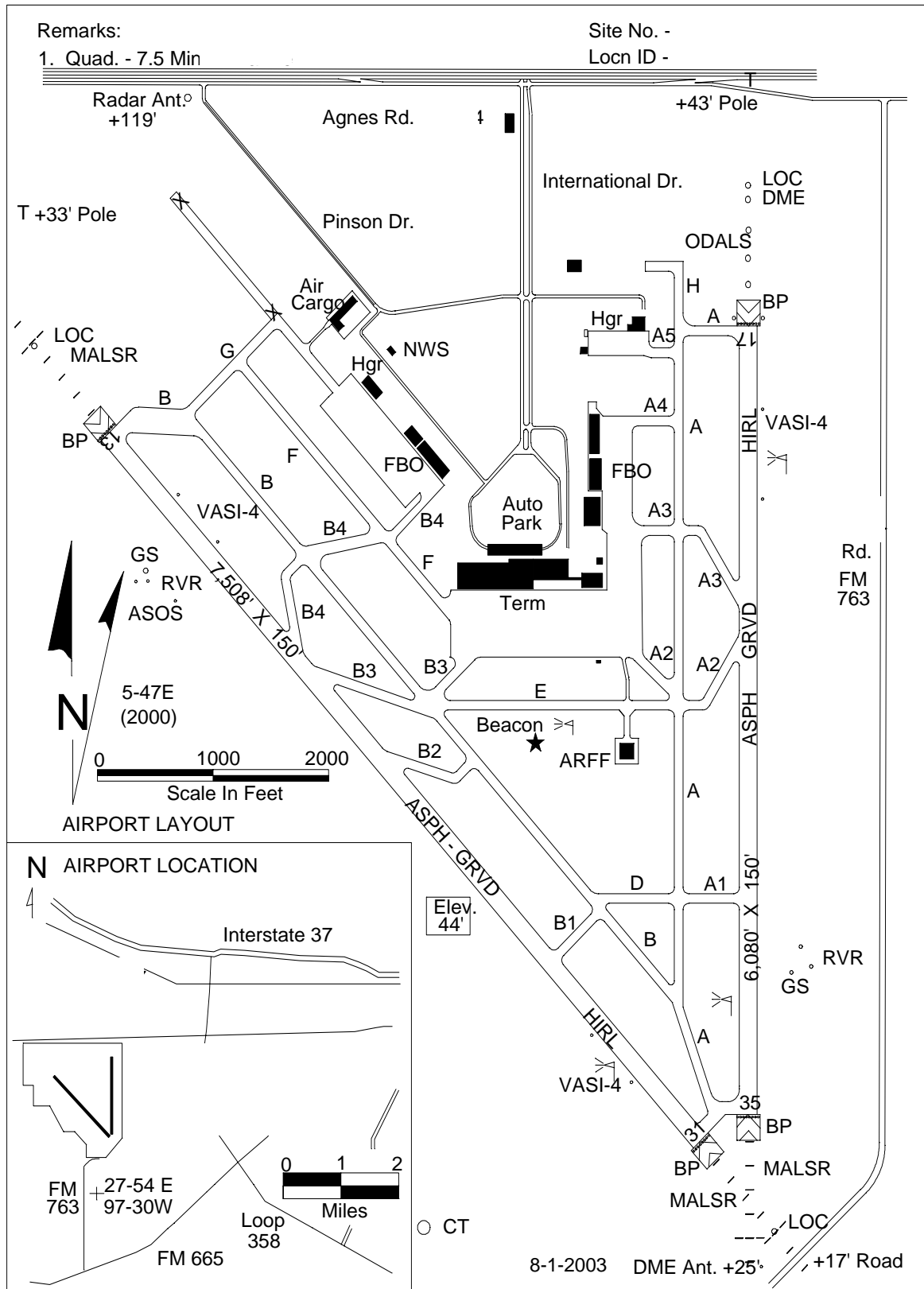


APPENDIX 3

PERIODIC CONDITION INSPECTION CHECKLIST

DATE: _____ DAY: _____		√ Satisfactory
TIME: _____ INSPECTOR: _____		X Unsatisfactory
FACILITIES	CONDITIONS	REMARKS/ACTIONS TAKEN
Pavement Areas	Rubber Deposits	
	Polishing	
Markings and Signs	Visible	
	Standards	
Fueling Operations	Physical Facilities	
	Mobile Fuelers	
	Fire Extinguishers	
	Fuel Marking/Labeling	
	Frayed Wiring	
Navigational Aids	RENs/VGSI Aiming	
Lighting	Power Generator Check	
	Circuit Resistance Test	
	Aim/Adjustment	
Obstructions	Surveyed Trees/Structures	
	Overhead Power Lines	
Aircraft Rescue and Fire Fighting	Response Times	
	Live Fire Drills	
	Training	
Additional Remarks		

Airfield Map on Reverse Side



APPENDIX 4

SPECIAL INSPECTION CHECKLIST

DATE: _____ DAY: _____		√ Satisfactory
TIME: _____ INSPECTOR: _____		X Unsatisfactory
FACILITIES	CONDITIONS	√
Pavement Areas	Ponding/Edge Dams	
Markings And Signs	Visible after rain	
	Standards after Construction	
Safety Areas	Drainage	
	Reopening Runways	
	Reopening Taxiways	
Snow and Ice	Surface conditions	
	Snowbank clearance	
	Lights & Signs Obscured	
	FOD	
	Braking Action/MU Reports	
Construction	Barricades	
	Construction Lights	
	Equipment Parking	
SMGCS	SMGCS Lighting	
Additional Remarks		

Airfield Map on Reverse Side



APPENDIX 5A

QUARTERLY INSPECTION – MOBILE FUELERS

Inspector: _____ Fueling Agent: _____ Date: _____

S – Satisfactory U – Unsatisfactory R – Remark Below	Jet A Fuelers			100LL Fuelers			Other Fueler								
	S	U	R	S	U	R	S	U	R						
No Smoking sign in cab															
Flammability Signs/Haz Mat Placards all sides															
Bonding Cables and Clips functional															
Deadman Control for all nozzles															
2 Fire Extinguishers – Proper type/Inspected															
Emergency Shutoffs operable and marked															
No Fuel Leaks – Hoses/Gaskets/Valves															
Vehicle Exhaust System – Shielded/Leak free															
No evidence of Smoking – No ashtray in cab															
Vehicle Parking – 10' apart/50' from buildings.															
Explosion proof electrical/Light lens intact															
Ignition Sources (Clothing, Shoes, Matches)															
							No of Mobile Fuelers								
Proper Fueling Procedures Observed							Jet A _____								
Fueling Personnel Meet Training Requirements							100 LL _____								
Fueling Personnel Training Records maintained							Other _____								
Remarks: _____															

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APPENDIX 5B

QUARTERLY INSPECTION – FUEL STORAGE AREAS

Inspector: _____ Fueling Agent: _____ Date: _____

S – Satisfactory U – Unsatisfactory R – Remark Below	Jet A Section			100LL Section			Other _____		
	S	U	R	S	U	R	S	U	R
Fencing/Locks/Signs									
Piping protected from vehicles									
No Smoking signs posted									
Deadman Controls for loading stations									
2 Fire Extinguishers – Inspected/Accessible									
Boldly Marked Emergency Cutoffs – Location									
No Fuel Leaks									
Bonding wire/clips at loading stations/operable									
Piping/Pumps bonded and grounded									
No vegetation or materials to spread fire									
No evidence of Smoking									
Hoses in good condition									
Explosion Proof Electrical Equipment									
Remarks: _____									



U.S. Department
of Transportation

Federal Aviation
Administration

Advisory Circular

Subject: Painting, Marking, and Lighting of
Vehicles Used on an Airport

Date: April 1, 2010

AC No: AC 150/5210-5D

Initiated by: AAS-100

Change:

1. **PURPOSE.** This advisory circular (AC) provides guidance, specifications, and standards for painting, marking, and lighting of vehicles operating in the airport air operations area (AOA). The approved lights, colors, and markings herein assure the conspicuity of vehicles operating in the AOA from both the ground and the air.

2. **CANCELLATION.** This AC cancels AC 150/5210-5C, Painting, Marking, and Lighting of Vehicles Used on an Airport, dated August 31, 2007.

3. **APPLICATION.** The Federal Aviation Administration (FAA) recommends the guidelines and standards in this Advisory Circular for vehicles operating in the airport AOA. In general, use of this AC is not mandatory. *However*, use of this AC is mandatory for vehicles funded with federal grant monies through the Airport Improvement Program (AIP) and/or with revenue from the Passenger Facility Charges (PFC) Program. See Grant Assurance No. 34, "Policies, Standards, and Specifications," and PFC Assurance No. 9, "Standard and Specifications."

Vehicles covered by this AC that do not meet this standard may be used until the vehicle is repainted or replaced, but no later than **December 31, 2010**.

4. **PRINCIPAL CHANGES.** This AC contains new specifications and recommendations for the painting, marking, and lighting of Towbarless Tow Vehicles (TLTVs).

5. **METRIC UNITS.** To promote an orderly transition to metric units, this AC includes both English and metric dimensions. The metric conversions may not be exact equivalents, and until there is an official changeover to the metric system, the English dimensions will govern.

6. **COMMENTS OR SUGGESTIONS** for improvements to this AC should be sent to:

Manager, Airport Engineering Division
Federal Aviation Administration
ATTN: AAS-100
800 Independence Avenue, S.W.
Washington, DC 20591

Michael J. O'Donnell
Director of Airport Safety and Standards

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PAINTING, MARKING, AND LIGHTING OF VEHICLES USED ON AN AIRPORT

1. SOURCES OF APPLICABLE DOCUMENTS.

- a.** American National Standards Institute, Inc. (ANSI), 25 West 43rd St. 4th Floor, New York, NY 10036. Website: **www.ansi.org**
- b.** American Society for Testing & Materials (ASTM), ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959. Website: **www.astm.org**
- c.** The National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, Massachusetts 02169-7471. Website: **www.nfpa.org**
- d.** The U. S. General Services Administration (GSA), Centralized Mailing List Services, 501 West Felix Street, Whse 9, South End P.O. Box 6477, Fort Worth, Texas 76115-6477. Website: **www.gsa.gov**
- e.** The Superintendent of Documents, U.S. Government Printing Office, 732 North Capitol St. NW, Washington, DC 20401.
- f.** Society of Automotive Engineers, Inc. (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001. Website: **www.sae.org**
- g.** FAA Advisory Circulars: U.S. Department of Transportation, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Ave., Landover, MD 20785. Website: **www.faa.gov**
- h.** FAA Engineering Briefs: **www.faa.gov/airports/engineering/engineering_briefs/**

2. DEFINITIONS. The following definitions apply in this AC:

- a. Vehicle** – All conveyances, except aircraft, used on the ground to transport persons, cargo, equipment or those required to perform maintenance, construction, service, and security duties.
- b. Air Operations Area (AOA)** – The portion of airport that encompasses the landing, take off, taxiing, and parking areas for aircraft.
- c. Airport Emergency Vehicles** – Vehicles that are authorized in the AOA for emergency purposes (e.g., ambulances, aircraft rescue and fire fighting (ARFF) vehicles and emergency response vehicles) as authorized by the airport traffic control tower (ATCT) or an authorized on-site accident/incident commander.
- d. Airport Operations Vehicles** – Vehicles routinely used by airport operations personnel for airport inspection and duties associated with airfield operations (such as airfield condition reporting and Incident Command) on the AOA and Movement Area.
- e. Airport Security Vehicles** – Vehicles that are authorized in the AOA for security purposes, as needed (e.g. police cars).

- f. Airfield Service Vehicles** – Vehicles that are routinely used in the AOA for airfield service, maintenance, or construction (e.g. snow blowers, snowplows, maintenance trucks, and tractors).
- g. Aircraft Support Vehicles** – Vehicles that are routinely used in the AOA to support aircraft operations (e.g. aircraft pushback tractors, baggage/cargo tractors or trucks, air conditioning and aviation fuel trucks). These vehicles are typically owned by airlines, vendors, or contractors and are not eligible for Federal funding.
- h. Reduced Visibility** – Prevailing visibility is less than one statute mile (1609 meters) and/or the runway visual range (RVR) is less than 6,000 feet (1830 meters).
- i. Movement Area** – The runways, taxiways, and other areas of an airport/heliport that are used for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports/heliports with an operating airport traffic control tower (ATCT), specific approval for entry onto the movement area must be obtained from air traffic control (ATC).
- j. Other Vehicles** – Vehicles that are not routinely authorized in the AOA (e.g. construction vehicles). These vehicles are typically owned by airlines, vendors, or contractors and are not eligible for Federal funding.
- k. Peak Intensity** – Peak intensity, for purposes of this document, means the maximum magnitude of luminescence as measured in candela.
- l. Towbarless Tow Vehicle (TLTV)** – a type of aircraft support vehicle whose main purpose is to tow aircraft in the AOA by way of nose gear capture.

3. VEHICLE PAINTING.

NOTE: *Airport vehicle paint and markings are a safety of flight requirement. The approved colors/markings herein assure conspicuity of vehicles operating in the AOA from both the ground and air.*

a. Airport Emergency Vehicles.

(1) Ambulances. Ambulance vehicles are painted per the most current version of Federal Specification KKK-A-1822, *Federal Specification for the Star-of-Life Ambulance*. Ambulances are not considered vehicles routinely operating on the AOA.

(2) Aircraft Rescue and Fire Fighting (ARFF) Vehicles. Yellowish-green is the vehicle color standard. Color specifications are per Appendix A.

NOTE: *A yellowish-green color provides optimum visibility during all light levels encountered during a 24-hour day and under variations of light that result from weather and seasonal changes.*

b. Airport Operations Vehicles. Airport operations vehicles may be painted in colors designated by the airport operator. The characteristics must be coordinated with the respective ATCT and identified in the tower letter of agreement.

c. Airport Security Vehicles. Comply with specific state or local requirements.

d. Airfield Service Vehicles. Chrome yellow is the vehicle color standard. Color specifications are per Appendix A. When vehicles are equipped with bumper bars 8 inches (200 mm) or more in depth, the bars must be painted in alternate stripes 4 inches (100 mm) in width of chrome yellow and black inclined 45° to the vertical.

e. Aircraft Support Vehicles.

(1) Any color or combination of colors other than yellowish-green or chrome yellow. The bumper bar paint scheme in paragraph 3.d (of alternating chrome yellow and black stripe) is recommended.

(2) **TLTVs.** International orange is the vehicle color standard. Retroreflective tape covering more than 25 percent of the vehicle's vertical surfaces may be used as a temporary measure to meet this standard prior to scheduled vehicle painting.

f. Other Vehicles. Any color or combination of colors other than solid black or white.

4. VEHICLE MARKING.

a. Airport Emergency Vehicles.

(1) **Ambulances.** Ambulances are marked per the most current version of Federal Specification KKK-A-1822.

(2) **ARFF Vehicles.** Emergency rescue and fire fighting vehicles are marked with the letters "ARFF," "Fire," or "Rescue" and in accordance with 4.c.(1)-(5) of this AC.

b. Airport Operations Vehicles. Airport operations vehicles may be marked as designated by the airport operator. Marking must be coordinated with the respective ATCT and identified in the tower letter of agreement.

c. Airfield Service Vehicles and Aircraft Support Vehicles.

(1) Airport operator owned vehicles must display an identification number on each side and on the roof (the hood should be used if the vehicle has no roof).

(2) Side numbers will be a minimum of 16 inches (410 mm) in height and conspicuously located.

(3) Roof numbers will be a minimum of 24 inches (610 mm) in height and affixed with their bases toward the front of the vehicle. The identification numbers should provide sharp color contrast to the vehicle color.

(4) In addition to the identification numbers, airport operator-owned vehicles must display either the name of the airport and/or the airport insignia.

(5) To further improve night-time recognition of vehicles, a minimum 8 inch (200 mm) wide horizontal band of high gloss white paint or white reflective tape (Retroreflective, ASTM-D 4956-09, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Type III & above) must be used around the vehicle's surface. Figures 1, 2, and 3 show suggested locations for the horizontal reflective band.

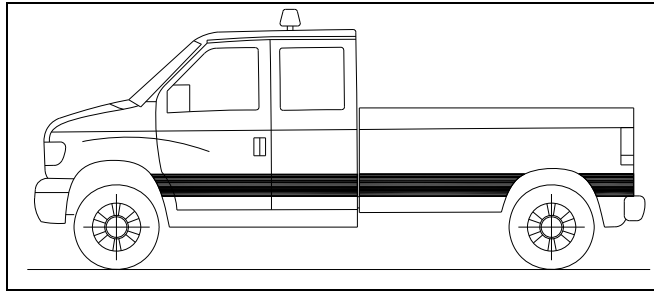


Figure 1: Suggested location for the horizontal reflective band, Option 1

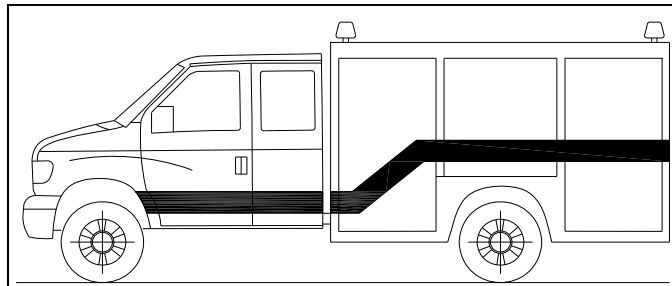


Figure 2: Suggested location for the horizontal reflective band, Option 2

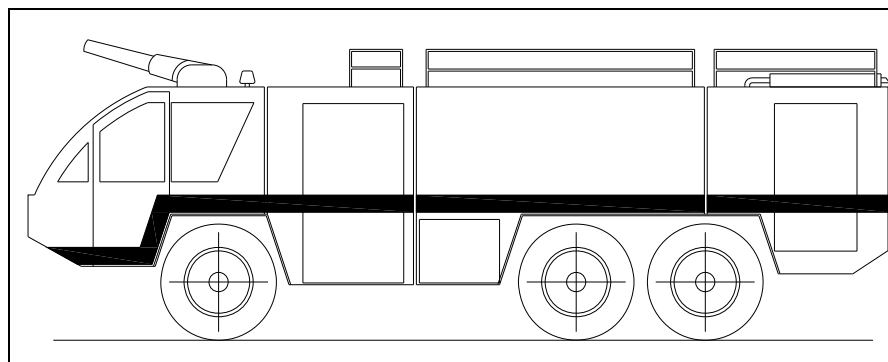


Figure 3: Suggested location for the horizontal reflective band, Option 3

(6) **TLTVs.** Retroreflective tape is used to outline the shape of a TLTV. If the vertical edge of the vehicle is rounded, the tape should be placed on the rounded portion to reflect light in both the horizontal and vertical planes. Where the placement of the tape may interfere with, or may be worn down by, maintenance or operational activities, tape is not required. Suggested locations for the retroreflective bands are shown in Figure 4.

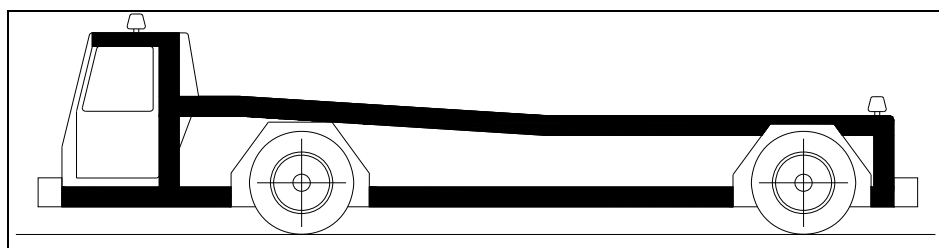


Figure 4: Suggested placement of retroreflective tape on a TLTV

d. Airport Security and Other Vehicles.

(1) Vehicles other than those that routinely traverse any portion of the AOA under the control of ATC, which are not escorted by a vehicle in constant two-way radio communication with ATC and properly equipped and authorized to operate in the AOA, must be provided with a flag on a staff attached to the vehicle so that the flag will be readily visible.

(2) At airports without air traffic control facilities, flags must be provided on all vehicles.

(3) The flag must be at least a 3-foot by 3-foot (0.9 meter by 0.9 meter) square having a checkered pattern of international orange and white squares at least 1 foot (300 mm) on each side (see Appendix A for the fabric color specification).

5. VEHICLE LIGHTING.

a. Airfield Service, Aircraft Support, and Airport Operations Vehicles.

(1) The standard for identification lighting is a yellow flashing light that is mounted on the uppermost part of the vehicle structure. A steady yellow light designates vehicles limited to non-movement areas.

(2) The light must be visible from any direction, day and night, including from the air.

(3) Color specifications for vehicle identification lights are per Appendix B.

(4) **TLTVs.** An LED light bar placed above the operator's cab may be used in place of the rotating yellow flashing light. In addition, a yellow flashing light (of any type) must be installed on the upper left-rear and right-rear corners of the TLTV, and must be activated when an aircraft is in tow. The size of the rear flashing lights must be large enough to meet the requirements of Section 5.c, but not so large as to interfere with the normal or towing operations of the TLTV.

b. Airport Emergency, Security, and Other Vehicles, which are not escorted by a properly lighted vehicle, must be identified during periods of low visibility by a light.

c. Characteristics of Flashing Lights:

(1) Ambulance lights must meet the specifications in the most current version of Federal Specification KKK-A-1822, and ARFF vehicles must meet NFPA, state, and local requirements.

(2) Lights must have peak intensity within the range of 40 to 400 candelas (effective) from 0° (horizontal) up to 10° above the horizontal and for 360° horizontally. The upper limit of 400 candelas (effective) is necessary to avoid damage to night vision.

(3) From 10° to 15° above the horizontal plane, the light output must be 1/10th of peak intensity or between 4 and 40 candelas (effective).

- (4) Lights must flash at 75 ± 15 flashes per minute.

NOTES:

- 1. The effective intensity of a flashing light is equal to the intensity of a steady-burning (fixed) light of the same color that produces the same visual range under identical conditions of observation.*
- 2. If xenon flashtubes are used, refer to AC 150/5345-43, Specification for Obstruction Lighting Equipment, for guidance concerning methods of calculating effective intensity.*

d. Light Colors.

(1) Airport Emergency Vehicles.

(a) **Ambulances.** Per the most current version of Federal Specification KKK-A-1822.

(b) **ARFF Vehicles.** Red or a combination of red-and-white flashing lights per the chromaticity requirements in Appendix B.

(2) Airport Security Vehicles. Signal blue or a combination of red and signal blue flashing light per the chromaticity requirements in Appendix B.

(3) Airfield Service, Aircraft Support, Airport Operations, and Other Vehicles. Yellow flashing light per the chromaticity requirements in Appendix B.

APPENDIX A. COLOR SPECIFICATIONS

A-1. SPECIFICATIONS. Colors specified in Table A-1 are per the Commission Internationale de l'Eclairage (CIE) L*a*b* system of color specification. For a description of this system, refer to American Society for Testing & Materials (ASTM) D 2244, *Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates*.

Table A-1. Specification for vehicle and flag colors

Standard Illuminant D65 Usage	Chrome Yellow			Yellowish-Green			International Orange		
	Vehicle Paint			Vehicle Paint			Vehicle Paint / Flag Fabric		
CIELAB DATA	L*	a*	b*	L*	a*	b*	L*	a*	b*
Centroid Color	72.8	24.4	77.6	78.3	-10.2	80.4	45.0	53.5	52.0
Point 1	72.8	31.8	82.9	78.3	-9.0	92.0	45.0	61.4	47.8
Point 2	72.8	25.5	66.7	78.3	-7.6	73.2	45.0	53.9	41.4
Point 3	72.8	18.0	69.3	78.3	-11.0	69.3	45.0	53.5	53.4
Point 4	72.8	22.4	86.0	78.3	-13.4	86.2	45.0	49.7	60.4
Light Limit	77.8			83.3			49.9		
Dark Limit	67.8			73.3			41.6		
Max ΔE	11.1			11.7			10.7		

A-2. COLOR TESTS. Acceptable colors are those that meet the gloss rating test and either a visual or an instrumental color test as follows:

NOTE: Flag fabric colors must meet either the instrumental tests in Table A-1 or the visual method described in paragraph A-2b(1).

a. Gloss Rating Test. This test is performed per ASTM D 523, *Standard Test Method for Specular Gloss*, on a paint sample of the color to be applied on the vehicle. An acceptable color sample is high gloss with a minimum gloss rating of 70 units, for 60° geometry.

b. Color Test Methods:

(1) Visual. Prepare a master specimen of the color (per Table A-1) and gloss (per paragraph A-2a). This specimen will be the master color and be used as the basis of comparison per ASTM D 5531-05, *Standard Guide for the Preparation, Maintenance, and Distribution of Physical Product Standards for Color and Geometric Appearance of Coatings*. To verify the paint color of a vehicle visually, vehicle paint samples must be

prepared and viewed per ASTM D 1729-96 (Reapproved 2009), *Standard Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials*.

(2) Instrumental. This test requires a test specimen sample and reference to Table A-1. All test specimen measurements should be conducted per ASTM E 1164-09a *Standard Practice for Obtaining Spectrometric Data for Object-Color Evaluation*. Test specimen tolerances must be per Table A-1 per the following:

(a) Plot the centroid color using the a^* and b^* CIELAB coordinate data from Table A-1 on graph paper or by entry of the coordinate data into a computer program. Plot and connect points 1 through 4 from the same table to form a quadrilateral; noting that the centroid color is within this figure. See Figure A-1 for plots of all three color specifications in Table A-1.

(b) Perform color sample measurements per ASTM E 1164-09a. If necessary, convert measurements to CIELAB L^* , a^* , and b^* color space. See ASTM E 308-08, *Standard Practice for Computing the Colors of Objects by Using the CIE System*, for color space conversion formulae.

(c) An acceptable color is one that meets:

(i) the chromaticity requirements of the color samples a^* and b^* CIELAB coordinate data by falling within the quadrilateral;

(ii) the L^* data lightness requirement by falling within the range defined by the light and dark data of Table A-1;

(iii) the total color difference (ΔE) by not exceeding the limits in Table A-1 when the CIELAB data are computed in the following formula:

$$\Delta E = (\Delta L^{*2} + \Delta a^{*2} + \Delta b^{*2})^{\frac{1}{2}}$$

where ΔL^* , Δa^* , and Δb^* values are the differences between those values for the centroid color in Table A-1 and those of the color sample measurements.

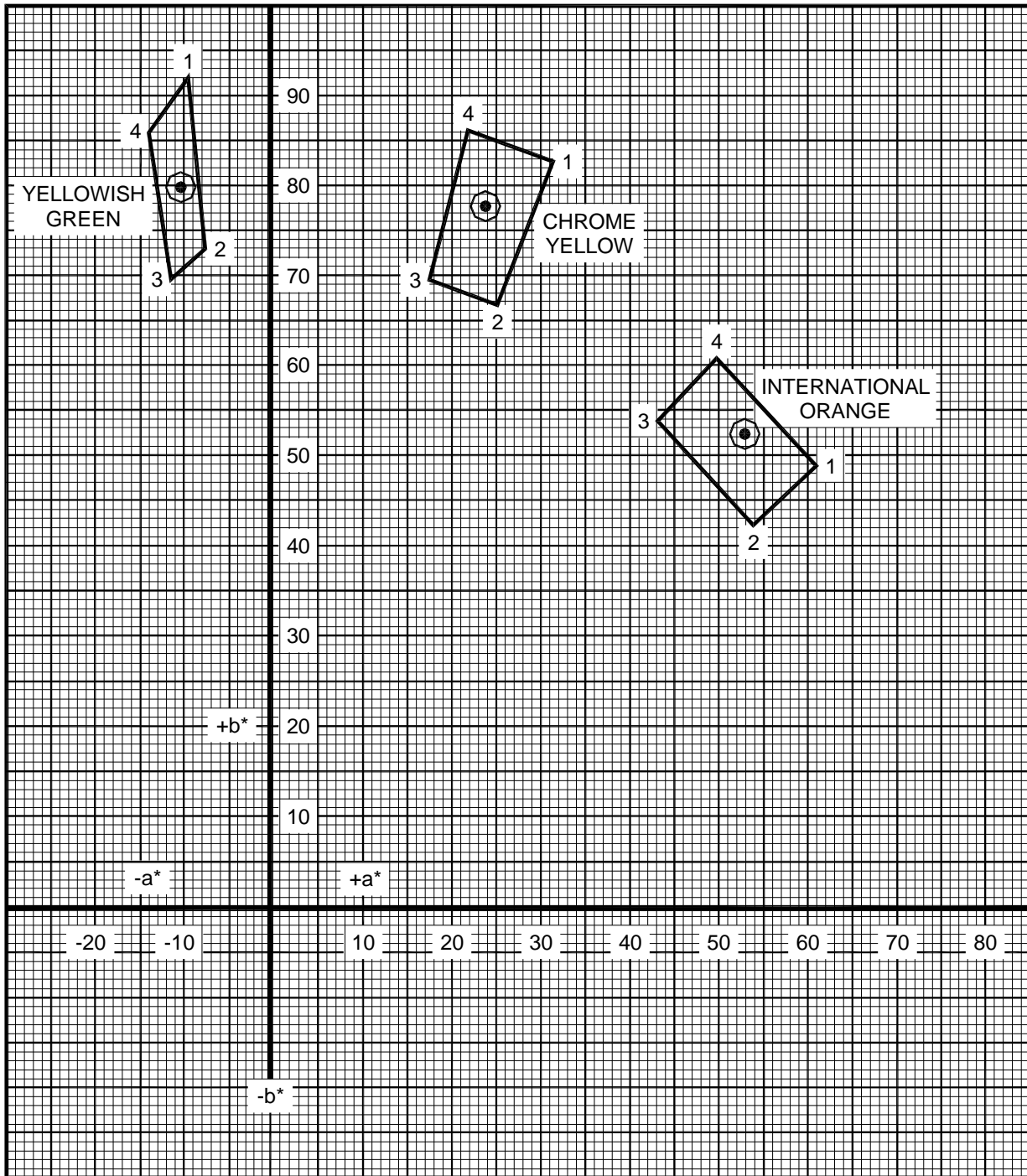


Figure A-1. Plot of selected color paint specifications

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APPENDIX B. COLOR SPECIFICATIONS FOR VEHICLE IDENTIFICATION LIGHTS

B-1. SPECIFICATIONS. The Society of Automotive Engineers (SAE) Standard J578 Revised December 2006, *Color Specification*, defines the acceptable color boundary limits and measurement of emitted red, white, signal blue, and yellow light for vehicle lights. This standard applies to the overall emitted color of light from the device in lieu of emitted light from any small area of the lens. The color of emitted light must fall within the color boundaries per SAE J578 Revised December 2006 (color boundary equations are in the standard) using color measurement methods detailed in the standard. See FAA Engineering Brief #67, Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures, for additional information and Alternative Lighting Devices.

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U.S. Department
of Transportation

Federal Aviation
Administration

Advisory Circular

Subject: Operational Safety on
Airports During Construction

Date: 9/29/11
Initiated by: AAS-100

AC No: 150/5370-2F

- 1. Purpose.** This AC sets forth guidelines for operational safety on airports during construction.
- 2. What this AC Cancels.** This AC cancels AC 150/5370-2E, Operational Safety on Airports During Construction, dated January 17, 2003.
- 3. Whom This AC Affects.** This AC assists airport operators in complying with Title 14 Code of Federal Regulations (CFR) Part 139, Certification of Airports (Part 139). For those certificated airports, this AC provides one way, but not the only way, of meeting those requirements. The use of this AC is mandatory for those airport construction projects receiving funds under the Airport Improvement Program (AIP) or the Passenger Facility Charge (PFC) Program. See Grant Assurance No. 34, "Policies, Standards, and Specifications," and PFC Assurance No. 9, "Standard and Specifications." While we do not require non-certificated airports without grant agreements to adhere to these guidelines, we recommend that they do so to help these airports maintain operational safety during construction.
- 4. Principal Changes.**
 - a.** Construction activities are prohibited in safety areas while the associated runway or taxiway is open to aircraft.
 - b.** Guidance is provided in incorporating Safety Risk Management.
 - c.** Recommended checklists are provided for writing Construction Safety and Phasing Plans and for daily inspections.
- 5. Reading Material Related to this AC.** Numerous ACs are referenced in the text of this AC. These references do not include a revision letter, as they are to be read as referring to the latest version. Appendix 1 contains a list of reading material on airport construction, design, and potential safety hazards during construction, as well as instructions for obtaining these documents.

Michael J. O'Donnell
Director of Airport Safety and Standards

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Chapter 1. Planning an Airfield Construction Project

101. Overview. Airports are complex environments, and procedures and conditions associated with construction activities often affect aircraft operations and can jeopardize operational safety. Safety considerations are paramount and may make operational impacts unavoidable. However, careful planning, scheduling, and coordination of construction activities can minimize disruption of normal aircraft operations and avoid situations that compromise the airport's operational safety. The airport operator must understand how construction activities and aircraft operations affect one another to be able to develop an effective plan to complete the project. While the guidance in this AC is primarily used for construction operations, some of the concepts, methods and procedures described may also enhance the day-to-day airport maintenance operations, such as lighting maintenance and snow removal operations.

102. Plan for Safety. Safety, maintaining aircraft operations, and construction costs are all interrelated. Since safety must not be compromised, the airport operator must strike a balance between maintaining aircraft operations and construction costs. This balance will vary widely depending on the operational needs and resources of the airport and will require early coordination with airport users and the FAA. As the project design progresses, the necessary construction locations, activities, and associated costs will be identified. As they are identified, their impact to airport operations must be assessed. Adjustments are made to the proposed construction activities, often by phasing the project, and/or to airport operations in order to maintain operational safety. This planning effort will ultimately result in a project Construction Safety and Phasing Plan (CSPP). The development of the CSPP takes place through the following five steps:

a. Identify Affected Areas. The airport operator must determine the geographic areas on the airport affected by the construction project. Some, such as a runway extension, will be defined by the project. Others may be variable, such as the location of haul routes and material stockpiles.

b. Describe Current Operations. Identify the normal airport operations in each affected area for each phase of the project. This becomes the baseline from which the impact on operations by construction activities can be measured. This should include a narrative of the typical users and aircraft operating within the affected areas. It should also include information related to airport operations: the Aircraft Reference Code (ACRC) for each runway; Airplane Design Group (ADG) and Taxiway Design Group (TDG)¹ for each affected taxiway; designated approach visibility minimums; available approach and departure procedures; most demanding aircraft; declared distances; available air traffic control services; airport Surface Movement Guidance and Control System plan; and others. The applicable seasons, days and times for certain operations should also be identified as applicable.

c. Allow for Temporary Changes to Operations. To the extent practical, current airport operations should be maintained during the construction. In consultation with airport users, Aircraft Rescue and Fire Fighting (ARFF) personnel, and FAA Air Traffic Organization (ATO) personnel, the airport operator should identify and prioritize the airport's most important operations. The construction activities should be planned, through project phasing if necessary, to safely accommodate these operations. When the construction activities cannot be adjusted to safely maintain current operations, regardless of their importance, then the operations must be revised accordingly. Allowable changes include temporary revisions to approach procedures, restricting certain aircraft to specific runways and taxiways, suspension of certain operations, decreased weights for some aircraft due to shortened runways,

¹ Taxiway Design Group will be introduced in AC 150/5300-13A.

and other changes. An example of a table showing temporary operations versus current operations is shown in Table 3-1 Sample Operations Effects.

d. Take Required Measures to Revised Operations. Once the level and type of aircraft operations to be maintained are identified, the airport operator must determine the measures required to safely conduct the planned operations during the construction. These measures will result in associated costs, which can be broadly interpreted to include not only direct construction costs, but also loss of revenue from impacted operations. Analysis of costs may indicate a need to reevaluate allowable changes to operations. As aircraft operations and allowable changes will vary so widely among airports, this AC presents general guidance on those subjects.

e. Manage Safety Risk. Certain airport projects may require the airport operator to provide a Project Proposal Summary to help the FAA to determine the appropriate level of Safety Risk Management (SRM) documentation. The airport operator must coordinate with the appropriate FAA Airports Regional or District Office early in the development of the CSPP to determine the need for SRM documentation. See FAA Order 5200.11, FAA Airports (ARP) Safety Management System (SMS), for more information. If the FAA requires SRM documentation, the airport operator must at a minimum:

- (1) **Notify the appropriate FAA Airports Regional or District Office** during the project “scope development” phase of any project requiring a CSPP.
- (2) **Provide documents** identified by the FAA as necessary to conduct SRM.
- (3) **Participate in the SRM process** for airport projects.
- (4) **Provide a representative** to participate on the SRM panel.
- (5) **Ensure that all applicable SRM identified risks elements are recorded** and mitigated within the CSPP.

103. Develop a Construction Safety and Phasing Plan (CSPP). Development of an effective CSPP will require familiarity with many other documents referenced throughout this AC. See Appendix 1, Related Reading Material for a list of related reading material.

a. List Requirements. A CSPP must be developed for each on-airfield construction project funded by the Airport Improvement Program (AIP) or the Passenger Facility Charge (PFC) program or located on an airport certificated under Part 139. As per Order 5200.11, such projects do not include construction, rehabilitation, or change of any facility that is entirely outside the air operations area, does not involve any expansion of the facility envelope and does not involve construction equipment, haul routes or placement of material in locations that require access to the air operations area, increase the facility envelope, or impact line-of-sight. Such facilities may include passenger terminals and parking or other structures. However, extraordinary circumstances may trigger the need for a Safety Assessment and a CSPP. The CSPP is subject to subsequent review and approval under the FAA’s Safety Risk Management procedures (see paragraph 102.e above). Additional information may be found in Order 5200.11.

b. Prepare a Safety Plan Compliance Document. The Safety Plan Compliance Document (SPCD) details how the contractor will comply with the CSPP. Also, it will not be possible to determine all safety plan details (for example specific hazard equipment and lighting, contractor’s points of contact, construction equipment heights) during the development of the CSPP. The successful contractor must define such details by preparing an SPCD that the airport operator reviews for approval prior to issuance of a notice-to-proceed. The SPCD is a subset of the CSPP, similar to how a shop drawing review is a subset to the technical specifications.

c. **Assume Responsibility for the CSPP.** The airport operator is responsible for establishing and enforcing the CSPP. The airport operator may use the services of an engineering consultant to help develop the CSPP. However, writing the CSPP cannot be delegated to the construction contractor. Only those details the airport operator determines cannot be addressed before contract award are developed by the contractor and submitted for approval as the SPCD. The SPCD does not restate nor propose differences to provisions already addressed in the CSPP.

104. Who Is Responsible for Safety During Construction?

a. **Establish a Safety Culture.** Everyone has a role in operational safety on airports during construction: the airport operator, the airport's consultants, the construction contractor and subcontractors, airport users, airport tenants, ARFF personnel, Air Traffic personnel, including Technical Operations personnel, FAA Airports Division personnel, and others. Close communication and coordination between all affected parties is the key to maintaining safe operations. Such communication and coordination should start at the project scoping meeting and continue through the completion of the project. The airport operator and contractor should conduct onsite safety inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

b. **Assess Airport Operator's Responsibilities.** An airport operator has overall responsibility for all activities on an airport, including construction. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on the responsibilities listed below can be found throughout this AC. The airport operator must:

(1) **Develop a CSPP** that complies with the safety guidelines of Chapter 2, Construction Safety and Phasing Plans, and Chapter 3, Guidelines for Writing a CSPP. The airport operator may develop the CSPP internally or have a consultant develop the CSPP for approval by the airport operator. For tenant sponsored projects, approve a CSPP developed by the tenant or its consultant.

(2) **Require, review and approve the SPCD** by the contractor that indicates how it will comply with the CSPP and provides details that cannot be determined before contract award.

(3) **Convene a preconstruction meeting** with the construction contractor, consultant, airport employees and, if appropriate, tenant sponsor and other tenants to review and discuss project safety before beginning construction activity. The appropriate FAA representatives should be invited to attend the meeting. See AC 150/5300-9, *Predesign, Prebid, and Preconstruction Conferences for Airport Grant Projects*. (Note "FAA" refers to the Airports Regional or District Office, the Air Traffic Organization, Flight Standards Service, and other offices that support airport operations, flight regulations, and construction/environmental policies.)

(4) **Ensure contact information** is accurate for each representative/point of contact identified in the CSPP and SPCD.

(5) **Hold weekly or, if necessary, daily safety meetings** with all affected parties to coordinate activities.

(6) **Notify users, ARFF personnel, and FAA ATO personnel of construction** and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAM) and other methods, as appropriate. Convene a meeting for review and discussion if necessary.

(7) **Ensure construction personnel know of any applicable airport procedures** and of changes to those procedures that may affect their work.

(8) **Ensure construction contractors and subcontractors undergo training** required by the CSPP and SPCD.

(9) **Ensure vehicle and pedestrian operations** addressed in the CSPP and SPCD are coordinated with airport tenants, the airport traffic control tower (ATCT), and construction contractors.

(10) **At certificated airports**, ensure each CSPP and SPCD is consistent with Part 139.

(11) **Conduct inspections** sufficiently frequently to ensure construction contractors and tenants comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.

(12) **Resolve safety deficiencies immediately.** At airports subject to 49 CFR Part 1542, Airport Security, ensure construction access complies with the security requirements of that regulation.

(13) **Notify appropriate parties** when conditions exist that invoke provisions of the CSPP and SPCD (for example, implementation of low-visibility operations).

(14) **Ensure prompt submittal of a Notice of Proposed Construction or Alteration** (Form 7460-1) for conducting an aeronautical study of potential obstructions such as tall equipment (cranes, concrete pumps, other.), stock piles, and haul routes. A separate form may be filed for each potential obstruction, or one form may be filed describing the entire construction area and maximum equipment height. In the latter case, a separate form must be filed for any object beyond or higher than the originally evaluated area/height. The FAA encourages online submittal of forms for expediency. The appropriate FAA Airports Regional or District Office can provide assistance in determining which objects require an aeronautical study.

(15) **Promptly notify the FAA Airports Regional or District Office** of any proposed changes to the CSPP prior to implementation of the change. Changes to the CSPP require review and approval by the airport operator and the FAA. Coordinate with appropriate local and other federal government agencies, such as EPA, OSHA, TSA, and the state environmental agency.

c. Define Construction Contractor's Responsibilities. The contractor is responsible for complying with the CSPP and SPCD. The contractor must:

(1) **Submit a Safety Plan Compliance Document (SPCD)** to the airport operator describing how it will comply with the requirements of the CSPP and supplying any details that could not be determined before contract award. The SPCD must include a certification statement by the contractor that indicates it understands the operational safety requirements of the CSPP and it asserts it will not deviate from the approved CSPP and SPCD unless written approval is granted by the airport operator. Any construction practice proposed by the contractor that does not conform to the CSPP and SPCD may impact the airport's operational safety and will require a revision to the CSPP and SPCD and re-coordination with the airport operator and the FAA in advance.

(2) **Have available at all times copies** of the CSPP and SPCD for reference by the airport operator and its representatives, and by subcontractors and contractor employees.

(3) **Ensure that construction personnel** are familiar with safety procedures and regulations on the airport. Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport. Many projects will require 24-hour coverage.

(4) **Identify in the SPCD the contractor's on-site employees** responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site whenever active construction is taking place.

(5) **Conduct inspections** sufficiently frequently to ensure construction personnel comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.

(6) **Restrict movement of construction vehicles and personnel** to permitted construction areas by flagging, barricading, erecting temporary fencing, or providing escorts, as appropriate and as specified in the CSPP and SPCD.

(7) **Ensure that no contractor employees**, employees of subcontractors or suppliers, or other persons enter any part of the air operations area (AOA) from the construction site unless authorized.

(8) **Ensure prompt submittal through the airport operator of Form 7460-1** for the purpose of conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, other equipment), stock piles, and haul routes when different from cases previously filed by the airport operator. The FAA encourages online submittal of forms for expediency.

d. Define Tenant's Responsibilities if planning construction activities on leased property. Airport tenants, such as airline operators, fixed base operators, and FAA ATO/Technical Operations sponsoring construction must:

(1) **Develop, or have a consultant develop, a project specific CSPP** and submit it to the airport operator for certification and subsequent approval by the FAA. The approved CSPP must be made part of any contract awarded by the tenant for construction work.

(2) **In coordination with its contractor, develop an SPCD** and submit it to the airport operator for approval to be issued prior to issuance of a Notice to Proceed.

(3) **Ensure that construction personnel are familiar with safety procedures** and regulations on the airport.

(4) **Provide a point of contact** of who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.

(5) **Identify in the SPCD the contractor's on-site employees** responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site whenever active construction is taking place.

(6) **Ensure that no tenant or contractor employees**, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.

(7) **Restrict movement of construction vehicles** to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate, and as specified in the CSPP and SPCD.

(8) **Ensure prompt submittal through the airport operator of Form 7460-1** for the purpose of conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, other.), stock piles, and haul routes. The FAA encourages online submittal of forms for expediency.

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Chapter 2. Construction Safety and Phasing Plans

Section 1. Basic Considerations

201. Overview. Aviation safety is the primary consideration at airports, especially during construction. The airport operator's Construction Safety and Phasing Plan (CSPP) and the contractor's Safety Plan Compliance Document (SPCD) are the primary tools to ensure safety compliance when coordinating construction activities with airport operations. These documents identify all aspects of the construction project that pose a potential safety hazard to airport operations and outline respective mitigation procedures for each hazard. They must provide all information necessary for the Airport Operations department to conduct airfield inspections and expeditiously identify and correct unsafe conditions during construction. All aviation safety provisions included within the project drawings, contract specifications, and other related documents must also be reflected in the CSPP and SPCD.

202. Assume Responsibility. Operational safety on the airport remains the airport operator's responsibility at all times. The airport operator must develop, certify, and submit for FAA approval each CSPP. It is the airport operator's responsibility to apply the requirements of the FAA approved CSPP. The airport operator must revise the CSPP when conditions warrant changes and must submit the revised CSPP to the FAA for approval. The airport operator must also require and approve a SPCD from the project contractor.

203. Submit the CSPP. Construction Safety and Phasing Plans should be developed concurrently with the project design. Milestone versions of the CSPP should be submitted for review and approval as follows. While these milestones are not mandatory, early submission will help to avoid delays. Submittals are preferred in 8.5 x 11 in or 11 x 17 in format for compatibility with the FAA's Obstruction Evaluation / Airport Airspace Analysis (OE / AAA) process.

a. Submit an Outline/Draft. By the time approximately 25% to 30% of the project design is completed, the principal elements of the CSPP should be established. Airport operators are encouraged to submit an outline or draft, detailing all CSPP provisions developed to date, to the FAA for review at this stage of the project design.

b. Submit a Construction Safety and Phasing Plan (CSPP). The CSPP should be formally submitted for FAA approval when the project design is 80% to 90% complete. Since provisions in the CSPP will influence contract costs, it is important to obtain FAA approval in time to include all such provisions in the procurement contract.

c. Submit a Safety Plan Compliance Document (SPCD). The contractor should submit the SPCD to the airport operator for approval to be issued prior to the Notice to Proceed.

d. Submit CSPP Revisions. All revisions to the CSPP or SPCD should be submitted to the FAA for approval as soon as required changes are identified.

204. Meet CSPP Requirements.

a. To the extent possible, the CSPP should address the following as outlined in Section 2, Plan Requirements and Chapter 3, Guidelines for Writing a CSPP, as appropriate. Details that cannot be determined at this stage are to be included in the SPCD.

(1) Coordination.

- (a) Contractor progress meetings.
 - (b) Scope or schedule changes.
 - (c) FAA ATO coordination.
- (2) Phasing.**
 - (a) Phase elements.
 - (b) Construction safety drawings
- (3) Areas and operations affected by the construction activity.**
 - (a) Identification of affected areas.
 - (b) Mitigation of effects.
- (4) Protection of navigation aids (NAVAIDs).**
- (5) Contractor access.**
 - (a) Location of stockpiled construction materials.
 - (b) Vehicle and pedestrian operations.
- (6) Wildlife management.**
 - (a) Trash.
 - (b) Standing water.
 - (c) Tall grass and seeds.
 - (d) Poorly maintained fencing and gates.
 - (e) Disruption of existing wildlife habitat.
- (7) Foreign Object Debris (FOD) management.**
- (8) Hazardous materials (HAZMAT) management**
- (9) Notification of construction activities.**
 - (a) Maintenance of a list of responsible representatives/ points of contact.
 - (b) Notices to Airmen (NOTAM).
 - (c) Emergency notification procedures.
 - (d) Coordination with ARFF Personnel.
 - (e) Notification to the FAA.
- (10) Inspection requirements.**
 - (a) Daily (or more frequent) inspections.
 - (b) Final inspections.
- (11) Underground utilities.**
- (12) Penalties.**
- (13) Special conditions.**
- (14) Runway and taxiway visual aids.** Marking, lighting, signs, and visual NAVAIDs.

- (a) General.
- (b) Markings.
- (c) Lighting and visual NAVAIDs.
- (d) Signs.
- (15) Marking and signs for access routes.**
- (16) Hazard marking and lighting.**
 - (a) Purpose.
 - (b) Equipment.
- (17) Protection.** Of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces
 - (a) Runway Safety Area (RSA).
 - (b) Runway Object Free Area (ROFA).
 - (c) Taxiway Safety Area (TSA).
 - (d) Taxiway Object Free Area (TOFA).
 - (e) Obstacle Free Zone (OFZ).
 - (f) Runway approach/departure surfaces.
- (18) Other limitations on construction.**
 - (a) Prohibitions.
 - (b) Restrictions.

b. The Safety Plan Compliance Document (SPCD) should include a general statement by the construction contractor that he/she has read and will abide by the CSPP. In addition, the SPCD must include all supplemental information that could not be included in the CSPP prior to the contract award. The contractor statement should include the name of the contractor, the title of the project CSPP, the approval date of the CSPP, and a reference to any supplemental information (that is, “I, Name of Contractor, have read the Title of Project CSPP, approved on Date, and will abide by it as written and with the following additions as noted:”). The supplemental information in the SPCD should be written to match the format of the CSPP indicating each subject by corresponding CSPP subject number and title. If no supplemental information is necessary for any specific subject, the statement, “No supplemental information,” should be written after the corresponding subject title. The SPCD should not duplicate information in the CSPP:

- (1) Coordination.** Discuss details of proposed safety meetings with the airport operator and with contractor employees and subcontractors.
- (2) Phasing.** Discuss proposed construction schedule elements, including:
 - (a) Duration of each phase.
 - (b) Daily start and finish of construction, including “night only” construction.
 - (c) Duration of construction activities during:
 - (i)** Normal runway operations.
 - (ii)** Closed runway operations.

(iii) Modified runway “Aircraft Reference Code” usage.

(3) Areas and operations affected by the construction activity. These areas and operations should be identified in the CSPP and should not require an entry in the SPCD.

(4) Protection of NAVAIDs. Discuss specific methods proposed to protect operating NAVAIDs.

(5) Contractor access. Provide the following:

(a) Details on how the contractor will maintain the integrity of the airport security fence (gate guards, daily log of construction personnel, and other).

(b) Listing of individuals requiring driver training (for certificated airports and as requested).

(c) Radio communications.

(i) Types of radios and backup capabilities.

(ii) Who will be monitoring radios.

(iii) Whom to contact if the ATCT cannot reach the contractor’s designated person by radio.

(d) Details on how the contractor will escort material delivery vehicles.

(6) Wildlife management. Discuss the following:

(a) Methods and procedures to prevent wildlife attraction.

(b) Wildlife reporting procedures.

(7) Foreign Object Debris (FOD) management. Discuss equipment and methods for control of FOD, including construction debris and dust.

(8) Hazardous material (HAZMAT) management. Discuss equipment and methods for responding to hazardous spills.

(9) Notification of construction activities. Provide the following:

(a) Contractor points of contact.

(b) Contractor emergency contact.

(c) Listing of tall or other requested equipment proposed for use on the airport and the timeframe for submitting 7460-1 forms not previously submitted by the airport operator.

(d) Batch plant details, including 7460-1 submittal.

(10) Inspection requirements. Discuss daily (or more frequent) inspections and special inspection procedures.

(11) Underground utilities. Discuss proposed methods of identifying and protecting underground utilities.

(12) Penalties. Penalties should be identified in the CSPP and should not require an entry in the SPCD.

(13) Special conditions. Discuss proposed actions for each special condition identified in the CSPP.

(14) Runway and taxiway visual aids. Including marking, lighting, signs, and visual NAVAIDs. Discuss proposed visual aids including the following:

- (a) Equipment and methods for covering signage and airfield lights.
- (b) Equipment and methods for temporary closure markings (paint, fabric, other).
- (c) Types of temporary Visual Guidance Slope Indicators (VGSI).

(15) Marking and signs for access routes. Discuss proposed methods of demarcating access routes for vehicle drivers.

(16) Hazard marking and lighting. Discuss proposed equipment and methods for identifying excavation areas.

(17) Protection of runway and taxiway safety areas. including object free areas, obstacle free zones, and approach/departure surfaces. Discuss proposed methods of identifying, demarcating, and protecting airport surfaces including:

- (a) Equipment and methods for maintaining Taxiway Safety Area standards.
- (b) Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.

(18) Other limitations on construction should be identified in the CSPP and should not require an entry in the SPCD.

Section 2. Plan Requirements

205. Coordination. Airport operators, or tenants conducting construction on their leased properties, should use predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction (see AC 150/5300-9). In addition, the following should be coordinated as required:

a. Contractor Progress Meetings. Operational safety should be a standing agenda item for discussion during progress meetings throughout the project.

b. Scope or Schedule Changes. Changes in the scope or duration of the project may necessitate revisions to the CSPP and review and approval by the airport operator and the FAA.

c. FAA ATO Coordination. Early coordination with FAA ATO is required to schedule airway facility shutdowns and restarts. Relocation or adjustments to NAVAIDs, or changes to final grades in critical areas, may require an FAA flight inspection prior to restarting the facility. Flight inspections must be coordinated and scheduled well in advance of the intended facility restart. Flight inspections may require a reimbursable agreement between the airport operator and FAA ATO. Reimbursable agreements should be coordinated a minimum of 12 months prior to the start of construction. (See 213.e(3)(b) for required FAA notification regarding FAA owned NAVAIDs.)

206. Phasing. Once it has been determined what types and levels of airport operations will be maintained, the most efficient sequence of construction may not be feasible. In such a case, the sequence of construction may be phased to gain maximum efficiency while allowing for the required operations. The development of the resulting construction phases should be coordinated with local Air Traffic personnel and airport users. The sequenced construction phases established in the CSPP must be incorporated into the project design and must be reflected in the contract drawings and specifications.

a. Phase Elements. For each phase the CSPP should detail:

- Areas closed to aircraft operations

- Duration of closures
- Taxi routes
- ARFF access routes
- Construction staging areas
- Construction access and haul routes
- Impacts to NAVAIDs
- Lighting and marking changes
- Available runway length
- Declared distances (if applicable)
- Required hazard marking and lighting
- Lead times for required notifications

b. Construction Safety Drawings. Drawings specifically indicating operational safety procedures and methods in affected areas (that is, construction safety drawings) should be developed for each construction phase. Such drawings should be included in the CSPP as referenced attachments and should likewise be included in the contract drawing package.

207. Areas and Operations Affected by Construction Activity. Runways and taxiways should remain in use by aircraft to the maximum extent possible without compromising safety. Pre-meetings with the FAA Air Traffic Organization (ATO) will support operational simulations. See Chapter 3 for an example of a table showing temporary operations versus current operations.

a. Identification of Affected Areas. Identifying areas and operations affected by the construction will help to determine possible safety problems. The affected areas should be identified in the construction safety drawings for each construction phase. (See 206.b above.) Of particular concern are:

(1) **Closing, or partial closing, of runways, taxiways and aprons.** When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing, landing, or taking off in either direction on that pavement is prohibited. A displaced threshold, by contrast, is established to ensure obstacle clearance and adequate safety area for landing aircraft. The pavement prior to the displaced threshold is available for take-off in the direction of the displacement and for landing and taking off in the opposite direction. Misunderstanding this difference, and issuance of a subsequently inaccurate NOTAM, can lead to a hazardous condition.

(2) **Closing of Aircraft Rescue and Fire Fighting access routes.**

(3) **Closing of access routes used by airport and airline support vehicles.**

(4) **Interruption of utilities, including water supplies for fire fighting.**

(5) **Approach/departure surfaces affected by heights of objects.**

(6) **Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads.**

b. Mitigation of Effects. Establishment of specific procedures is necessary to maintain the safety and efficiency of airport operations. The CSPP must address:

(1) **Temporary changes to runway and/or taxi operations.**

(2) **Detours for ARFF and other airport vehicles.**

- (3) **Maintenance of essential utilities.**
- (4) **Temporary changes to air traffic control procedures. Such changes must be coordinated with the ATO.**

208. Navigation Aid (NAVAID) Protection. Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, coordinate with the appropriate FAA ATO/Technical Operations office to evaluate the effect of construction activity and the required distance and direction from the NAVAID. (See paragraph 213.e(3) below.) Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. If any NAVAID may be affected, the CSPP and SPCD must show an understanding of the “critical area” associated with each NAVAID and describe how it will be protected. Where applicable, the operational critical areas of NAVAIDs should be graphically delineated on the project drawings. Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction equipment and activities may require NAVAID shutdown or adjustment of instrument approach minimums for low visibility operations. This condition requires that a NOTAM be filed (see paragraph 213.b below). Construction activities and materials/equipment storage near a NAVAID must not obstruct access to the equipment and instruments for maintenance. Submittal of a 7460-1 form is required for construction vehicles operating near FAA NAVAIDs. (See paragraph 213.e(1) below.)

209. Contractor Access. The CSPP must detail the areas to which the contractor must have access, and explain how contractor personnel will access those areas. Specifically address:

a. Location of Stockpiled Construction Materials. Stockpiled materials and equipment storage are not permitted within the RSA and OFZ, and if possible should not be permitted within the Object Free Area (OFA) of an operational runway. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. (See paragraph 218.b below.) This includes determining and verifying that materials are stabilized and stored at an approved location so as not to be a hazard to aircraft operations and to prevent attraction of wildlife and foreign object damage. See paragraphs 210 and 211 below.

b. Vehicle and Pedestrian Operations. The CSPP should include specific vehicle and pedestrian requirements. Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. The airport operator should coordinate requirements for vehicle operations with airport tenants, contractors, and the FAA air traffic manager. In regard to vehicle and pedestrian operations, the CSPP should include the following, and detail associated training requirements:

- (1) **Construction site parking.** Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the AOA. These areas should provide reasonable contractor employee access to the job site.
- (2) **Construction equipment parking.** Contractor employees must park and service all construction vehicles in an area designated by the airport operator outside the OFZ and never in the safety area of an active runway or taxiway. Unless a complex setup procedure makes movement of specialized equipment infeasible, inactive equipment must not be parked on a closed taxiway or runway. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lighted. Employees should also park construction vehicles outside the OFA when not in use by

construction personnel (for example, overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigation aids. The FAA must also study those areas to determine effects on airport design criteria, surfaces established by 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace (Part 77), and on NAVAIDs and Instrument Approach Procedures (IAP). See paragraph 213.e(1) below for further information.

(3) Access and haul roads. Determine the construction contractor's access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Access routes used by contractor vehicles must be clearly marked to prevent inadvertent entry to areas open to airport operations. Pay special attention to ensure that if construction traffic is to share or cross any ARFF routes that ARFF right of way is not impeded at any time, and that construction traffic on haul roads does not interfere with NAVAIDs or approach surfaces of operational runways.

(4) Marking and lighting of vehicles in accordance with AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport.

(5) Description of proper vehicle operations on various areas under normal, lost communications, and emergency conditions.

(6) Required escorts.

(7) Training requirements for vehicle drivers to ensure compliance with the airport operator's vehicle rules and regulations. Specific training should be provided to those vehicle operators providing escorts. See AC 150/5210-20, Ground Vehicle Operations on Airports, for information on training and records maintenance requirements.

(8) Situational awareness. Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time.

(9) Two-way radio communication procedures.

(a) General. The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCT. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact, as directed by the airport operator, with:

(i) Airport operations

(ii) ATCT

(iii) Common Traffic Advisory Frequency (CTAF), which may include UNICOM, MULTICOM.

(iv) Automatic Terminal Information Service (ATIS). This frequency is useful for monitoring conditions on the airport. Local air traffic will broadcast information regarding construction related runway closures and "shortened" runways on the ATIS frequency.

(b) Areas requiring two-way radio communication with the ATCT. Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport.

(c) Frequencies to be used. The airport operator will specify the frequencies to be used by the contractor, which may include the CTAF for monitoring of aircraft operations. Frequencies may also be assigned by the airport operator for other communications, including any radio frequency in compliance with Federal Communications Commission requirements. At airports with an ATCT, the airport operator will specify the frequency assigned by the ATCT to be used between contractor vehicles and the ATCT.

(d) Proper radio usage, including read back requirements.

(e) Proper phraseology, including the International Phonetic Alphabet.

(f) Light gun signals. Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure. See the FAA safety placard “Ground Vehicle Guide to Airport Signs and Markings.” This safety placard may be downloaded through the Runway Safety Program Web site at http://www.faa.gov/airports/runway_safety/publications/ (See “Signs & Markings Vehicle Dashboard Sticker”.) or obtained from the FAA Airports Regional Office.

(10) Maintenance of the secured area of the airport, including:

(a) Fencing and gates. Airport operators and contractors must take care to maintain security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and unauthorized people. Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit “piggybacking” behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-00/52, Recommended Security Guidelines for Airport Planning and Construction, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

(b) Badging requirements.

(c) Airports subject to 49 CFR Part 1542, Airport Security, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel.

210. Wildlife Management. The CSPP and SPCD must be in accordance with the airport operator’s wildlife hazard management plan, if applicable. See also AC 150/5200-33, Hazardous Wildlife Attractants On or Near Airports, and Certalert 98-05, Grasses Attractive to Hazardous Wildlife. Construction contractors must carefully control and continuously remove waste or loose materials that might attract wildlife. Contractor personnel must be aware of and avoid construction activities that can create wildlife hazards on airports, such as:

a. Trash. Food scraps must be collected from construction personnel activity.

b. Standing Water.

c. Tall Grass and Seeds. Requirements for turf establishment can be at odds with requirements for wildlife control. Grass seed is attractive to birds. Lower quality seed mixtures can contain seeds of plants (such as clover) that attract larger wildlife. Seeding should comply with the guidance in AC 150/5370-10, Standards for Specifying Construction of Airports, Item T-901, Seeding. Contact the local office of the United States Department of Agriculture Soil Conservation Service or the State University Agricultural Extension Service (County Agent or equivalent) for assistance and recommendations. These agencies can also provide liming and fertilizer recommendations.

d. Poorly Maintained Fencing and Gates. See 209.b(10)(a) above.

e. Disruption of Existing Wildlife Habitat. While this will frequently be unavoidable due to the nature of the project, the CSPP should specify under what circumstances (location, wildlife type) contractor personnel should immediately notify the airport operator of wildlife sightings.

211. Foreign Object Debris (FOD) Management. Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials capable of creating FOD must be continuously removed during the construction project. Fencing (other than security fencing) may be necessary to contain material that can be carried by wind into areas where aircraft operate. See AC 150/5210-24, Foreign Object Debris (FOD) Management.

212. Hazardous Materials (HAZMAT) Management. Contractors operating construction vehicles and equipment on the airport must be prepared to expeditiously contain and clean-up spills resulting from fuel or hydraulic fluid leaks. Transport and handling of other hazardous materials on an airport also requires special procedures. See AC 150/5320-15, Management of Airport Industrial Waste.

213. Notification of Construction Activities. The CSPP and SPCD must detail procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of the airport. It must address the notification actions described below, as applicable.

a. List of Responsible Representatives/ points of contact for all involved parties, and procedures for contacting each of them, including after hours.

b. NOTAMs. Only the airport operator may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center), and must provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. The airport operator must file and maintain a list of authorized representatives with the FSS. Refer to AC 150/5200-28, Notices to Airmen (NOTAMs) for Airport Operators, for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA owned facilities. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator. See paragraph 207.a(1) above regarding issuing NOTAMs for partially closed runways versus runways with displaced thresholds.

c. Emergency notification procedures for medical, fire fighting, and police response.

d. Coordination with ARFF. The CSPP must detail procedures for coordinating through the airport sponsor with ARFF personnel, mutual aid providers, and other emergency services if construction requires:

- The deactivation and subsequent reactivation of water lines or fire hydrants, or
- The rerouting, blocking and restoration of emergency access routes, or
- The use of hazardous materials on the airfield.

e. Notification to the FAA.

(1) Part 77. Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed

parking areas for this equipment (i.e. cranes, graders, other equipment) on airports. FAA Form 7460-1, Notice of Proposed Construction or Alteration, can be used for this purpose and submitted to the appropriate FAA Airports Regional or District Office. See Appendix 1, Related Reading Material, to download the form. Further guidance is available on the FAA web site at oeaaa.faa.gov.

(2) Part 157. With some exceptions, Title 14 CFR Part 157, Notice of Construction, Alteration, Activation, and Deactivation of Airports, requires that the airport operator notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, Notice of Landing Area Proposal, to the nearest FAA Airports Regional or District Office. See Appendix 1, Related Reading Material to download the form.

(3) NAVAIDS. For emergency (short-notice) notification about impacts to both airport owned and FAA owned NAVAIDS, contact: 866-432-2622.

(a) Airport owned/FAA maintained. If construction operations require a shutdown of more than 24 hours, or more than 4 hours daily on consecutive days, of a NAVAID owned by the airport but maintained by the FAA, provide a 45-day minimum notice to FAA ATO/Technical Operations prior to facility shutdown.

(b) FAA owned.

(i) General. The airport operator must notify the appropriate FAA ATO Service Area Planning and Requirements (P&R) Group a minimum of 45 days prior to implementing an event that causes impacts to NAVAIDS. (Impacts to FAA equipment covered by a Reimbursable Agreement (RA) do not have to be reported by the airport operator.)

(ii) Coordinate work for an FAA owned NAVAID shutdown with the local FAA ATO/Technical Operations office, including any necessary reimbursable agreements and flight checks. Detail procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDS. In addition, provide seven days notice to schedule the actual shutdown.

214. Inspection Requirements.

a. Daily Inspections. Inspections should be conducted at least daily, but more frequently if necessary to ensure conformance with the CSPP. A sample checklist is provided in Appendix 3, Safety and Phasing Plan Checklist. See also AC 150/5200-18, Airport Safety Self-Inspection.

b. Final Inspections. New runways and extended runway closures may require safety inspections at certificated airports prior to allowing air carrier service. Coordinate with the FAA Airport Certification Safety Inspector (ACSI) to determine if a final inspection will be necessary.

215. Underground Utilities. The CSPP and/or SPCD must include procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas. This may involve coordinating with public utilities and FAA ATO/Technical Operations. Note that “One Call” or “Miss Utility” services do not include FAA ATO/Technical Operations

216. Penalties. The CSPP should detail penalty provisions for noncompliance with airport rules and regulations and the safety plans (for example, if a vehicle is involved in a runway incursion). Such penalties typically include rescission of driving privileges or access to the AOA.

217. Special Conditions. The CSPP must detail any special conditions that affect the operation of the

airport and will require the activation of any special procedures (for example, low-visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, Vehicle / Pedestrian Deviation (VPD) and other activities requiring construction suspension/resumption).

218. Runway and Taxiway Visual Aids. Includes marking, lighting, signs, and visual NAVAIDS. The CSPP must ensure that areas where aircraft will be operating are clearly and visibly separated from construction areas, including closed runways. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking, lighting, signs, and visual NAVAIDS remain in place and operational. The CSPP must address the following, as appropriate:

a. General. Airport markings, lighting, signs, and visual NAVAIDS must be clearly visible to pilots, not misleading, confusing, or deceptive. All must be secured in place to prevent movement by prop wash, jet blast, wing vortices, or other wind currents and constructed of materials that would minimize damage to an aircraft in the event of inadvertent contact.

b. Markings. Markings must be in compliance with the standards of AC 150/5340-1, Standards for Airport Markings. Runways and runway exit taxiways closed to aircraft operations are marked with a yellow X. The preferred visual aid to depict temporary runway closure is the lighted X signal placed on or near the runway designation numbers. (See paragraph 218.b(1)(b) below.)

(1) Closed Runways and Taxiways.

(a) **Permanently Closed Runways.** For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place Xs at each end and at 1,000-foot (300 m) intervals.

(b) **Temporarily Closed Runways.** For runways that have been temporarily closed, place an X at the each end of the runway directly on or as near as practicable to the runway designation numbers. Figure 2-1 illustrates.



Figure 2-1 Markings for a Temporarily Closed Runway

(c) **Partially Closed Runways and Displaced Thresholds.** When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, the markings must comply with AC 150/5340-1. An X is not used on a partially closed runway or a runway with a displaced threshold. See paragraph 207.a(1) above for the difference between partially closed runways and runways with displaced thresholds.

(i) **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see AC 150/5340-1).

(ii) **Displaced Thresholds.** Pavement markings for a displaced threshold consist of a runway threshold bar and white arrowheads with and without arrow shafts. These markings are required to identify the portion of the runway before the displaced threshold to provide centerline guidance for pilots during approaches, takeoffs, and landing rollouts from the opposite direction. See AC 150/5340-1.

(d) Taxiways.

(i) Permanently Closed Taxiways. AC 150/5300-13 notes that it is preferable to remove the pavement, but for pavement that is to remain, place an X at the entrance to both ends of the closed section. Obliterate taxiway centerline markings, including runway leadoff lines, leading to the closed taxiway. Figure 2-2 illustrates.

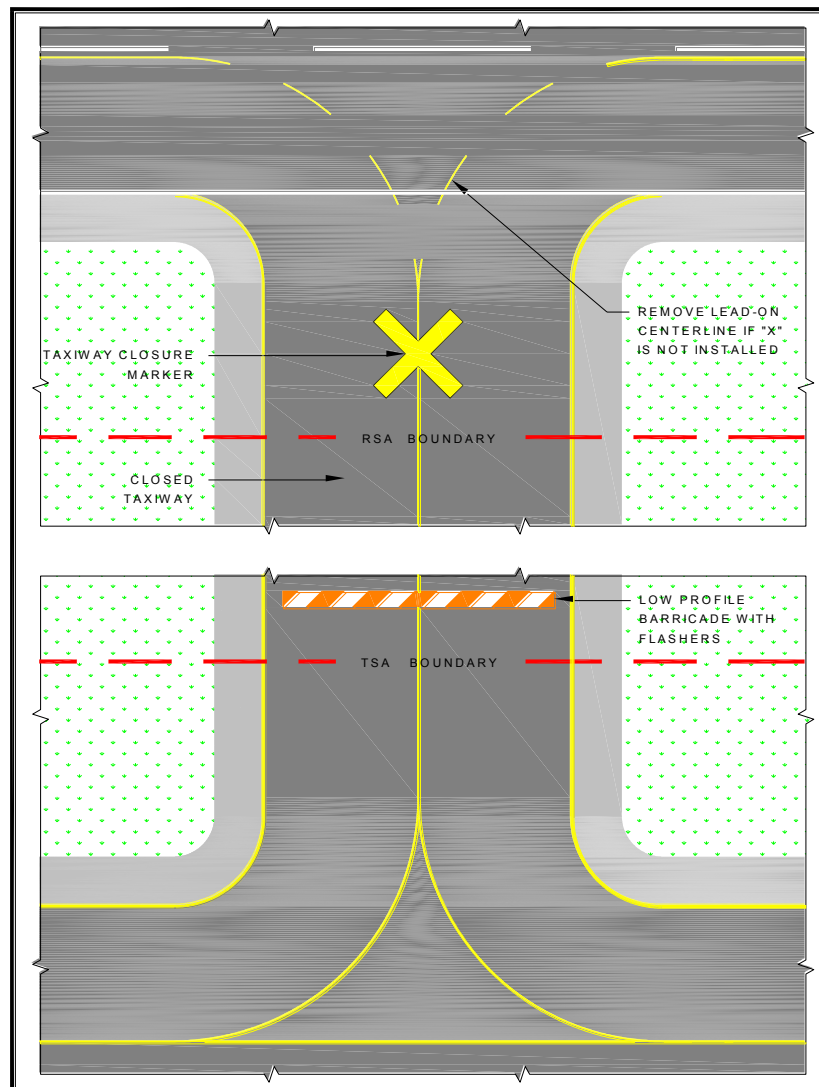


Figure 2-2 Taxiway Closure

(ii) Temporarily Closed Taxiways. Place barricades outside the safety area of intersecting taxiways. For runway/taxiway intersections, place an X at the entrance to the closed taxiway from the runway. If the taxiway will be closed for an extended period, obliterate taxiway centerline markings, including runway leadoff lines, leading to the closed section. If the centerline markings will be reused upon reopening the taxiway, it is preferable to paint over the marking. This will result in less damage to the pavement when the upper layer of paint is ultimately removed.

(e) Temporarily Closed Airport. When the airport is closed temporarily, mark all the runways as closed.

(i) If unable to paint temporary markings on the pavement, construct them from any of the following materials: fabric, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and appropriately secured to prevent movement by prop wash, jet blast, or other wind currents.

(ii) It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. When removing runway markings, apply the same treatment to areas between stripes or numbers, as the cleaned area will appear to pilots as a marking in the shape of the treated area.

(iii) If it is not possible to install threshold bars, chevrons, and arrows on the pavement, temporary outboard markings may be used. Locate them outside of the runway pavement surface on both sides of the runway. The dimension along the runway direction must be the same as if installed on the pavement. The lateral dimension must be at least one-half that of on-pavement markings. If the markings are not discernable on grass or snow, apply a black background with appropriate material over the ground to ensure they are clearly visible.

(iv) The application rate of paint to mark a short-term temporary runway and taxiway markings may deviate from the standard (see Item P-620, "Runway and Taxiway Painting," in AC 150/5370-10), but the dimensions must meet the existing standards.

(f) **Lighting and Visual NAVAIDs.** This paragraph refers to standard runway and taxiway lighting systems. See below for hazard lighting. Lighting must be in conformance with AC 150/5340-30, Design and Installation Details for Airport Visual Aids, and AC 150/5345-50, Specification for Portable Runway and Taxiway Lights. When disconnecting runway and taxiway lighting fixtures, disconnect the associated isolation transformers. Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value. Secure, identify, and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources.

(2) Permanently Closed Runways and Taxiways. For runways and taxiways that have been permanently closed, disconnect the lighting circuits.

(3) **Temporarily Closed Runways.** If available, use a lighted X, both at night and during the day, placed at each end of the runway facing the approach. The use of a lighted X is required if night work requires runway lighting to be on. See AC 150/5345-55, Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure. For runways that have been temporarily closed, but for an extended period, and for those with pilot controlled lighting, disconnect the lighting circuits or secure switches to prevent inadvertent activation. For runways that will be opened periodically, coordinate procedures with the FAA air traffic manager or, at airports without an ATCT, the airport operator. Activate stop bars if available. Figure 2-3 shows a lighted X by day. Figure 2-4 shows a lighted X at night.



Figure 2-3 Lighted X in Daytime



Figure 2-4 Lighted X at Night

(4) **Partially Closed Runways and Displaced Thresholds.** When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing and landing or

taking off in either direction. A displaced threshold, by contrast, is put in place to ensure obstacle clearance by landing aircraft. The pavement prior to the displaced threshold is available for takeoff in the direction of the displacement, and for landing and takeoff in the opposite direction. Misunderstanding this difference and issuance of a subsequently inaccurate NOTAM can result in a hazardous situation. For both partially closed runways and displaced thresholds, approach lighting systems at the affected end must be placed out of service

(a) **Partially Closed Runways.** Disconnect edge and threshold lights on that part of the runway at and behind the threshold (that is, the portion of the runway that is closed). Alternately, cover the light fixture in such a way as to prevent light leakage.

(b) **Displaced Thresholds.** Edge lighting in the area of the displacement emits red light in the direction of approach and yellow light in the opposite direction. Centerline lights are blanked out in the direction of approach if the displacement is 700 ft or less. If the displacement is over 700 ft, place the centerline lights out of service. See AC 150/5340-30 for details on lighting displaced thresholds.

(c) **Temporary runway thresholds and runway ends** must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions.

(d) **A temporary threshold on an unlighted runway** may be marked by retroreflective, elevated markers in addition to markings noted in paragraph 218.b(1)(c) above. Markers seen by aircraft on approach are green. Markers at the rollout end of the runway are red. At certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR Part 139.309). At non-certificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39, Specification for L-853, Runway and Taxiway Retroreflective Markers.

(e) **Temporary threshold lights and end lights and related visual NAVAIDs** are installed outboard of the edges of the full-strength pavement only when they cannot be installed on the pavement. They are installed with bases at grade level or as low as possible, but not more than 3 in (7.6 cm) above ground. When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage. See AC 150/5370-10.

(f) **Maintain threshold and edge lighting color and spacing standards** as described in AC 150/5340-30. Battery powered, solar, or portable lights that meet the criteria in AC 150/5345-50 may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operations but may be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight Standards Division of the applicable FAA Regional Office.

(g) **Reconfigure yellow lenses (caution zone), as necessary.** If the runway has centerline lights, reconfigure the red lenses, as necessary, or place the centerline lights out of service.

(h) **Relocate the visual glide slope indicator (VGSI), such as VASI and PAPI; other airport lights, such as Runway End Identifier Lights (REIL); and approach lights** to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI, coordinate its installation or disabling with the local ATO/Technical Operations Office. Relocation of such visual aids will depend on the duration of the project and the benefits gained from the relocation, as this can result in great expense.

(i) **Issue a NOTAM to inform pilots of temporary lighting conditions.**

(5) Temporarily Closed Taxiways. If possible, deactivate the taxiway lighting circuits. When deactivation is not possible (for example other taxiways on the same circuit are to remain open),

cover the light fixture in such a way as to prevent light leakage.

c. Signs. To the extent possible, signs must be in conformance with AC 150/5345-44, Specification for Runway and Taxiway Signs and AC 150/5340-18, Standard for Airport Sign Systems. Any time a sign does not serve its normal function; it must be covered or removed to prevent misdirecting pilots. Note that information signs identifying a crossing taxiway continue to perform their normal function even if the crossing taxiway is closed. For long term construction projects, consider relocating signs, especially runway distance remaining signs.

219. Marking and Signs for Access Routes. The CSPP should indicate that pavement markings and signs for construction personnel will conform to AC 150/5340-18 and, to the extent practicable, with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or State highway specifications. Signs adjacent to areas used by aircraft must comply with the frangibility requirements of AC 150/5220-23, Frangible Connections, which may require modification to size and height guidance in the MUTCD.

220. Hazard Marking, Lighting and Signing.

a. Hazard Marking and Lighting Prevents Pilots from entering areas closed to aircraft, and prevents construction personnel from entering areas open to aircraft. The CSPP must specify prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Hazard marking and lighting must also be specified to identify open manholes, small areas under repair, stockpiled material, waste areas, and areas subject to jet blast. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

b. Equipment.

(1) Barricades, including traffic cones, (weighted or sturdily attached to the surface) are acceptable methods used to identify and define the limits of construction and hazardous areas on airports. Careful consideration must be given to selecting equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast. The spacing of barricades must be such that a breach is physically prevented barring a deliberate act. For example, if barricades are intended to exclude vehicles, gaps between barricades must be smaller than the width of the excluded vehicles, generally 4 ft. Provision must be made for ARFF access if necessary. If barricades are intended to exclude pedestrians, they must be continuously linked. Continuous linking may be accomplished through the use of ropes, securely attached to prevent FOD.

(2) Lights must be red, either steady burning or flashing, and must meet the luminance requirements of the State Highway Department. Batteries powering lights will last longer if lights flash. Lights must be mounted on barricades and spaced at no more than 10 ft. Lights must be operated between sunset and sunrise and during periods of low visibility whenever the airport is open for operations. They may be operated by photocell, but this may require that the contractor turn them on manually during periods of low visibility during daytime hours.

(3) Supplement barricades with signs (for example “No Entry,” “No Vehicles”) as necessary.

(4) Air Operations Area – General. Barricades are not permitted in any active safety area. Within a runway or taxiway object free area, and on aprons, use orange traffic cones, flashing or steady burning red lights as noted above, collapsible barricades marked with diagonal, alternating orange and

white stripes; and/or signs to separate all construction/maintenance areas from the movement area. Barricades may be supplemented with alternating orange and white flags at least 20 by 20 in (50 by 50 cm) square and securely fastened to eliminate FOD. All barricades adjacent to any open runway or taxiway / taxilane safety area, or apron must be as low as possible to the ground, and no more than 18 in high, exclusive of supplementary lights and flags. Barricades must be of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, or other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 in (7.6 cm) above the ground. Figure 2-5 and Figure 2-6 show sample barricades with proper coloring and flags.



Figure 2-5 Interlocking Barricades



Figure 2-6 Low Profile Barricades

(5) **Air Operations Area – Runway/Taxiway Intersections.** Use highly reflective barricades with lights to close taxiways leading to closed runways. Evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period of time. However, even for closures of relatively short duration, close all taxiway/runway intersections with barricades. The use of traffic cones is appropriate for short duration closures.

(6) **Air Operations Area – Other.** Beyond runway and taxiway object free areas and

aprons, barricades intended for construction vehicles and personnel may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels.

(7) **Maintenance.** The construction specifications must include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person's information with the airport operator. Lighting should be checked for proper operation at least once per day, preferably at dusk.

221. Protection of Runway and Taxiway Safety Areas. Runway and taxiway safety areas, Obstacle Free zones (OFZ), object free areas (OFA), and approach surfaces are described in AC 150/5300-13. Protection of these areas includes limitations on the location and height of equipment and stockpiled material. An FAA airspace study may be required. Coordinate with the appropriate FAA Airports Regional or District Office if there is any doubt as to requirements or dimensions (See paragraph 213.e above.) as soon as the location and height of materials or equipment are known. The CSPP should include drawings showing all safety areas, object free areas, obstacle free zones and approach departure surfaces affected by construction.

a. Runway Safety Area (RSA). A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway (see AC 150/5300-13). Construction activities within the existing RSA are subject to the following conditions:

(1) **No construction may occur within the existing RSA** while the runway is open for aircraft operations. The RSA dimensions may be temporarily adjusted if the runway is restricted to aircraft operations requiring an RSA that is equal to the RSA width and length beyond the runway ends available during construction. (see AC 150/5300-13). The temporary use of declared distances and/or partial runway closures may provide the necessary RSA under certain circumstances. Coordinate with the appropriate FAA Airports Regional or District Office to have declared distances information published. See AC 150/5300-13 for guidance on the use of declared distances.

(2) **The airport operator must coordinate** the adjustment of RSA dimensions as permitted above with the appropriate FAA Airports Regional or District Office and the local FAA air traffic manager and issue a NOTAM.

(3) **The CSPP and SPCD must provide procedures** for ensuring adequate distance for protection from blasting operations, if required by operational considerations.

(4) **Excavations.**

(a) Open trenches or excavations are not permitted within the RSA while the runway is open. If possible, backfill trenches before the runway is opened. If the runway must be opened before excavations are backfilled, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the runway across the trench without damage to the aircraft.

(b) Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

(5) **Erosion Control.** Soil erosion must be controlled to maintain RSA standards, that is, the RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

b. Runway Object Free Area (ROFA). Construction, including excavations, may be permitted in the ROFA. However, equipment must be removed from the ROFA when not in use, and material should not be stockpiled in the ROFA if not necessary. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

c. Taxiway Safety Area (TSA). A taxiway safety area is a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway. (See AC 150/5300-13.) Construction activities within the TSA are subject to the following conditions:

(1) **No construction may occur** within the TSA while the taxiway is open for aircraft operations. The TSA dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a TSA that is equal to the TSA width available during construction (see AC 150/5300-13, Table 4-1).

(2) **The airport operator must coordinate** the adjustment of the TSA width as permitted above with the appropriate FAA Airports Regional or District Office and the FAA air traffic manager and issue a NOTAM.

(3) **The CSPP and SPCD must provide procedures** for ensuring adequate distance for protection from blasting operations.

(4) **Excavations.**

(a) Open trenches or excavations are not permitted within the TSA while the taxiway is open. If possible, backfill trenches before the taxiway is opened. If the taxiway must be opened before excavations are backfilled, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the taxiway across the trench without damage to the aircraft.

(b) Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

(5) **Erosion Control.** Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

d. Taxiway Object Free Area (TOFA). Unlike the Runway Object Free Area, aircraft wings regularly penetrate the taxiway object free area during normal operations. Thus the restrictions are more stringent. Except as provided below, no construction may occur within the taxiway object free area while the taxiway is open for aircraft operations.

(1) **The taxiway object free area dimensions** may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a taxiway object free area that is equal to the taxiway object free area width available.

(2) **Offset taxiway pavement markings** may be used as a temporary measure to provide the required taxiway object free area. Where offset taxiway pavement markings are provided, centerline lighting or reflectors are required.

(3) **Construction activity may be accomplished** without adjusting the width of the taxiway object free area, subject to the following restrictions:

- (a) Appropriate NOTAMs are issued.
- (b) Marking and lighting meeting the provisions of paragraphs 218 and 220 above are implemented.
- (c) Five-foot clearance is maintained between equipment and materials and any part of an aircraft (includes wingtip overhang). In these situations, flaggers must be used to direct construction equipment, and wing walkers will be necessary to guide aircraft. Wing walkers should be airline/aviation personnel rather than construction workers. If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the pavement), then it will be necessary to move personnel and equipment for the passage of that aircraft.

e. Obstacle Free Zone (OFZ). In general, personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If a penetration to the OFZ is necessary, it may be possible to continue aircraft operations through operational restrictions. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

f. Runway Approach/Departure Areas and Clearways. All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in Appendix 2, “Threshold Siting Requirements,” of AC 150/5300-13. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

(1) Construction activity in a runway approach/departure area may result in the need to partially close a runway or displace the existing runway threshold. Partial runway closure, displacement of the runway threshold, as well as closure of the complete runway and other portions of the movement area also require coordination through the airport operator with the appropriate FAA air traffic manager (FSS if non-towered) and ATO/Technical Operations (for affected NAVAIDS) and airport users.

(2) Caution regarding partial runway closures. When filing a NOTAM for a partial runway closure, clearly state to OCC personnel that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold). There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition).

(3) Caution regarding displaced thresholds. : Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, other work. within the existing RSA of any usable runway end, do not implement a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

222. Other Limitations on Construction. The CSPP must specify any other limitations on construction, including but not limited to:

a. Prohibitions.

- (1) No use of tall equipment** (cranes, concrete pumps, and so on) unless a 7460-1 determination letter is issued for such equipment.
- (2) No use of open flame welding or torches** unless fire safety precautions are provided and the airport operator has approved their use.
- (3) No use of electrical blasting caps** on or within 1,000 ft (300 m) of the airport property.

See AC 150/5370-10.

- (4) **No use of flare pots** within the AOA.

b. Restrictions.

- (1) **Construction suspension required during specific airport operations.**
- (2) **Areas that cannot be worked on simultaneously.**
- (3) **Day or night construction restrictions.**
- (4) **Seasonal construction restrictions.**

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Chapter 3. Guidelines for Writing a CSPP

301. General Requirements. The CSPP is a standalone document written to correspond with the subjects outlined in Chapter 2, Section 1, paragraph 204. The CSPP is organized by numbered sections corresponding to each subject listed in Chapter 2, Section 1, paragraph 204, and described in detail in Chapter 2, Section 2. Each section number and title in the CSPP matches the corresponding subject outlined in Chapter 2, paragraph 204 (for example, 1. Coordination, 2. Phasing, 3. Areas and Operations Affected by the Construction Activity, and so on.). With the exception of the project scope of work outlined in Section 2. Phasing, only subjects specific to operational safety during construction should be addressed.

302. Applicability of Subjects. Each section should, to the extent practical, focus on the specific subject. Where an overlapping requirement spans several sections, the requirement should be explained in detail in the most applicable section. A reference to that section should be included in all other sections where the requirement may apply. For example, the requirement to protect existing underground FAA Instrument Landing System (ILS) cables during trenching operations could be considered FAA ATO coordination (Section 1. Coordination, paragraph 205.c), an area and operation affected by the construction activity (Section 3. Areas and Operations Affected by the Construction Activity, paragraph 207.a(4)), a protection of a NAVAID (Section 4. Protection of Navigational Aids (NAVAIDs), paragraph 208), or a notification to the FAA of construction activities (Section 9. Notification of Construction Activities, paragraph 210.e(3)(b)). However, it is more specifically an underground utility requirement (Section 11. Underground Utilities, paragraph 215). The procedure for protecting underground ILS cables during trenching operations should therefore be described in Section 11: *“The contractor must coordinate with the local FAA System Support Center (SSC) to mark existing ILS cable routes along Runway 17-35. The ILS cables will be located by hand digging whenever the trenching operation moves within 10 feet of the cable markings.”* All other applicable sections should include a reference to Section 11: *“ILS cables shall be identified and protected as described in Section 11”* or *“See Section 11 for ILS cable identification and protection requirements.”* Thus, the CSPP should be considered as a whole, with no need to duplicate responses to related issues.

303. Graphical Representations. Construction safety drawings should be included in the CSPP as attachments. When other graphical representations will aid in supporting written statements, the drawings, diagrams, and/or photographs should also be attached to the CSPP. References should be made in the CSPP to each graphical attachment and may be made in multiple sections.

304. Reference Documents. The CSPP must not incorporate a document by reference unless reproduction of the material in that document is prohibited. In that case, either copies of or a source for the referenced document must be provided to the contractor.

305. Restrictions. The CSPP should not be considered as a project design review document. The CSPP should also avoid mention of permanent (“as-built”) features such as pavements, markings, signs, and lighting, except when such features are intended to aid in maintaining operational safety during the construction.

306. Coordination. Include in this section a detailed description of conferences and meetings both before and during the project. Include appropriate information from AC 150/5300-9. Discuss coordination procedures and schedules for each required FAA ATO airway facility shutdown and restart and all required flight inspections.

307. Phasing. Include in this section a detailed scope of work description for the project as a whole and each phase of work covered by the CSPP. This includes all locations and durations of the work proposed. Attach drawings to graphically support the written scope of work. Detail in this section the sequenced phases of the proposed construction. Include a reference to paragraph 308 below, as appropriate.

308. Areas and Operations Affected By Construction. Focus in this section on identifying the areas and operations affected by the construction. Describe corresponding mitigation that is not covered in detail elsewhere in the CSPP. Include references to paragraphs below as appropriate. Attach drawings as necessary to graphically describe affected areas and mechanisms proposed. Tables and charts such as the following may be helpful in highlighting issues to be addressed.

Table 3-1 Sample Operations Effects

Project	Runway 15-33 Reconstruction	
Phase	Phase II: Reconstruct Runway 15 End	
Scope of Work	Reconstruct 1,000 ft of north end of Runway 15-33 with Portland Cement Concrete (PCC).	
Operational Requirements	Normal (Existing)	Phase II (Anticipated)
Runway 15 Average Aircraft Operations	Carrier: 52 /day GA: 26 /day Military: 11 /day	Carrier: 52 /day GA: 20 /day Military: 0 /day
Runway 33 Average Aircraft Operations	Carrier: 40 /day GA: 18 /day Military: 10 /day	Carrier: 20 /day GA: 5 /day Military: 0 /day
Runway 15-33 ARC	C-IV	C-IV
Runway 15 Approach Visibility Minimums	¾ mile	1 mile
Runway 33 Approach Visibility Minimums	¾ mile	1 mile
Runway 15 Declared Distances	TORA: 7,820	TORA: 6,420
	TODA: 7,820	TODA: 6,420
	ASDA: 7,820	ASDA: 6,420
	LDA: 7,820	LDA: 6,420
Runway 33 Declared Distances	TORA: 8,320	TORA: 6,920
	TODA: 8,320	TODA: 6,920
	ASDA: 8,320	ASDA: 6,920
	LDA: 7,820	LDA: 6,420
Runway 15 Approach Procedures	ILS	LOC only
	RNAV	N/A
	VOR	N/A
Runway 33 Approach Procedures	ILS	Visual only
	RNAV	N/A
	VOR	N/A
Runway 15 NAVAIDs	ILS/DME, MALSR, RVR	LOC/DME, PAPI (temp), RVR

Runway 33 NAVAIDs	ILS/DME, MALSF, PAPI, RVR	MALSF, PAPI, RVR
Taxiway G ADG	IV	IV (N/A between T/W H and R/W 15 end)
Taxiway E ADG	IV	IV
ATCT (hours open)	06:00 – 24:00 local	06:00 – 24:00 local
ARFF Index	D	D
Special Conditions	Air National Guard (ANG) military operations	Military operations relocated to alternate ANG Base
	Airline XYZ requires VGSI	Airline XYZ requires VGSI

Complete the following chart for each phase to determine the area that must be protected along the runway edges:

Runway	Aircraft Approach Category* A, B, C, or D	Airplane Design Group* I, II, III, or IV	RSA Width in Feet Divided by 2*
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

*See AC 150/5300-13 to complete the chart for a specific runway.

Complete the following chart for each phase to determine the area that must be protected before the runway threshold:

Runway End Number	Airplane Design Group* I, II, III, or IV	Aircraft Approach Category* A, B, C, or D	Minimum Safety Area Prior to the Threshold*	Minimum Distance to Threshold Based on Required Approach Slope*	
_____	_____	_____	_____ ft	_____ ft	_____: 1
_____	_____	_____	_____ ft	_____ ft	_____: 1
_____	_____	_____	_____ ft	_____ ft	_____: 1
_____	_____	_____	_____ ft	_____ ft	_____: 1

*See AC 150/5300-13 to complete the chart for a specific runway.

309. Navigation Aid (NAVAID) Protection. List in this section all NAVAID facilities that will be affected by the construction. Identify NAVAID facilities that will be placed out of service at any time prior to or during construction activities. Identify individuals responsible for coordinating each shutdown and when each facility will be out of service. Include a reference to paragraph 306 above for FAA ATO NAVAID shutdown, restart, and flight inspection coordination. Outline in detail procedures to protect each NAVAID facility remaining in service from interference by construction activities. Include a reference to paragraph 314 for the issuance of NOTAMs as required. Include a reference to paragraph 316 for the protection of underground cables and piping serving NAVAIDs. If temporary visual aids are proposed to replace or supplement existing facilities, include a reference to paragraph 319. Attach drawings to graphically indicate the affected NAVAIDS and the corresponding critical areas.

310. Contractor Access. This will necessarily be the most extensive section of the CSPP. Provide

sufficient detail so that a contractor not experienced in working on airports will understand the unique restrictions such work will require. Due to this extent, it should be broken down into subsections as described below:

a. Location of Stockpiled Construction Materials. Describe in this section specific locations for stockpiling material. Note any height restrictions on stockpiles. Include a reference to paragraph 321 for hazard marking and lighting devices used to identify stockpiles. Include a reference to paragraph 311 for provisions to prevent stockpile material from becoming wildlife attractants. Include a reference to paragraph 312 for provisions to prevent stockpile material from becoming FOD. Attach drawings to graphically indicate the stockpile locations.

b. Vehicle and Pedestrian Operations. While there are many items to be addressed in this major subsection of the CSPP, all are concerned with one main issue: keeping people and vehicles from areas of the airport where they don't belong. This includes preventing unauthorized entry to the AOA and preventing the improper movement of pedestrians or vehicles on the airport. In this section, focus on mechanisms to prevent construction vehicles and workers traveling to and from the worksite from unauthorized entry into movement areas. Specify locations of parking for both employee vehicles and construction equipment, and routes for access and haul roads. In most cases, this will best be accomplished by attaching a drawing. Quote from AC 150/5210-5 specific requirements for contractor vehicles rather than referring to the AC as a whole, and include special requirements for identifying Hazardous Material (HAZMAT) vehicles. Quote from, rather than incorporate by reference, AC 150/5210-20 as appropriate to address the airport's rules for ground vehicle operations, including its training program. Discuss the airport's recordkeeping system listing authorized vehicle operators.

c. Two-Way Radio Communications. Include a special section to identify all individuals who are required to maintain communications with Air Traffic (AT) at airports with active towers, or monitor Common Traffic Advisory Frequencies (CTAF) at airports without or with closed ATCT. Include training requirements for all individuals required to communicate with AT. Individuals required to monitor AT frequencies should also be identified. If construction employees are also required to communicate by radio with Airport Operations, this procedure should be described in detail. Usage of vehicle mounted radios and/or portable radios should be addressed. Communication procedures for the event of disabled radio communication (that is, light signals, telephone numbers, others) must be included. All radio frequencies should be identified (Tower, Ground Control, CTAF, UNICOM, ATIS, and so on).

d. Airport Security. Address security as it applies to vehicle and pedestrian operations. Discuss TSA requirements, security badging requirements, perimeter fence integrity, gate security, and other needs. Attach drawings to graphically indicate secured and/or Security Identification Display Areas (SIDA), perimeter fencing, and available access points.

311. Wildlife Management. Discuss in this section wildlife management procedures. Describe the maintenance of existing wildlife mitigation devices, such as perimeter fences, and procedures to limit wildlife attractants. Include procedures to notify Airport Operations of wildlife encounters. Include a reference to paragraph 310 for security (wildlife) fence integrity maintenance as required.

312. Foreign Object Debris (FOD) Management. In this section, discuss methods to control and monitor FOD: worksite housekeeping, ground vehicle tire inspections, runway sweeps, and so on. Include a reference to paragraph 315 for inspection requirements as required.

313. Hazardous Materials (HAZMAT) Management. Describe in this section HAZMAT management procedures: fuel deliveries, spill recovery procedures, Material Safety Data Sheet (MSDS) availability, and other considerations. Any specific airport HAZMAT restrictions should also be

identified. Include a reference to paragraph 310 for HAZMAT vehicle identification requirements. Quote from, rather than incorporate by reference, AC 150/5320-15.

314. Notification of Construction Activities. List in this section the names and telephone numbers of points of contact for all parties affected by the construction project. We recommend a single list that includes all telephone numbers required under this section. Include emergency notification procedures for all representatives of all parties potentially impacted by the construction. Identify individual representatives – and at least one alternate – for each party. List both on-duty and off-duty contact information for each individual, including individuals responsible for emergency maintenance of airport construction hazard lighting and barricades. Describe procedures to coordinate immediate response to events that might adversely affect the operational safety of the airport (such as interrupted NAVAID service). Explain requirements for and the procedures for the issuance of Notices to Airmen (NOTAMs), notification to FAA required by 14 CFR Part 77 and Part 157 and in the event of affected NAVAIDs. For NOTAMs, identify an individual, and at least one alternate, responsible for issuing and cancelling each specific type of Notice to Airmen (NOTAM) required. Detail notification methods for police, fire fighting, and medical emergencies. This may include 911, but should also include direct phone numbers of local police departments and nearby hospitals. The local Poison Control number should be listed. Procedures regarding notification of Airport Operations and/or the ARFF Department of such emergencies should be identified, as applicable. If airport radio communications are identified as a means of emergency notification, include a reference to paragraph 310. Differentiate between emergency and nonemergency notification of ARFF personnel, the latter including activities that affect ARFF water supplies and access roads. Identify the primary ARFF contact person and at least one alternate. If notification is to be made through Airport Operations, then detail this procedure. Include a method of confirmation from the ARFF department.

315. Inspection Requirements. Describe in this section inspection requirements to ensure airfield safety compliance. Include a requirement for routine inspections by the resident engineer (RE) and the construction contractors. If the engineering consultants and/or contractors have a Safety Officer who will conduct such inspections, identify this individual. Describe procedures for special inspections, such as those required to reopen areas for aircraft operations. Part 139 requires daily airfield inspections at certificated airports, but these may need to be more frequent when construction is in progress. Discuss the role of such inspections on areas under construction. Include a requirement to immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

316. Underground Utilities. Explain how existing underground utilities will be located and protected. Identify each utility owner and include contact information for each company/agency in the master list. Address emergency response procedures for damaged or disrupted utilities. Include a reference to paragraph 314 above for notification of utility owners of accidental utility disruption as required.

317. Penalties. Describe in this section specific penalties imposed for noncompliance with airport rules and regulations, including the CSPP: SIDA violations, Vehicle/Pedestrian Deviations (VPD), and others.

318. Special Conditions. Identify any special conditions that may trigger specific safety mitigation actions outlined in this CSPP: low visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, VPD, and other activities requiring construction suspension/resumption. Include a reference to paragraph 310 above for compliance with airport safety and security measures and for radio communications as required. Include a reference to paragraph 319 below for emergency notification of all involved parties, including police/security, ARFF, and medical services.

319. Runway and Taxiway Visual Aids. Include marking, lighting, signs, and visual NAVAIDS.

Detail temporary runway and taxiway marking, lighting, signs, and visual NAVAIDs required for the construction. Discuss existing marking, lighting, signs, and visual NAVAIDs that are temporarily, altered, obliterated, or shut down. Consider non-federal facilities and address requirements for reimbursable agreements necessary for alteration of FAA facilities and for necessary flight checks. Identify temporary TORA signs or runway distance remaining signs if appropriate. Identify required temporary visual NAVAIDs such as REIL or PAPI. Quote from, rather than incorporate by reference, AC 150/5340-1, Standards for Airport Markings, AC 150/5340-18, Standards for Airport Sign Systems, and AC 150/5340-30, as required. Attach drawings to graphically indicate proposed marking, lighting, signs, and visual NAVAIDs.

320. Marking and Signs for Access Routes. Detail plans for marking and signs for vehicle access routes. To the extent possible, signs should be in conformance with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or State highway specifications, not hand lettered. Detail any modifications to the guidance in the MUTCD necessary to meet frangibility/height requirements.

321. Hazard Marking and Lighting. Specify all marking and lighting equipment, including when and where each type of device is to be used. Specify maximum gaps between barricades and the maximum spacing of hazard lighting. Identify one individual and at least one alternate responsible for maintenance of hazard marking and lighting equipment in the master telephone list. Include a reference to paragraph 314 above. Attach drawings to graphically indicate the placement of hazard marking and lighting equipment.

322. Protection of Runway and Taxiway Safety Areas. This section should focus exclusively on procedures for protecting all safety areas, including those altered by the construction: methods of demarcation, limit of access, movement within safety areas, stockpiling and trenching restrictions, and so on. Reference AC 150/5300-13: Airport Design as required. Include a reference to paragraph 310 above for procedures regarding vehicle and personnel movement within safety areas. Include a reference to paragraph 310 above for material stockpile restrictions as required. Detail requirements for trenching, excavations, and backfill. Include a reference to paragraph 321 for hazard marking and lighting devices used to identify open excavations as required. If runway and taxiway closures are proposed to protect safety areas, or if temporary displaced thresholds and/or revised declared distances are used to provide adequate Runway Safety Area, include a reference to paragraphs 314 and 319 above. Detail procedures for protecting the runway OFZ, runway OFA, taxiway OFA and runway approach surfaces including those altered by the construction: methods of demarcation, limit of cranes, storage of equipment, and so on. Quote from, rather than incorporate by reference, AC 150/5300-13: Airport Design as required. Include a reference to paragraph 323 for height (i.e. crane) restrictions as required. One way to address the height of equipment that will move during the project is to establish a three-dimensional “box” within which equipment will be confined that can be studied as a single object. Attach drawings to graphically indicate the safety area, OFZ, and OFA boundaries.

323. Other Limitations on Construction. This section should describe what limitations must be applied to each area of work and when each limitation will be applied: limitations due to airport operations, height (i.e. crane) restrictions, areas which cannot be worked at simultaneously, day/night work restrictions, winter construction, and other limitations. Include a reference to paragraph 307 above for project phasing requirements based on construction limitations as required.

Appendix 1. Related Reading Material

Obtain the latest version of the following free publications from the FAA on its Web site at <http://www.faa.gov/airports/>.

AC	Title and Description
AC 150/5200-28	Notices to Airmen (NOTAMs) for Airport Operators
	Guidance for using the NOTAM System in airport reporting.
AC 150/5200-30	Airport Winter Safety and Operations
	Guidance for airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.
AC 150/5200-33	Hazardous Wildlife Attractants On or Near Airports
	Guidance on locating certain land uses that might attract hazardous wildlife to public-use airports.
AC 150/5210-5	Painting, Marking, and Lighting of Vehicles Used on an Airport.
	Guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.
AC 150/5210-20	Ground Vehicle Operations on Airports
	Guidance to airport operators on developing ground vehicle operation training programs.
AC 150/5300-13	Airport Design
	FAA standards and recommendations for airport design, establishes approach visibility minimums as an airport design parameter, and contains the Object Free area and the obstacle free-zone criteria.
AC 150/5310-24	Airport Foreign Object Debris Management
	Guidance for developing and managing an airport foreign object debris (FOD) program
AC 150/5220-4	Water Supply Systems for Aircraft Fire and Rescue Protection.
	Guidance on selecting a water source and meeting standards for a distribution system to support aircraft rescue and fire fighting service operations on airports.
AC 150/5320-15	Management of Airport Industrial Waste
	Basic information on the characteristics, management, and regulations of industrial wastes generated at airports. Guidance for developing a Storm Water Pollution Prevention Plan (SWPPP) that applies best management practices to eliminate, prevent, or reduce pollutants in storm water runoff with particular airport industrial activities.
AC 150/5340-1	Standards for Airport Markings
	FAA standards for markings used on airport runways, taxiways, and aprons.
AC 150/5340-18	Standards for Airport Sign Systems
	FAA standards for the siting and installation of signs on airport runways and taxiways.
AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
	FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.

AC	Title and Description
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
	Guidance and recommendations on the installation of airport visual aids.
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-44	Specification for Runway and Taxiway Signs
	FAA specifications for unlighted and lighted signs for taxiways and runways.
AC 150/5345-53	Airport Lighting Certification Program
	Details on the Airport Lighting Equipment Certification Program (ALECP).
AC 150/5345-50	Specification for Portable Runway and Taxiway Lights
	FAA standards for portable runway and taxiway lights and runway end identifier lights for temporary use to permit continued aircraft operations while all or part of a runway lighting system is inoperative.
AC 150/5345-55	Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure
AC 150/5370-10	Standards for Specifying Construction of Airports
	Standards for construction of airports, including earthwork, drainage, paving, turfing, lighting, and incidental construction.
FAA Order 5200.11	FAA Airports (ARP) Safety Management System (SMS)
	Basics for implementing SMS within ARP. Includes roles and responsibilities of ARP management and staff as well as other FAA lines of business that contribute to the ARP SMS.
FAA Certalert 98-05	Grasses Attractive to Hazardous Wildlife
	Guidance on grass management and seed selection.
FAA Form 7460-1	Notice of Proposed Construction or Alteration
FAA Form 7480-1	Notice of Landing Area Proposal

Obtain the latest version of the following free publications from the Electronic Code of Federal Regulations at <http://ecfr.gpoaccess.gov/>.

Title 14 CFR Part 139	Certification of Airports
Title 49 CFR Part 1542	Airport Security

Obtain the latest version of the Manual on Uniform Traffic Control Devices from the Federal Highway Administration at <http://mutcd.fhwa.dot.gov/>.

Appendix 2. Definition of Terms

Term	Definition
7460-1	Notice Of Proposed Construction Or Alteration. For on-airport projects, the form submitted to the FAA regional or airports division office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR Part 77, safe, efficient use, and preservation of the navigable airspace. (See guidance available on the FAA web site at oeaaa.faa.gov .) The form may be downloaded at http://www.faa.gov/airports/resources/forms/ , or filed electronically at: https://oeaaa.faa.gov .
7480-1	Notice Of Landing Area Proposal. Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport The form may be downloaded at http://www.faa.gov/airports/resources/forms/ .
AC	Advisory Circular
ACRC	Aircraft Reference Code
ACSI	Airport Certification Safety Inspector
ADG	Airplane Design Group
AIP	Airport Improvement Program
ALECP	Airport Lighting Equipment Certification Program
ANG	Air National Guard
AOA	Air Operations Area. Any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runways, taxiways, or aprons.
ARFF	Aircraft Rescue and Fire Fighting
ARP	FAA Office of Airports
ASDA	Accelerate-Stop Distance Available
ATCT	Airport Traffic Control Tower
ATIS	Automatic Terminal Information Service
ATO	Air Traffic Organization
Certificated Airport	An airport that has been issued an Airport Operating Certificate by the FAA under the authority of 14 CFR Part 139, Certification of Airports.
CFR	Code of Federal Regulations
Construction	The presence and movement of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.
CSPP	Construction Safety And Phasing Plan. The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.

Term	Definition
CTAF	Common Traffic Advisory Frequency
Displaced Threshold	A threshold that is located at a point on the runway other than the designated beginning of the runway. The portion of pavement behind a displaced threshold is available for takeoffs in either direction or landing from the opposite direction.
DOT	Department of Transportation
EPA	Environmental Protection Agency
FOD	Foreign Object Debris
HAZMAT	Hazardous Materials
IFR	Instrument Flight Rules
ILS	Instrument Landing System
LDA	Landing Distance Available
LOC	Localizer antenna array
Movement Area	The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading aprons and aircraft parking areas (reference 14 CFR Part 139).
MSDS	Material Safety Data Sheet
MUTCD	Manual on Uniform Traffic Control Devices
NAVAID	Navigation Aid
NAVAID Critical Area	An area of defined shape and size associated with a NAVAID that must remain clear and graded to avoid interference with the electronic signal.
Non-Movement Area	The area inside the airport security fence exclusive of the Movement Area. It is important to note that the non-movement area includes pavement traversed by aircraft.
NOTAM	Notices to Airmen
Obstruction	Any object/obstacle exceeding the obstruction standards specified by 14 CFR Part 77, subpart C.
OE / AAA	Obstruction Evaluation / Airport Airspace Analysis
OFA	Object Free Area. An area on the ground centered on the runway, taxiway, or taxi lane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. (See AC 150/5300-13, for additional guidance on OFA standards and wingtip clearance criteria.)
OFZ	Obstacle Free Zone. The airspace below 150 ft (45 m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches. The OFZ is subdivided as follows: Runway OFZ, Inner Approach OFZ, Inner Transitional OFZ, and Precision OFZ. Refer to AC 150/5300-13 for guidance on OFZ.
OSHA	Occupational Safety and Health Administration
P&R	Planning and Requirements Group

Term	Definition
PAPI	Precision Approach Path Indicators
PFC	Passenger Facility Charge
PLASI	Pulse Light Approach Slope Indicators
Project Proposal Summary	A clear and concise description of the proposed project or change that is the object of Safety Risk Management.
RE	Resident Engineer
REIL	Runway End Identifier Lights
RNAV	Area Navigation
ROFA	Runway Object Free Area
RSA	Runway Safety Area. A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with AC 150/5300-13.
SIDA	Security Identification Display Area
SMS	Safety Management System
SPCD	Safety Plan Compliance Document. Details developed and submitted by a contractor to the airport operator for approval providing details on how the performance of a construction project will comply with the CSPP.
SRM	Safety Risk Management
Taxiway Safety Area	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with AC 150/5300-13.
TDG	Taxiway Design Group
Temporary	Any condition that is not intended to be permanent.
Temporary Runway End	The beginning of that portion of the runway available for landing and taking off in one direction, and for landing in the other direction. Note the difference from a displaced threshold.
Threshold	The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.
TODA	Takeoff Distance Available
TOFA	Taxiway Object Free Area
TORA	Takeoff Run Available. The length of the runway less any length of runway unavailable and/or unsuitable for takeoff run computations. See AC 150/5300-13 for guidance on declared distances.
TSA	Taxiway Safety Area Transportation Security Administration
UNICOM	A radio communications system of a type used at small airports.
VASI	Visual Approach Slope Indicators

Term	Definition
VGSI	Visual Glide Slope Indicator. A device that provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicators (PAPI), visual approach slope indicators (VASI), and pulse light approach slope indicators (PLASI).
VFR	Visual Flight Rules
VOR	VHF Omnidirectional Radio Range
VPD	Vehicle / Pedestrian Deviation

Appendix 3. Safety and Phasing Plan Checklist

This appendix is keyed to Section 2. Plan Requirements. In the electronic version of this AC, clicking on the paragraph designation in the Reference column will access the applicable paragraph. There may be instances where the CSPP requires provisions that are not covered by the list in this appendix.

This checklist is intended as an aid, not as a required submittal.

Coordination	Reference	Addressed			Remarks
General Considerations					
Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.	205	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Operational safety is a standing agenda item for construction progress meetings.	205	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Scheduling of the construction phases is properly addressed.	206	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Areas and Operations Affected by Construction Activity					
Drawings showing affected areas are included.	207.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Closed or partially closed runways, taxiways, and aprons are depicted on drawings.	207.a(1)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Access routes used by ARFF vehicles affected by the project are addressed.	207.a(2)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Access routes used by airport and airline support vehicles affected by the project are addressed.	207.a(3)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Underground utilities, including water supplies for fire fighting and drainage.	207.a(4)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Approach/departure surfaces affected by heights of temporary objects are addressed.	207.a(5)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.	207.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Temporary changes to taxi operations are addressed.	207.b(1)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	

Coordination	Reference	Addressed			Remarks
Detours for ARFF and other airport vehicles are identified.	207.b(2)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Maintenance of essential utilities and underground infrastructure is addressed.	207.b(3)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Temporary changes to air traffic control procedures are addressed.	207.b(4)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
NAVAIDS					
Critical areas for NAVAIDS are depicted on drawings.	208	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Effects of construction activity on the performance of NAVAIDS, including unanticipated power outages, are addressed.	208	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Protection of NAVAID facilities is addressed.	208	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The required distance and direction from each NAVAID to any construction activity is depicted on drawings.	208	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.	208, 213.a, 213.e(3)(a), 218.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Contractor Access					
The CSPP addresses areas to which contractor will have access and how the areas will be accessed.	209	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.	209	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The location of stockpiled construction materials is depicted on drawings.	209.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The requirement for stockpiles in the ROFA to be approved by FAA is included.	209.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Requirements for proper stockpiling of materials are included.	209.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	

Coordination	Reference	Addressed			Remarks
Construction site parking is addressed.	209.b(1)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Construction equipment parking is addressed.	209.b(2)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Access and haul roads are addressed.	209.b(3)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
A requirement for marking and lighting of vehicles to comply with AC 150/5210-5, Painting, Marking and Lighting of Vehicles Used on an Airport, is included.	209.b(4)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Proper vehicle operations, including requirements for escorts, are described.	209.b(5), 209.b(6)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Training requirements for vehicle drivers are addressed.	209.b(7)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Two-way radio communications procedures are described.	209.b(9)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Maintenance of the secured area of the airport is addressed.	209.b(10)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Wildlife Management					
The airport operator's wildlife management procedures are addressed.	210	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Foreign Object Debris Management					
The airport operator's FOD management procedures are addressed.	211	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Hazardous Materials Management					
The airport operator's hazardous materials management procedures are addressed.	212	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Notification of Construction Activities					
Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed.	213	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	

Coordination	Reference	Addressed			Remarks
Maintenance of a list by the airport operator of the responsible representatives/points of contact for all involved parties and procedures for contacting them 24 hours a day, seven days a week is specified.	213.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
A list of local ATO/Technical Operations personnel is included.	213.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
A list of ATCT managers on duty is included.	213.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
A list of authorized representatives to the OCC is included.	213.b	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Procedures for coordinating, issuing, maintaining and cancelling by the airport operator of NOTAMS about airport conditions resulting from construction are included.	208, 213.b, 218.b(4)(i)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.	213.b	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Emergency notification procedures for medical, fire fighting, and police response are addressed.	213.c	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Coordination with ARFF personnel for non-emergency issues is addressed.	213.d	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Notification to the FAA under 14 CFR parts 77 and 157 is addressed.	213.e	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.	213.e(3)(b)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Inspection Requirements					
Daily inspections by both the airport operator and contractor are specified.	214.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Final inspections at certificated airports are specified when required.	214.b	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Underground Utilities					
Procedures for protecting existing underground facilities in excavation areas are described.	215	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	

Coordination	Reference	Addressed			Remarks
Penalties					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	216	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Special Conditions					
Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed.	217	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Runway and Taxiway Visual Aids - Marking, Lighting, Signs, and Visual NAVAIDS					
The proper securing of temporary airport markings, lighting, signs, and visual NAVAIDS is addressed.	218.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Frangibility of airport markings, lighting, signs, and visual NAVAIDS is specified.	218.a, 218.c, 219, 220.b(4)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The requirement for markings to be in compliance with AC 150/5340-1, Standards for Airport Markings is specified.	218.b	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The requirement for lighting to conform to AC 150/5340-30, Design and Installation Details for Airport Visual Aids, AC 150/5345-50, Specification for Portable Runway and Taxiway Lights , and AC 150/5345-53 Airport Lighting Certification Program, is specified.	218.b(1)(f)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The use of a lighted X is specified where appropriate.	218.b(1)(b), 218.b(3)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The requirement for signs to conform to AC 150/5345-44, Specification for Runway and Taxiway Signs, AC 50/5340-18, Standards for Airport Sign Systems, and AC 150/5345-53, Airport Lighting Certification Program, is specified.	218.c	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Marking and Signs For Access Routes					
The CSPP specifies that pavement markings and signs intended for construction personnel should conform to AC 150/5340-18 and, to the extent practicable, with the MUTCD and/or State highway specifications.	219	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Hazard Marking and Lighting					
Prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles are specified.	220.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	

Coordination	Reference	Addressed			Remarks
Hazard marking and lighting are specified to identify open manholes, small areas under repair, stockpiled material, and waste areas.	220.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The CSPP considers less obvious construction-related hazards.	220.a	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast is specified.	220.b(1)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.	220.b(1)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Red lights meeting the luminance requirements of the State Highway Department are specified.	220.b(2)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Barricades, temporary markers, and other objects placed and left in areas adjacent to any open runway, taxiway, taxi lane, or apron are specified to be as low as possible to the ground, and no more than 18 in high.	220.b(4)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Barricades marked with diagonal, alternating orange and white stripes are specified to indicate construction locations in which no part of an aircraft may enter.	220.b(4)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways.	220.b(5)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Markings for temporary closures are specified.	220.b(5)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The provision of a contractor's representative on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades is specified.	220.b(7)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Protection of Runway and Taxiway Safety Areas					
The CSPP clearly states that no construction may occur within a safety area while the associated runway or taxiway is open for aircraft operations.	221.a(1), 221.c(1)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The CSPP specifies that the airport operator coordinates the adjustment of RSA or TSA dimensions with the ATCT and the appropriate FAA Airports Regional or District Office and issues a local NOTAM.	221.a(2), 221.c(2)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	

Coordination	Reference	Addressed			Remarks
Procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations, are detailed.	221.c(3)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The CSPP specifies that open trenches or excavations are not permitted within a safety area while the associated runway or taxiway is open.	221.a(4)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Appropriate covering of excavations in the RSA or TSA that cannot be backfilled before the associated runway or taxiway is open is detailed.	221.a(4)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site.	221.a(4)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Grading and soil erosion control to maintain RSA/TSA standards are addressed.	221.c(5)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The CSPP specifies that equipment is to be removed from the ROFA when not in use.	221.b	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The CSPP clearly states that no construction may occur within a taxiway safety area while the taxiway is open for aircraft operations.	221.c	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.	221.d	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Measures to ensure that personnel, material, and/or equipment do not penetrate the OFZ or threshold siting surfaces while the runway is open for aircraft operations are included.	221.e	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Provisions for protection of runway approach/departure areas and clearways are included.	221.f	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
Other Limitations on Construction					
The CSPP prohibits the use of open flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use.	222.a(2)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The CSPP prohibits the use of flare pots within the AOA at any time.	222.a(4)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	
The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft (300 m) of the airport property.	222.a(3)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA	

Appendix 4. Construction Project Daily Safety Inspection Checklist

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project.

Potentially Hazardous Conditions

Item	Action Required	or	None
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.			<input type="checkbox"/>
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.			<input type="checkbox"/>
Runway resurfacing projects resulting in lips exceeding 3 in (7.6 cm) from pavement edges and ends.			<input type="checkbox"/>
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.			<input type="checkbox"/>
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.			<input type="checkbox"/>
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and approach zones.			<input type="checkbox"/>
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.			<input type="checkbox"/>
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.			<input type="checkbox"/>

Item	Action Required	or	None
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.			<input type="checkbox"/>
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.			<input type="checkbox"/>
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.			<input type="checkbox"/>
Obliterated or faded temporary markings on active operational areas.			<input type="checkbox"/>
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.			<input type="checkbox"/>
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.			<input type="checkbox"/>
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.			<input type="checkbox"/>
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.			<input type="checkbox"/>
Lack of radio communications with construction vehicles in airport movement areas.			<input type="checkbox"/>
Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.			<input type="checkbox"/>
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.			<input type="checkbox"/>
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.			<input type="checkbox"/>

Item	Action Required	or	None
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).			<input type="checkbox"/>
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.			<input type="checkbox"/>
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.			<input type="checkbox"/>
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.			<input type="checkbox"/>
Site burning, which can cause possible obscuration.			<input type="checkbox"/>
Construction work taking place outside of designated work areas and out of phase.			<input type="checkbox"/>

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Errata Sheet for

Advisory Circular 150/5370-2F, Operational Safety on Airports During Construction

Last Update: October 14, 2011

This errata sheet logs content and/or coding errors identified after the AC was signed on September 29, 2011. These errors have been corrected in the PDF version of the AC available on the FAA website.

#	Description of Correction	Location	Rationale	Date Error Corrected
1	Replaced Figure 2-2.	Page 20.	Original drawing showed runway centerline in yellow. New drawing shows correct runway centerline drawn in white.	10/14/2011



U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: QUALITY CONTROL OF
CONSTRUCTION FOR AIRPORT GRANT
PROJECTS

Date: 9/29/07
Initiated by: AAS-100

AC No.: 150/5370-12A
Change:

1. PURPOSE. This advisory circular (AC) provides information to ensure the quality of construction accomplished under the Federal Aviation Administration's (FAA) Airport Improvement Program (AIP).

2. BACKGROUND. The FAA has the responsibility of determining whether all construction work accomplished under the AIP is in accordance with the contract documents. A report issued by the Office of the Inspector General indicated that, in some instances, work performed was not accomplished in compliance with plans and specifications. In addition, quantities of materials used were not properly measured and documented and testing or quality assurance procedures were inadequate.

3. CANCELLATION. This AC cancels AC 150/5370-12, *Quality Control of Construction for Airport Grant Projects*, dated September 6, 1985.

4. APPLICATION. The FAA recommends the guidelines and standards in this AC for airport construction projects. This AC does not constitute a regulation and in general is not mandatory. However, use of these guidelines is mandatory for construction projects funded under the Airport Improvement Program (AIP). Mandatory terms such as "must" apply only to those who undertake construction projects using AIP funds. For such projects, the sponsor, the sponsor's engineer, and the FAA project manager must assume the responsibilities outlined in the following paragraphs to ensure the materials and workmanship incorporated into a project are in conformity with the requirements of the approved or certified plans and specifications.

5. SPONSOR'S RESPONSIBILITIES. The sponsor is responsible for all project engineering, including the preparation of plans and specifications, construction supervision, and inspection and testing for acceptability and quality. If the sponsor does not have the staff or the expertise to perform these services, then the sponsor should retain a consulting engineering firm. The consultant represents the sponsor and has overall responsibility for reporting on the acceptability and quality of the work. The relations of the consultant with the sponsor must be clearly defined by a written agreement before the start of work.

a. Engineering Services. AC 150/5100-14, *Architectural, Engineering, and Planning Consultant Services for Airport Grant Projects*, identifies items that should be included in a contract for engineering services. In some cases, the sponsor may retain an independent firm to perform testing for project control. It is, therefore, extremely important that the contract clearly delineate the division of responsibility and authority between the sponsor, the consultant, and the testing firm. For example, the agreement should define the party responsible for designating the location and number of tests, for interpreting test results, and for follow-up procedures for failing test results.

b. Predesign and Preconstruction Conferences. Predesign and preconstruction conferences conducted by the sponsor should be held to discuss various items, including testing and quality control. AC 150/5300-9, *Predesign, Prebid, and Preconstruction Conferences for Airport Grant Projects*, provides guidance for conducting such conferences.

c. Supervision and Inspection. The sponsor must provide adequate and qualified engineering supervision and construction inspection during all stages of the work. The FAA may request the sponsor to furnish

a written assurance that it has reviewed the qualifications of personnel who will be performing these functions and that they are qualified to do so.

6. ENGINEER's RESPONSIBILITIES. The basic services normally required for airport development projects are the preliminary phase, design phase, bidding phase, and construction phase. The design and construction phases are directly related to quality of construction. AC 150/5100-14 contains a listing of activities normally performed during these phases.

a. Design Phase. The design phase includes all activities required to accomplish a complete project design, including development of plans and specifications. The standards contained in AC 150/5370-10, *Standards for Specifying Construction of Airports*, current edition, relate to materials and methods used in the construction of airports and must be used for projects funded under the FAA's AIP. Although these specifications reflect acceptable standards, practices, and techniques in airport construction, they are general in scope. For contract purposes, the various permissible options with regard to local materials, methods, and testing must be defined in the contract documents. In particular, the minimum testing frequency for job control must be specified in the project specifications.

b. Construction Phase. The construction phase includes all activities required after the award of a construction contract. The basic services of an engineering agreement normally include periodic inspection of the work in progress but not the services of a full-time resident engineer or inspector. Full-time inspection may be provided by the sponsor or by the consulting engineer under a supplemental agreement. In some instances, the sponsor may negotiate a separate agreement for services to be provided during this phase.

(1) Resident Engineer or Inspector. The resident engineer or inspector must have field experience in the type of work to be performed; be fully qualified to make interpretations, decisions, field computations, etc.; and have knowledge of testing requirements and procedures. The resident engineer or inspector must have the authority to reject both unsatisfactory workmanship and materials. Primary duties are as follows:

(i) Checks activities to ensure compliance with the plans and specifications. Informs the contractor of any work that is in noncompliance.

(ii) Ensures that all testing required by the specification is performed. All commercially produced products, such as pipe and reinforcing steel, that are used on the project should be accompanied by numerical test results or a certification from the manufacturer that the material meets the applicable standards.

(iii) Visits the testing laboratory to determine if it has the equipment and qualified personnel necessary to conduct the tests required by the specifications.

(iv) Ensures that tests are performed at the frequency stated in the specifications. Determine when and where tests will be taken and witness tests. If not indicated in the specifications, a sufficient number of tests should be taken to verify that the construction is acceptable.

(v) Reviews test reports and certifications for conformance with the specifications. Each test report for material in-place should, at a minimum, contain the following:

(a) Test performed and date.

(b) Applicable standard or project specification.

(c) Test location.

(d) Test result.

(e) Action taken on failing tests.

(f) Lot size and location and adjusted contract price when statistical acceptance procedures are specified or when provisions allow for reduced payment.

(vi) Maintains a file of test reports and certifications.

(vii) Informs the contractor of deficiencies so corrections can be made and retesting performed prior to covering any substandard work with additional material.

(viii) Documents quantities of materials used on the project by actual measurements and computations in a field notebook or computer printouts retained in a folder. For materials paid for on a weight basis, a summary of the material placed each day should be kept in the field notebook. The notebook and/or computer printouts, supported by the original set of weigh tickets, is the basis for payment.

(ix) Maintains a set of working drawings on the job site that can be used to prepare “as-built” drawings.

(x) Reviews payment requests from the contractor.

(xi) Maintains a diary that should contain daily entries made and signed by the resident engineer. Each entry should include the following, plus any additional pertinent data:

(a) Date and weather conditions.

(b) Names of important visitors.

(c) Construction work in progress and location.

(d) Size of contractor’s work force and equipment in use.

(e) Number of hours worked per day for contractor and subcontractors.

(f) The substance of important conversations with the contractor about conduct, progress, changes, test results, interpretations of specifications, or other details.

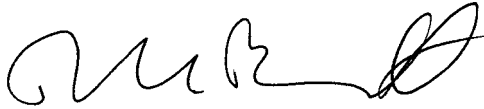
(xii) Submits copies of FAA Form 5370-1, *Construction Progress and Inspection Report*, or equivalent form to the appropriate FAA Airports Division/District/Field Office upon request.

7. FAA PROJECT MANAGER’S RESPONSIBILITIES. The FAA project manager has the responsibility to monitor the project to ensure the terms and conditions of the grant agreement are met, to maintain a broad overview of the construction to be reasonably certain the work is accomplished in accordance with the plans and specifications, and to evaluate the adequacy of the sponsor’s construction inspection. FAA project oversight does not relieve the sponsor’s responsibility of ensuring adequate supervision and inspection during all stages of the work and ensuring the work is in conformance with the plans and specifications.

8. COMMENTS OR SUGGESTIONS. Comments or suggestions for improving this AC should be sent to—

Manager, Airport Engineering Division
Federal Aviation Administration
ATTN: AAS-100
800 Independence Avenue, SW
Washington, DC 20591

9. COPIES OF THIS AC. The Office of Airport Safety and Standards is in the process of making ACs available to the public through the Internet. These ACs can be found on the Federal Aviation Administration (FAA) website at http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/.

A handwritten signature in black ink, appearing to read 'DLB', with a stylized flourish at the end.

David L. Bennett
Director of Airport Safety and Standards

SPECIAL CONDITIONS

SECTION 1

PROJECT INFORMATION

1. CONTRACT PROVISIONS. The General Provisions and these Special Conditions are applicable to all divisions and sections of the Contract Documents and Specifications. It shall be the Contractor's responsibility to so inform all parties who should be bound or influenced thereby.

In the event there are discrepancies between the technical specifications, general provisions, general conditions and the special conditions, the interpretation most advantageous to the Owner shall apply.

2. DESCRIPTION OF WORK. The proposed Work includes the following: See Construction Plans.

3. LOCATION OF THE WORK. The site of the proposed Work is at the Duluth International Airport, Duluth, MN.

4. DEFINITIONS. The following terms when used in the Contract Documents shall mean the following:

A. ADDENDA. Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding documents or the Contract Documents.

B. BID. The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work and services to be performed.

C. DAY. Unless otherwise defined shall mean "calendar" day.

D. DRAWINGS. The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by the Engineer and are referred to in the Contract Documents.

E. ENGINEER. The term "Engineer" in the Contract Documents means Reynolds, Smith and Hills, Inc., 4525 Airport Approach Road, Duluth Minnesota, 55811.

F. FIELD ORDER. A written order issued by the Engineer which orders minor changes in the work consistent with the intent of the Contract Documents but which does not involve a change in the Contract Price or the Contract Time.

The Engineer may authorize minor changes in the work not involving an adjustment in the contract price or the contract time, which are consistent with the overall intent of the Contract Documents. These may be accomplished by a field order and shall be binding on the Owner, and also on the Contractor who shall perform the change promptly. If the Contractor believes that a field order justifies an increase in the contract price or contract time, the Contractor shall make a claim under Section 50, Subsection 50-16, Claims for Adjustment and Disputes of the General Provisions before doing the Work.

G. FURNISH or INSTALL or PROVIDE or SUPPLY. Unless specifically limited in the context, the word "Furnish" or the word "Install" or the word "Provide" or the word "Supply" or any combination or similar directive or usage thereof, shall mean FURNISHING AND INCORPORATION IN THE WORK including all necessary labor, materials, equipment, and anything necessary to perform the work indicated.

H. GOOD REPAIR. Good repair shall be construed to mean any defect, functional or structural deterioration (except that from ordinary and reasonable use) which appreciably reduces the effectiveness or efficiency of the work or improvement for the purpose intended, or any serious departure from the standards of original construction described in the Contract Documents, shall be remedied by the Contractor. Such remedy will be made without further cost to the Owner, including in part, all damages caused by such defect, deficiency, deterioration or departure, and by its repair, replacement or correction.

I. MAY. Permissive.

J. REFERENCE TO TRADE OR SUBCONTRACTORS. When only one principal contract exists for all work covered by the Contract Documents, reference to trade or subcontractors in the Contract Documents shall not create any contractual relationship between the Owner and any trade or subcontractor, with whom the principal contractor may subcontract.

K. SAMPLES. Samples are physical examples furnished or constructed by the Contractor to illustrate materials, equipment, workmanship or finishes, and to establish standards by which the work will be judged.

L. "SHALL" IMPLIED. In the interest of conciseness, some sentences, statements, and clauses used in the specifications exclude any form of the verb "shall" normally expressed in a verb phrase with verbs such as "furnish", "install", "provide", "perform", "construct", "erect", "comply", "apply", "submit", or similar "verb", but any such sentences, statements, and clauses shall be interpreted to include the applicable form of the phrase "The Contractor shall" and the requirements described therein shall be interpreted as mandatory elements of the Contract.

M. SHALL. Mandatory.

N. SUBCONTRACTOR. Party supplying labor and material or any labor for work at the site of the project for, and under separate contract or agreement with the Contractor. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner and any subcontractor.

O. SUBSTANTIAL COMPLETION. When the work is sufficiently complete so it may be safely, conveniently and beneficially utilized by the Owner for all of the purposes for which it was intended.

P. WILL. Mandatory.

Q. SEDIMENT. Soil and other debris that have eroded and have been transported by runoff water or wind.

R. SOLID WASTES. Rubbish, debris, and other discarded solid materials, except hazardous waste as defined in paragraph entitled, "Hazardous Waste," resulting from industrial, commercial, and agricultural operations and from community activities.

S. RUBBISH. Combustible and noncombustible wastes including paper, boxes, glass, crockery, metal, lumber, cans, and bones.

T. DEBRIS. Combustible and noncombustible wastes such as ashes and waste materials resulting from construction or maintenance and repair work, leaves, and tree trimmings.

U. CHEMICAL WASTES. Salts, acids, alkalies, herbicides, pesticides, and organic chemicals.

V. SEWAGE. Waste characterized as domestic sanitary sewage.

W. GARBAGE. Refuse and scraps resulting from consumption of food.

X. HAZARDOUS WASTES. Hazardous substances as defined in 40 CFR 261 or as defined by applicable state and local regulations.

Y. OILY WASTES. Petroleum products and bituminous materials.

Z. HAZARDOUS MATERIALS. As defined in DOT Regulation 49 CFR 171 and listed in CFR 172.

AA. HAZARDOUS SUBSTANCES. As defined in EPA PL 96-510.

5. APPLICABLE DRAWINGS. The drawings applicable to this project are listed in the Index of Drawings as included herein.

6. PROPOSAL REQUIREMENTS. In addition to those herein before described items to be submitted with the Bidder's Proposal, the bidder shall submit, with his proposal, a list of all subcontractors the bidder proposes to use on the work of this Contract.

After the Owner accepts the bidder's proposal and such bidder is awarded a Contract, the successful bidder may not substitute a subcontractor listed in the proposal without the prior written approval of the Owner. Such approval shall be obtained at least ten calendar days prior to the date scheduled for that subcontractor to begin work.

7. ACCESS TO THE WORK. Access to the work shall be via the access routes designated on the Contract Layout Plan. The Contractor shall identify access routes with suitable signs, barricades and similar equipment. The entire access route and construction site shall be kept free and clean of all debris at all times and maintained in good repair by the Contractor. All damage to the access route caused by the actions of the Contractor or his agents shall be immediately repaired to the satisfaction of the Owner.

No separate payment will be made for complying with the requirements of this paragraph "ACCESS TO THE WORK." No other access to the work site will be permitted without written approval by the Owner and Engineer. Contractor's vehicles and equipment, including vehicles and equipment of the subcontractors and others coming under the Contractor's control, will not be permitted to traverse other airfield areas or pavements without written approval of the Owner and Engineer. Contractor's vehicles, equipment and materials may be stored in the area designated on the Plans. Upon completion of the work, the storage area shall be cleaned up and returned to its original condition to the satisfaction of the Owner. No separate payment will be made for cleanup and restoration of the storage area. Personal services, such as canteen trucks, will not be permitted beyond this area and drivers of vehicles being operated beyond this area shall be subject to loss of permission to enter the construction site.

8. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

A. Shop drawings are drawings, diagrams, schedules and other data specially prepared for the work by the Contractor or any subcontractor, manufacturer, supplier or distributor to illustrate some portion of the work.

B. Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams or other information furnished by the Contractor to illustrate a material, product or system for some portion of the work.

C. Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the work will be judged.

D. The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the work or in the work of the Owner or any separate contractor, all shop drawings, product data and samples required by the Contract Documents.

E. By approving and submitting shop drawings, product data and samples, the Contractor represents that he has determined and verified all materials, field measurements and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the work and of the Contract Documents.

F. The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Engineer's approval of shop drawings, product data or samples unless the Contractor has specifically informed the Engineer in writing of such deviation at the time of submission and the Engineer has given written approval of the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the shop drawings, product data or samples by the Engineer's approval thereof.

G. The Contractor shall direct specific attention, in writing or on resubmitted shop drawings, product data or samples to revisions other than those requested by the Engineer on previous submittals.

H. No portion of the work requiring submission of a shop drawing, product data or sample shall be commenced until the submittals have been approved by the Engineer as provided in the General Provisions, Section 50. All such portions of the work shall be in accordance with approved submittals.

I. The Contractor shall not reproduce the Engineer's project drawings for shop drawing use without prior written approval of the Engineer.

J. The Contractor shall submit six copies, or at Engineer's option, one reproducible copy and one print of all shop drawings required for the work of the various trades unless greater quantities are specifically requested for certain equipment. Of these, three copies, or the reproducible copy, will be annotated as appropriate and returned to the Contractor with appropriate action indicated. By agreement with the Engineer, the Contractor may submit more than the required number of copies. Receipt of less than the required number of copies will be cause for withholding the shop drawings, product data or samples from being checked until receipt of the necessary additional copies. Shop drawings shall be forwarded to Reynolds, Smith and Hills, Inc. 4525 Airport Approach Road, Duluth, MN 55811. The Contractor's letter of submittal must conform to the typical Contractor's "Transmittal Letter" which is available from the Engineer. The quantity of transmittal letters to be submitted shall be equal to the number of sets of drawings, product data or samples being submitted plus one. Each drawing or part of the drawings, product data or samples shall be listed separately on the letter and identified as indicated thereon. Failure to do this will cause rejection of the submittal. The Engineer will return to the Contractor the same transmittal letter, with the shop drawings, product data or samples disposition noted thereon along with the shop drawings, product data or samples when the review is completed. The Contractor shall forward separate transmittal letters for submitting each group of shop drawings, product data or samples common to a specification section.

K. In checking shop drawings, product data or samples prior to submittal, the Contractor is requested to note corrections or comments on the shop drawings, product data or samples in green pen.

L. Drawings returned to the Contractor will be stamped "Approved," "Approved as Noted," "Returned for Corrections," or "Not Approved." Drawings stamped "Approved as Noted" need not be returned for further approval if the notations are acceptable to the Contractor and subcontractors. Drawings stamped "Returned for Corrections" or "Not Approved" shall require new submission. Comments and corrections by the Engineer will be made in red pen on blue or black line prints.

M. Samples shall be submitted to the **Project Engineer of record**, accompanied with the same transmittal letter prescribed for shop drawings. Checking by Contractor of product data and samples before transmittal is required the same as for shop drawings.

9. PROJECT DOCUMENTATION.

A. Project Drawings: The successful Contractor will be furnished, at no charge, one (1) full-size set and one (1) disc of the Drawings and Specifications. Additional copies may be purchased at actual cost of reproduction.

A field set of Plans and Specifications shall remain on the job site at all times and shall be available at all times to the Engineer.

The Contractor shall immediately include plainly and conspicuously on the field set of drawings, and at appropriate paragraphs in the specifications, all changes or corrections made by addenda, field orders and change orders as they are issued.

Approved copies of all shop drawings, product data, samples and other submittals are to be kept on the job site at all times and shall be available at all times to the Engineer.

Changes and deviations from the existing conditions shall be submitted in writing for approval prior to installation. In no case shall any unspecified equipment or materials be installed without prior approval of the Engineer.

B. Record Documents:

(1) Definition: Record documents are defined to include those documents or copies relating directly to performance of the work, which the Contractor is required to prepare or maintain for the Owner's records, recording the work as actually performed. In particular, record documents show changes in the work in relation to the way in which shown and specified by original Contract Documents; and show additional information of value to the Owner's records, but not indicated by original Contract Documents. Record documents include newly prepared drawings (if any are specified), marked-up copies of contract drawings, shop drawings, specifications, addenda, field orders, change orders, marked-up product data submittals, record samples, field records for variable and concealed conditions such as excavations and foundations, and miscellaneous record information on work which is otherwise recorded only schematically or not at all.

(2) Record Drawings: The Contractor shall maintain a set of record drawings at the job site. The record drawings shall be kept legible and current and shall be available for inspection at all times by the Engineer. The Contractor shall show all changes or work added on these record drawings in a contrasting color.

(a) Mark-Up Procedure: During progress of the work, maintain a blue-line or black-line set of contract drawings and shop drawings, with mark-up of actual installations which vary substantially from the work as originally shown. Mark whatever drawing is most capable of showing actual physical condition, fully and accurately. Where shop drawings are marked up, mark cross-reference on contract drawings at corresponding location. Mark with erasable colored pencil, using separate colors where feasible to distinguish between changes for different categories of Work at same general location. Mark-up important additional information that was either shown schematically or omitted from original drawings. Give particular attention to information on work concealed, which would be difficult to identify or measure and record at a later date. Note alternate numbers, field orders or change order numbers and similar identification. Require each person preparing mark-ups to initial and date mark-ups and indicate name of firm. Label each sheet "PROJECT RECORD" in 1-1/2-inch high letters.

In showing changes in the work, use the same legends as used on the original drawings. Indicate exact locations by dimensions and exact elevations by job datum. Give dimensions from a permanent point.

(b) Preparation of Transparencies: In preparation for Certification of Substantial Completion on last major portion of the work, review completed mark-up of record drawings and shop drawings with Engineer. The Engineer will then proceed with preparation of a full set of corrected transparencies for contract drawings. The Engineer will date each updated drawing and label each sheet "RECORD DRAWING" in 1-1/2-inch high letters. Printing as required herein is the responsibility of the Engineer.

(c) Copies, Distribution: Upon completion of transparency record drawings, the Engineer shall prepare three blue-line or black-line prints of each drawing, regardless of whether changes and additional information were recorded thereon. The Engineer shall then organize each of three copies into manageable sets, bind with durable paper cover sheets, and print suitable titles and dates. The mark-up set of prints maintained during the construction period shall be bound in the same manner. The Engineer shall also organize transparencies into sets matching print sets, place set in a durable tube-type drawing container (with end caps) and mark end cap of each with suitable identification. The Engineer will retain one copy set. At the completion of the project, the Engineer shall submit one set of transparencies, with changes noted thereon, to the Owner.

(3) Record drawings shall contain the names, addresses and phone numbers of the Contractor and all subcontractors.

(4) The Engineer shall be the sole judge of the acceptability of the record drawings. Receipt and acceptance of the record drawings is a prerequisite for Final Payment.

C. Record Specifications:

(1) During the progress of the work, the Contractor shall maintain one copy of the specifications, including addenda, field orders, change orders and similar modifications issued in printed form during construction, marked-up variations (of substance) in actual work in comparison with text of specifications and modifications as issued at the jobsite. Give particular attention to substitutions, selection of options, and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing information and product data, where applicable. Upon completion of mark-up, the Contractor shall submit all data to the Engineer for the Owner's records. Label front cover "PROJECT RECORD" in 1-1/2-inch high letters.

(2) Where the record specifications is printed on one side of page only, mark variation on blank left-hand pages of the record specifications, facing printed right-hand pages containing original text affected by variation.

D. Record Product Data: During progress of the work, maintain one copy of each product data submittal, and mark-up significant variations in the actual work in comparison with submitted information. Include both variations in product as delivered to site, and variations from manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the work that cannot otherwise be readily discerned at a later date by direct observation. Note related field orders and change orders and mark-up of record drawings and specifications. Upon completion of mark-ups, submit complete set of product data submittal to the Engineer for the Owner's records. Label each data submittal "PROJECT RECORD" in 1-1/2-inch high letters.

E. Record Sample Submittal: Immediately prior to date(s) of substantial completion, the Engineer and Owner's authorized representatives will meet with the Contractor at the work site and will determine if any of the submitted samples maintained by the Contractor during progress of the work are to be transmitted to

the Owner for record purposes. The Contractor shall comply with the Engineer's instructions for packaging, identification marking and delivery to the Owner's sample storage space. Dispose of other samples in a legal manner specified for disposal as surplus and waste materials, unless otherwise indicated by Engineer.

F. Miscellaneous Record Submittals: Refer to other sections of these specifications for requirements of miscellaneous recordkeeping and submittals in connection with actual performance of the work. Immediately prior to date(s) of substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Engineer for the Owner's records. Categories of requirements resulting in miscellaneous work records are recognized to include, but not be limited to, the following:

(1) Required field records on excavations, foundations underground construction, wells and similar Work.

(2) Accurate survey showing locations and elevations of underground lines, including invert elevations of drainage piping, valves, tanks and manholes.

(3) Surveys establishing lines and levels of buildings, where applicable.

(4) Soil treatment certification.

(5) Inspection and Test Reports: Where not processed as shop drawings or product data.

(6) Concrete mix design record.

(7) Asphaltic concrete mix design record.

(8) Concrete block certification, where applicable.

G. Project Closeout: Closeout is hereby defined to include general requirements near end of contract time, in preparation for final acceptance, final payment, normal termination of Contract, occupancy by the Owner and similar actions evidencing completion of the work. Specific requirements for individual units or work are specified in other sections. Time of closeout is directly related to substantial completion, and therefore may be a single-time period for the entire work or a series of time periods for individual parts of the work which have been certified as substantially complete at different dates. The time variation, if any, shall be applicable to other provisions of this section.

H. Prerequisites to Substantial Completion:

(1) Prior to requesting the Engineer's inspection for Certification of Substantial Completion, for either entire work or portions thereof, complete the following and list no exceptions in request.

(a) In progress payment request coincident with, or first following date claimed, show 100 percent completion for the portion of work claimed as "Substantially Completed," or list incomplete items, value of incompleteness and reasons for being incomplete.

(b) Include supporting documentation for completion as indicated in the Contract Documents.

(c) Submit statement showing accounting of changes to the Contract sum.

(d) Advise the Owner of pending insurance change-over requirements.

(e) Obtain and submit releases enabling Owner's full and unrestricted use of the work and access to services and utilities, including, where required, occupancy permits, operating certificates and similar releases.

(f) Deliver tools, spare parts, extra stocks of materials and similar physical items to the Owner.

(g) Make final change-over of locks and transmit keys, where applicable, to the Owner, and advise the Owner's authorized representatives of change-over in security provisions.

(h) Complete start-up testing of systems, and instructions to the Owner's operating-maintenance personnel. Discontinue, or change over, and remove from project site any temporary facilities and services, along with construction tools and facilities, mock-ups and similar elements.

(2) Inspection Procedures: Upon receipt of the Contractor's request, the Engineer will proceed with the inspection or advise the Contractor of prerequisites not fulfilled. Following initial inspection, the Engineer will prepare the Certificate of Substantial Completion or advise the Contractor of work which must be performed prior to issuance of the certificate and repeat the inspection when requested and assured that work has been substantially completed. Results of completed inspection(s) will form initial "punch list" for Final Acceptance.

I. Prerequisites to Final Acceptance:

(1) Prior to requesting the Engineers' final inspection for Certification of Final Acceptance as required by the General Provisions, the Contractor shall complete the following and list known exceptions in the request:

(a) Submit certified copy of the Engineer's final punch list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by the Engineer.

(b) Submit final meter readings for utilities, measured record of stored fuel, and similar data as of time of Substantial Completion or when Owner took possession of and responsibility for corresponding elements of the Work.

(c) Complete final cleaning up requirements, including touch-up of marred surfaces.

(d) Touch-up and otherwise repair and restore marred exposed finishes.

(2) Reinspection Procedures: Following Substantial Completion, the Contractor shall correct or remedy all punch list items to the satisfaction of the Engineer and Owner within a two (2)-week period after the date of Substantial Completion. If subsequent inspections are necessary after the two-week period in order to eliminate all deficiencies, the cost of all subsequent inspections with respect to the Owner's and Engineer's time and expenses shall be paid by the Contractor. When ready, the Contractor shall request in writing, a final reinspection of the work. Upon completion of reinspection, the Engineer will prepare Certificate of Final Acceptance or advise the Contractor of work not completed or obligations not fulfilled as required for Final Acceptance. If necessary, the above procedures will be repeated.

J. Prerequisites to Final Payment:

(1) Final Payment: Final Payment will be made after Final Acceptance of the project by the Engineer and Owner upon request by the Contractor on condition that the Contractor:

(a) Furnish properly executed and completed release of claims from all material men and subcontractors who have furnished materials or labor for the work and submit supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

(b) Furnish the Contractor's Affidavit of Release of Claims (2 copies) that all material, men, and subcontractors have been paid in full. In the event they have not been paid in full, the Owner shall retain a sufficient sum to pay them in full and at his option, may make direct payment to obtain complete releases of claim.

(c) Furnish Contractor's Final Release of Claim (2 copies).

(d) Furnish required sets of record drawings and maintenance and operating instructions of new mechanical equipment.

(e) Furnish guarantees signed by subcontractors, material suppliers and countersigned by the Contractor for operating equipment.

(f) Submit specific warranties, workmanship-maintenance bonds, maintenance agreements, final certifications and similar documents.

(g) Furnish a signed guarantee, in form acceptable to the Engineer and Owner agreeing to repair or replace, as decided by the Engineer, all work and materials that prove defective within one (1) year from the date of Final Acceptance, including restoration of all other Work damaged in making such repairs or replacements.

(h) Furnish consent of Surety to Final Payment.

(i) Submit final progress payment application, reflecting all final changes to contract quantities and sums.

(j) Submit evidence of final, continuing insurance coverage complying with insurance requirements.

(k) Certify that all social security, employment and all other taxes (city, state, federal government) have been paid.

(l) Provide receipt, as applicable, of affidavits certifying all labor standards of local, state or federal requirements have been complied with by the Contractor.

(m) Submit actual DBE participation percentages along with the names, addresses and phone numbers of all DBE subcontractors, material suppliers utilized in the work.

K. Record Document Submittals: Specific requirements for record documents are shown in Section 9, PROJECT DOCUMENTATION. Other requirements are indicated in the General Provisions. General submittal requirements are indicated in "Submittals" sections. Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Engineer's reference during normal working hours.

(1) Record Drawings: The Engineer shall organize record drawing sheets into manageable sets, bind with durable paper cover sheets and print suitable titles, dates and other identification on cover of each set.

(2) Record Specifications: Upon completion of mark-ups, submit to the Engineer for the Owner's records.

(3) Record Product Data: Upon completion of mark-ups, submit complete set to the Engineer for the Owner's records.

(4) Record Sample Submittal: Comply with the Engineer's instructions for packaging, identification marking and delivery to the Owner's sample storage space.

(5) Miscellaneous Record Submittals: Complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Engineer for the Owner's records.

(6) Maintenance Manuals: Complete, place in order, properly identify and submit to the Engineer for the Owner's records.

L. Closeout Procedures: General Operating and Maintenance Instructions: Arrange for each installer of work requiring continuing maintenance or operation to meet with the Owner's authorized representatives, at the work site, to provide basic instructions needed for proper operation and maintenance of the entire work. Include instructions by manufacturer's representatives where installers are not expert in the required procedures. Review maintenance manuals, record documentation, tools, spare parts and materials, lubricants, fuel, identification system, control sequences; hazards, cleaning and similar procedures and facilities. For operational equipment, demonstrate start-up, shut-down, emergency operations, noise and vibration adjustments, safety, economy, efficiency adjustments and similar operations. Review maintenance and operations in relation with application warranties, agreements to maintain bonds, and similar continuing commitments.

10. FINAL CLEANING.

A. Provide final cleaning of the work, at time indicated, consisting of cleaning each surface or unit of work to normal "clean" condition.

B. Removal of Protection: Remove temporary protection devices and facilities that were installed during course of the work to protect previous completed work during remainder of the construction period.

C. Compliances: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site, or bury debris or excess materials on the Owner's property, or discharge volatile or other harmful or dangerous materials into drainage systems; remove waste materials from site and dispose of in a lawful manner.

Where extra materials of value remaining after completion of associated work have become the Owner's property, dispose of these as directed by the Owner.

11. CONTRACT DOCUMENTS REVISION/MODIFICATIONS.

Where portions of text have been lined through (~~example~~) this text has been deleted and does not apply to this project. Where portions of text have been added with shading (~~example~~), this text has been added and is

binding to this project. This process is utilized throughout the specifications and contract documents (excluding the plans).

END OF SPECIAL CONDITIONS - SECTION 1

SPECIAL CONDITIONS

SECTION 2

INSURANCE REQUIREMENTS

(Refer to City of Duluth Insurance Requirements)

END OF SPECIAL CONDITIONS - SECTION 2

SPECIAL CONDITIONS

SECTION 3

MISCELLANEOUS

1. PROVISIONS REQUIRED BY LAW DEEMED INSERTED. Each and every provision of law and clause required by law to be inserted in the Contract Documents shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein. If, for any reason, any such provision is not inserted in the Contract, or is not correctly inserted, then upon application of either party, the Contract shall forthwith be physically amended to make such insertion or correction.

2. CORRELATION OF DOCUMENTS.

A. The drawings and specifications are cooperative and supplementary. Portions of the work which can be best be illustrated by the drawings may not be included in the specifications and portions best described by the specifications may not be depicted on the drawings. All items necessary or incidental to completely construct or erect the work shall be furnished, whether called for in the specifications or shown on the drawings. Anything mentioned in the specifications and not shown on the drawings, or anything shown or mentioned on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both.

B. In case of disagreement between the drawings and specifications, or within either document itself, the better quality or greater quantity of work shall be estimated and included in the bid and contract price and the matter drawn to the Engineer's attention for decision.

3. NOTICE AND SERVICE THEREOF. Where the manner of giving notice is not otherwise provided for in the Contract Documents, any notice to the Contractor from the Owner relative to any part of the Contract shall be in writing and considered delivered and the service thereof completed, when said notice is posted, by certified or registered mail, to the Contractor at the address given in the Contractor's proposal, or at the last business address known to him who gives the notice, or delivered in person to the Contractor or his authorized representative on the site. It is mutually agreed that such notice shall be sufficient and adequate.

4. SUBCONTRACTING.

A. The Contractor may utilize the services of specialty or minority subcontractors on those parts of the work which, under normal contracting practices, are performed by specialty or minority subcontractors.

B. The Owner reserves the right to approve subcontractors for any work. The Contractor, if requested by the Owner, shall submit to the Owner the proposed award and such information as the Owner may require concerning any subcontractor.

C. The Contractor shall be as fully responsible to the Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, or under their control, as he is for the acts and omissions of persons directly employed by him.

D. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the Contract Documents insofar as applicable to the work of subcontractors, and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.

E. Nothing contained in the Contract Documents shall create any contractual relationships between any subcontractor and the Owner.

5. PROTECTION OF PERSONS.

A. The Contractor shall:

- (1) At all times protect the lives and health of his employees under the Contract;
- (2) Take all necessary precautions for the safety of all persons on or in the vicinity of the project site.
- (3) Comply with all applicable provisions of Federal, State and Municipal safety laws and building codes.
- (4) Comply with all pertinent provisions of the Manual of Accident Prevention in Construction issued by the Associated General Contractors of America, Inc., latest edition, to prevent accidents or injury to persons on or about or adjacent to the premises where the work is being performed. He shall erect and properly maintain at all times, as required by the conditions and progress of the work, all necessary safeguards for the protection of persons and shall post danger signs warning against the hazards created in part by features of construction such as protruding nails, rod hoists, well holes, falling materials, etc., and he shall designate a responsible member of his organization on the work site whose duty shall be the prevention of accidents;
- (5) Provide for all safeguards for the protection of those having Right-of-Entry during field review and observation of the work.

B. The Contractor shall comply with all provisions of the "Williams-Steiger Occupational Safety and Health Act of 1970" including any amendments thereto and rules and regulations issued pursuant thereto, applicable to the Work and performance of the Contract. Where a State in which work is performed has passed legislation bearing on Occupational Safety and Health, such legislation and amendments thereto, together with rules and regulations issued pursuant thereto, shall be complied with by the Contractor.

6. AUTHORITY OF ENGINEER.

A. The Engineer, through its duly authorized representatives, shall furnish engineering services during construction of the work to the extent provided in the Contract Documents. He shall observe and review the work in the process of construction or erection. Compliance with the Contract Documents shall be the Contractor's responsibility notwithstanding such observation or review. The Engineer has authority to recommend suspension of the work to the Owner when it appears such suspension may be necessary to accomplish the proper implementation of the intent of the Contract Documents. The authority to observe, review or recommend suspension of the work, or exercise such other authority as may be granted by the Contract Documents, shall not be construed or interpreted to mean supervision of construction, which is the Contractor's responsibility, nor make the Engineer responsible for providing a safe place for the performance of work by the Contractor or by the Contractor's employees, or those of suppliers or subcontractors, or for access, visits, use, work, travel, or occupancy by any other person. The Engineer shall also have the authority to reject any work, materials, or equipment which do not conform to the Contract Documents and to decide technical questions which arise in the execution of the work.

B. The Engineer shall determine the amount, quality, acceptability, and fitness of the several kinds of work, materials, equipment and supplies which are to be paid for under the Contract and shall decide questions which may arise in relation to said work and its compliance with the Contract Documents. The Engineer's estimates and decisions shall be final and conclusive, except as otherwise expressly provided in

case any question shall arise between the parties to the Contract relative to the Contract Documents, the determination or decision of the Engineer shall be a condition precedent to the right of the Contractor to receive any money or payment for work under the Contract affected in any manner or to any extent by such question.

C. The Engineer shall decide the meaning and intent of any portion of the Contract Documents where the same may be found obscure or be in dispute.

7. "GOOD REPAIR" PERIOD.

A. The Contractor hereby agrees to keep all work constructed under the Contract in good repair for a minimum period of one (1) year, unless a longer period is otherwise specified in the Contract Documents, from the date of acceptance of all of the work by the Owner. No provision of the Contract documents shall be valid which limits the "Good Repair" period to less than one (1) year from the date of acceptance of all of the work by the Owner. The work may be phased. If the work is phased, each phase of Work completed shall be inspected and approved for use by the Owner but shall not be accepted until all work for all phases is complete and a final inspection for all work has been performed.

B. It is intended that this provision shall apply whether or not bond is required, as a personal obligation of the Contractor.

C. The obligations of the Contractor as herein provided shall be in addition to and not in limitation of any obligations imposed upon him by special guarantees required by the Contract Documents or otherwise prescribed by law.

8. VARIATION FROM ESTIMATED QUANTITIES. The Contractor may reasonably expect a variation in estimated quantities such that the total payment for the completed work may range from 75 to 125 percent of the total amount of the Contract based on the estimated quantities defined in the proposal. The Contractor will not be allowed any claims for anticipated profits, for loss of profits, or for any damages because of a difference between the estimate of any item defined in the proposal and the amount of the item actually required or for the elimination of any part of the work. Funds for construction of the work herein contemplated are limited. The Owner reserves the right to eliminate or reduce the items of the proposal or any of the work as may be required to bring the cost of the work within the limits of available funds.

9. WATER FOR CONSTRUCTION. Water used for construction of this project will be furnished by the Contractor. The Contractor shall make the necessary arrangements with the Owner of the source of water for securing and/or transporting such water. No separate payment will be made for water used but the cost thereof shall be included in the various items of the proposal and bid schedule.

10. LIGHTS AND POWER. The Contractor shall provide, at his own expense, temporary lighting and facilities required for the proper prosecution and inspection of the work.

11. COORDINATION WITH OTHERS. In the event other contractors are doing work in the same area simultaneously with this project, the Contractor shall coordinate his proposed construction with that of the other contractors. The Contractor shall notify the Engineer of said coordination attempts and the results.

12. TESTING, INSPECTION, AND CONTROL. The Owner shall pay for all passing tests, the Contractor shall pay for all failing tests. Charges for failing tests will be deducted from the Contractor's earnings at the end of each month when the Contractor submits his periodic pay requests. The Contractor will pay for all tests, other than acceptance testing, and the costs of those tests shall be incidental to those items that require testing. The contractor shall furnish, at his own expense, all necessary specimens for testing of the materials, as required by the Engineer. The Contractor shall be responsible for notifying the testing laboratory to pick up the test samples. Also, the Engineer reserves the right to test at any location on the project, and at any

frequency he deems necessary before, during and after incorporation of all materials into the project to satisfy himself and ensure that all materials meet the specified requirements. All materials utilized in the project must meet specification requirements before, during and after incorporation into the project. Any additional testing that the Contractor deems necessary to ensure himself that the materials he is installing meet the required specifications and/or as a proof of the authorized testing laboratory shall be solely the expense of the Contractor whether the tests pass or fail.

13. LINES AND GRADES. Section 50, Item 50-06 of the General Provisions and Technical Specification P-104, Project Survey and Stakeout includes all requirement for all lines, grades, and measurements necessary to the proper prosecution and control of the work contracted for under these specifications shall be provided by the Contractor and he shall be solely responsible for the accuracy of said lines, grades and measurements.

14. TRADE NAMES AND MATERIALS. No material that has been used by the Contractor for any temporary purpose whatsoever is to be incorporated in the permanent structure without written consent of the Engineer.

Where materials or equipment are specified by a trade or brand name, it is not the intention of the Owner to discriminate against an equal product of another manufacturer, but rather to set a definite standard of quality or performance, and to establish an equal basis for the evaluation of bids. Where the words "equivalent", "proper", or "equal to" are used, they shall be understood to mean that the thing referred to shall be proper, the equivalent of, or equal to some other thing, in the opinion or judgement of the Engineer. Unless otherwise specified, all materials shall be the best of their respective kinds and shall be in all cases fully equal to approved samples. Notwithstanding that the words "or equal to" or other such expressions may be used in the plans and specifications in connection with the material, manufactured article or process, the material, manufactured article or process specifically designated shall be used, unless a substitute shall be approved in writing by the Engineer and the Engineer shall have the right to require the use of such specifically designated material, article or process.

15. PROPERTY LINES AND MONUMENTS. The Contractor shall protect all property corner markers and any other monument, and when any such markers or monuments are in danger of being disturbed, they shall be properly referenced and if disturbed shall be reset at the expense of the Contractor.

16. FENCES AND DRAINAGE CHANNELS. Boundary fences or other improvements removed to permit the installation of the work shall be replaced in the same location and left in a condition as good or better than that in which they were found. Existing fences not to be removed and intersecting with new fencing (fencing outside airport property) shall be connected to the new fencing in a manner acceptable to the fence owner and the Owner and/or Engineer.

Where surface drainage channels are disturbed or blocked during construction, they shall be restored to their original condition of grade and cross section after the work of construction is completed.

17. DISPOSAL OF WASTE AND SURPLUS EXCAVATION. All trees, stumps, slashings, brush or other debris to be removed from the site as a preliminary to the construction work shall be removed from the property and legally disposed of in a manner approved by the Engineer and at a site approved by the Owner. No burning on site will be permitted.

All excavated earth in excess of that required for embankment and backfill shall be disposed of in a satisfactory manner as shown on the plans or as directed by the Engineer to a site approved by the Owner.

18. AIR POLLUTION. The Contractor shall comply with all Federal, State and Local Requirements.

19. EXISTING UTILITIES AND SERVICE LINES. The Contractor shall be responsible for the protection of all existing utilities or service lines crossed or exposed by his construction operations. Where existing utilities or service lines are cut, broken or damaged, the Contractor shall replace or repair the utilities or service lines with

the same type of original material and construction, or better, at his own cost and expense, with the exception of those items included in the bid schedule.

20. RECORDS OF MATERIALS PURCHASED. By a certain time each month as defined and established at the preconstruction conference, the Contractor shall furnish to the Engineer, duplicate copies of all invoices for materials furnished to be incorporated into the work, plus a statement of all materials previously included on monthly estimates and incorporated into the work during the preceding month. This information is to be used to determine the value of materials on hand to be included in the monthly estimate for periodical payment.

21. CONTRACTOR ACCESS TO PROJECT SITE. The Contractor shall have a specific access route to the project site. This route is shown in the construction drawings. The Contractor shall use this route to bring all equipment and materials in. If the Contractor has a better route that will prevent damage to existing roads or provide safer access to the construction site, the Contractor shall supply a drawing showing the recommended route to the Owner and Engineer for approval at the preconstruction conference.

22. NIGHTTIME WORK. In phases of work requiring daytime work, the Contractor shall not perform nighttime work unless given approval in writing by the Engineer. The Contractor shall request in writing approval to perform nighttime work. If the Engineer approves said nighttime work, the Contractor shall coordinate closely with the Engineer and the Owner during any and all approved nighttime work. This includes any nighttime hauling of materials to the project site. If the Contractor wishes to perform nighttime work or haul materials at night, the Contractor shall reimburse the Owner for any nighttime inspection costs incurred by the Owner to adequately and properly inspect said nighttime work or hauling of materials.

In phases of work requiring nighttime work, the Contractor shall perform said nighttime work within the time frame allotted by the Owner. The Contractor shall coordinate with the Owner and Engineer each day before nighttime operations to ensure all special instructions, time limitations, directives, etc. are adhered to each night of nighttime operations. The Contractor shall not enter areas requiring nighttime construction operations until cleared to do so by the Owner. Any violation will result in a \$1,000.00 fine for each individual and each piece of equipment committing the infraction.

23. DUST CONTROL. The Contractor shall maintain strict dust control during the project duration. There are operational areas, aircraft parked on the airport as well as commercial facilities that perform maintenance and repair work to aircraft. Therefore, it is imperative that strict dust control be maintained so that damage or nuisance to the areas and facilities described above or airport operational areas is prevented. This dust control shall also include the dust that may occur during any construction procedure.

24. TRIP TICKETS, INVOICES, WEIGH BILLS, ETC. The Contractor shall be responsible for supplying any and all trip tickets, invoices, weigh bills, etc. which show the quantities actually used in the construction of the project. All said trip tickets, invoices, weigh bills, etc. shall relate directly to specific bid items. If the Contractor fails to submit said trip tickets, invoices, weigh bills, etc. to the Engineer or his authorized representative prior to or during the time of installation of materials into the project, any material overruns claimed by the Contractor at the end of the project shall not be accepted.

25. FINAL IN-PLACE EXCAVATION & EMBANKMENT SECTIONS. At the completion of the project, the Contractor shall submit final in-place earthwork cross sections for the entire project site affected by earthwork operations with the detailed calculations as to as-built excavation and/or embankment. The Contractor may use the cross sections provided in the plans and plot the as-built conditions on those cross section sheets along with the accompanying calculations. The Contractor shall be paid based upon the volume between the original ground line and the as-built ground line. The Contractor shall be paid based on the type of operations for which a bid price was provided.

END OF SPECIAL CONDITIONS - SECTION 3

SPECIAL CONDITIONS

SECTION 4

LISTING OF DUTIES, RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY OF THE RESIDENT PROJECT REPRESENTATIVE.

The Owner and/or Engineer shall furnish a Resident Project Representative (RPR), assistants and other field staff to assist the Engineer in observing performance of the Work of the Contractor.

Through more extensive on-site observations of the work in progress and field checks of materials and equipment by the RPR and assistants, the Engineer shall endeavor to provide further protection for the Owner against defects and deficiencies in the work; but, the furnishing of such services will not make the Engineer responsible for or give the Engineer control over construction means, methods, techniques, sequences or procedures or for safety precautions or programs, or responsibility for the Contractor's failure to perform the work in accordance with the Contract Documents.

The duties and responsibilities of the RPR are limited to those of the Engineer in the Engineer's agreement with the Owner and in the construction Contract Documents, and are further limited and described as follows:

A. General

1. The RPR is the Engineer's agent at the site and will act as directed by and under the supervision of the Engineer, and will confer with the Engineer and Owner regarding the RPR's actions. The RPR's dealings in matters pertaining to the on-site work shall in general be with the Engineer and the Contractor keeping the Owner advised as necessary. The RPR's dealings with subcontractors shall only be through or with the full knowledge and approval of the Contractor. The RPR shall generally communicate with the Owner with the knowledge of and under the direction of the Engineer.

B. Duties and Responsibilities of the RPR

1. Schedules: Review the progress schedule, schedule of shop drawing, product data and samples submittals and schedule of values prepared by the Contractor and consult with the Engineer concerning acceptability.

2. Conferences and Meetings: Attend meetings with the Contractor and Owner, such as preconstruction conferences, weekly progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.

3. Liaison:

a. Serve as the Engineer's liaison with the Contractor, working principally through the Contractor's superintendent and assist in understanding the intent of the Contract Documents; and assist the Engineer in serving as the Owner's liaison with the Contractor when the Contractor's operations affect the Owner's on-site operations.

b. Assist in obtaining from the Owner additional details or information, when required for proper execution of the Work.

4. Shop Drawings and Samples:

- a.** Record date of receipt of shop drawings, product data and samples.
- b.** Receive samples that are furnished at the site by the Contractor, and notify the Engineer of availability of samples for examination.
- c.** Advise the Engineer and the Contractor of the commencement of any work requiring a shop drawing, product data or sample if the submittal has not been approved by the Engineer.

5. Review of Work, Rejection of Defective Work, Inspections and Tests:

- a.** Conduct on-site observations of the work in progress to assist the Engineer in determining if the work is in general proceeding in accordance with the Contract Documents.
- b.** Report to the Engineer whenever the RPR believes that any work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise the Engineer of work that the RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
- c.** Verify that tests, equipment and systems startups and operating and maintenance training are conducted in the presence of appropriate personnel, and that the Contractor maintains adequate records thereof; and observe, record and report to the Engineer appropriate details relative to the test procedures and startups.
- d.** Accompany visiting inspectors representing public or other agencies having jurisdiction over the work, record the results of those inspections and report to the Engineer.

6. Interpretation of Contract Documents: Report to the Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to the Contractor clarifications and interpretations as issued by the Engineer.

7. Modifications: Consider and evaluate the Contractor's suggestions for modifications in drawings or specifications and report the suggestions along with the RPR's recommendations to the Engineer. Transmit to the Contractor decisions as issued by the Engineer.

8. Records:

- a.** Maintain at the job site orderly files for correspondence, reports of job conferences, shop drawings, product data and samples, reproductions of original Contract Documents including all work directive changes, addenda, change orders, field orders, additional drawings issued subsequent to the execution of the Contract, the Engineer's clarifications and interpretations of the Contract Documents, progress reports, and other work related documents.
- b.** Keep a diary or log book, recording the Contractor hours on the job site, weather conditions, data relative to questions of work field orders, change orders or changed conditions, list of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to the Engineer.
- c.** Record names, addresses and telephone numbers of all the Contractors, subcontractors and major suppliers of materials and equipment.

9. Reports:

a. Furnish the Engineer daily progress reports of progress of the work and of the Contractor's compliance with the progress schedule and schedule of shop drawing, product data and sample submittals.

b. Consult with the Engineer in advance of scheduled major tests, inspections or start of important phases of the work.

c. Draft proposed change orders and field orders, obtaining backup material from the Contractor and recommend to the Engineer change orders and field orders.

d. Report immediately to the Engineer and the Owner the occurrence of any accident.

10. Payment Requests: Review applications for payment with the Contractor for compliance with the established procedure for their submission and forward with recommendations to the Engineer, noting particularly the relationship of the payment requested to the schedule of values, work completed and materials and equipment delivered at the site but not incorporated in the Work.

11. Certificates, Maintenance and Operation Manuals: During the course of the work, verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by the Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to the Engineer for review and forwarding to the Owner prior to final payment for the work.

12. Completion:

a. Before the Engineer issues a Certificate of Substantial Completion, submit to the Contractor a punch list of observed items requiring completion or correction.

b. Conduct final inspection in the company of the Engineer, the Owner and the Contractor and prepare a final punch list of items to be completed or corrected.

c. Observe that all items on the final punch list have been completed or corrected and make recommendations to the Engineer concerning acceptance.

C. Limitations of Authority of the Resident Project Representative (RPR):

1. The RPR shall not authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by the Engineer.

2. The RPR shall not exceed the limitations of the Engineer's authority as set forth in the Contract Documents.

3. The RPR shall not undertake any of the responsibilities of the Contractor, subcontractors or the Contractor's superintendent.

4. The RPR shall not advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction unless such advice or directions are specifically required by the Contract Documents.

5. The RPR shall not advise on, issue directions regarding or assume control over safety precautions and programs in connection with the work.

6. The RPR shall not accept shop drawing, product data or sample submittals from anyone other than the Contractor.

7. The RPR shall not authorize the Owner to occupy the work in whole or in part.

8. The RPR shall not participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by the Engineer.

END OF SPECIAL CONDITIONS - SECTION 4

SPECIAL CONDITIONS**SECTION 5****SHOP DRAWING SUBMITTAL SUMMARY**

1. The following list is intended to assist the Contractor in identifying shop drawings, product data and samples that are required to complete the work described in the Contract Documents. The list is not necessarily all inclusive and other shop drawings not listed may be required to be submitted by the Contractor to meet the requirements stated in General Provision Section 60, "Control of Materials" and Special Conditions Section 1, Paragraph 9, "Shop Drawings, Product Data and Samples."

Item No.

Item Description

END OF SPECIAL CONDITIONS - SECTION 5

ITEM P-100 MOBILIZATION & GENERAL CONDITIONS

DESCRIPTION

100-1.1 The work specified in this item consists of the preparatory work and operations in mobilizing for beginning work on the project, including, but not limited to, those operations necessary for the movement of personnel, equipment, supplies and incidentals to the project site, and for the establishment of temporary offices, buildings, guard houses, utilities, safety equipment and first aid supplies, sanitary and other facilities as required by these specifications and state and local laws and regulations. The cost of bonds and any required insurance and any other preconstruction expenses necessary for the start of the work, excluding the cost of construction materials, shall also be included in this section.

METHOD OF MEASUREMENT

100-2.1 Measurement of the item, Mobilization, as specified herein will be on a lump sum basis.

BASIS OF PAYMENT

100-3.1 The work and incidental costs covered under this item will be paid for at the Contract lump sum price for the item of mobilization. The Engineer shall make the final determination of the allowable percentage of completion for the payment of mobilization and shall approve the percentage paid based on the percent of contract amount actually earned which will be based upon actual work completed.

PARTIAL PAYMENTS. Partial payments will be made in accordance with the following:

<u>Percent of Contract Amount Earned*</u>	<u>Allowable Percent Of the Lump Sum Price for the Item**</u>
0	0
5	25
10	50
25	75
50	100

* The Percent of Contract Amount Earned equals the work completed to date (including the total of all previous mobilization) plus or minus work completed associated with executed change orders, if any, divided by the Total Original Contract Amount plus or minus the Total Executed Change Order Amounts, if any.

** In the event the lump sum bid for mobilization exceeds 7.5 percent of the original contract amount for the project, the difference (remainder above 7.5%) will not be paid until the project is complete and the Engineer and Owner has issued a statement of final acceptance as of the date when the Contractor has furnished all of the required reports, certifications and other documentation. The date of final acceptance by the Engineer and Owner will govern, in accordance with statutes and regulations, for payment of retainage or other monies due to the Contractor.

Payment shall be made under:

Item P-100-3.1 Mobilization and General Conditions -- Per Lump Sum.

TESTING REQUIREMENTS

100-4.1 None.

END OF ITEM P-100

ITEM P-102 SAFETY AND SECURITY

GENERAL

102-1.1 The provisions of this safety and security plan and associated procedures are applicable within the boundaries of the **Duluth International Airport**. A complete understanding of all procedures and requirements contained herein is required to ensure safety during construction. This safety plan is a part of this Contract and deviations from the requirements established herein will be sufficient cause for Contract termination.

Required reference material associated with this safety plan includes:

FAA AC 150/5200-18[C], Airport Safety Self-Inspection
FAA AC 150/5210-5[D], Painting, Marking and Lighting of Vehicles Used on an Airport
FAA AC 150/5370-2[F], Operational Safety on Airports During Construction
FAA AC 150/5370-12[A], Quality Control of Construction for Airport Grant Projects

Copies of these documents are included in the specifications.

CONTRACTOR SAFETY AND SECURITY OFFICER

102-2.1 CONTRACTOR SAFETY AND SECURITY OFFICER (CSSO). The Contractor shall appoint its on-site Construction Superintendent or other qualified individual(s) as its duly authorized representative to serve as Contractor Safety and Security Officer (CSSO) for the duration of the Contract. The CSSO shall thoroughly understand the safety and security requirements of the Contract, the necessity for them and shall have sufficient authority to implement its provisions without significant deviation. The Contractor shall notify the Engineer in writing of the name of the individual(s) selected for the assignment.

The CSSO shall represent the Contractor on safety and security requirements compliance. The CSSO shall be especially knowledgeable regarding the requirements of FAA AC's 150/5200-18, Airport Self Inspection Guide and 150/5370-2 Operational Safety on Airports During Construction, latest edition.

102-2.2 RESPONSIBILITIES OF THE CONTRACTOR SAFETY AND SECURITY OFFICER. Prior to the desired date for commencement of any work on the project, the CSSO shall accomplish the following:

a. Develop and submit in writing a detailed work sequence schedule with dates and times specified for all milestone events. This sequence schedule shall conform, as a minimum, to the events specified in Section 3.1, Construction Sequence, and shall be subject to the approval of the Engineer. To assure adequate time for coordination, this document shall be submitted at least one week prior to the date of the Preconstruction Conference.

b. Develop and submit in writing a detailed outline of the procedures to be followed to maintain safety and security of both Contractor operations and the integrity of airport landside and airside operations during the prosecution of contract work. This plan shall detail, in addition, the procedures to be followed in the event of an accident or fire involving Contractor personnel and the Contractor's efforts to maintain fire protection and security. These procedures shall be subject to the approval of the Engineer and reflect any change as may be deemed necessary.

c. Conduct at least one meeting of all Contractor supervisory personnel prior to the start of contract work. The purpose of this meeting is to review the approved Work sequence schedule and safety and security procedures. Attendance at this meeting by the CSSO, all Contractor supervisory

personnel and the Engineer is mandatory. This meeting shall also be open to other employees of the Contractor and others as the Engineer may deem appropriate. Minutes of this meeting shall be taken by the CSSO, copies provided to each supervisor and kept on file in the Contractor's construction office for periodic review and updating.

d. Develop a safety and security orientation program and provide a briefing for all employees of the Contractor and subcontractors that will be used on the project. A similar briefing will be given to new employees prior to their use on contract work. In addition, the CSSO shall be responsible for briefing, from time to time, all Contractor personnel on any changes to safety and security measures deemed necessary.

CONSTRUCTION SEQUENCING

102-3.1 CONSTRUCTION SEQUENCE. The Contractor shall prepare a construction schedule and submit to the Engineer at least one week prior to the pre-construction conference.

102-3.2 CLOSING RUNWAYS. The Contractor shall acquaint his supervisors and employees with the sequence of construction and its relationship to airport activity and aircraft operations that are inherent to this airport. No runway, taxiway, apron or airport roadway shall be closed without the written approval of the Owner, to enable necessary NOTAMS and/or advisories to airport fixed based operators (FBOs), tenants and users.

The Contractor shall contact the Engineer a minimum of ten (10) days prior to any requested closing.

Any construction activity within **[250]** feet of the centerline of an active runway or within **[160]** feet of the centerline of an active taxiway or apron requires the closure of the affected area. These safety areas are shown on the phasing plan.

The Engineer will arrange for an inspection prior to return to service of any facility, that has been closed for work, on or adjacent thereto, or that has been used for a crossing point or haul route by the Contractor.

MARKING AND LIGHTING

102-4.1 Proper marking and lighting of areas on the airfield associated with the construction shall be the responsibility of the Contractor. This will include properly marking and lighting closed runways, taxiways, taxilanes, and aprons, the limits of construction, material storage areas, equipment storage areas, haul routes, parking areas and other areas defined as required for the Contractor's exclusive use. The Contractor shall erect and maintain around the perimeter of these areas suitable marking and warning devices visible for day and night use. Temporary barricades, flagging, and flashing warning lights shall be required at critical access points. The type and location of marking and warning devices will be approved by the Engineer.

Special emphasis shall be given to open trenches, excavations, heavy equipment marshalling areas, and stockpiled material located in the airport operations area, which shall be predominantly marked by the Contractor with flags and lighted by approved light units during hours of restricted visibility and darkness. All marking shall be in accordance with FAA Advisory Circular (AC) 150/5340-1J or latest edition.

TRAFFIC CONTROL

102-5.1 VEHICLE IDENTIFICATION. The Contractor shall establish and maintain a list of Contractor and subcontractor vehicles authorized to operate on the site. Contractor employee vehicles shall be

restricted to the Contractor's staging area and are not allowed in the Airport Operations Area (AOA) at any time. To be authorized to operate on the airport, each Contractor or subcontractor's vehicle shall:

a. be marked/flagged for high daytime visibility and lighted for nighttime operations. Vehicles that are not marked and/or lighted shall be escorted by a vehicle appropriately marked and/or lighted. Vehicles requiring escort shall be identified on the list.

b. be identified with the name and/or logo of the Contractor and be of sufficient size to be identified at a distance. Vehicles needing intermittent identification could be marked with tape or with commercially available magnetically attached markers. Vehicles that are not appropriately identified shall be escorted by a vehicle that conforms to this requirement. Vehicles requiring escort shall be identified on the list.

c. be operated in a manner that does not compromise the safety of either landside or airside airport operations. If, in the opinion of the Engineer, any vehicle is operated in a manner not fully consistent with this requirement, the Engineer has the right to restrict operation of the vehicle or prohibit its use on the airport.

102-5.2 ACCESS TO THE SITE OF CONSTRUCTION. The Contractor's access to the site shall be as shown on the Contract Layout Plan. No other access points shall be allowed unless approved by the Engineer. All Contractor traffic authorized to enter the site shall be experienced in the route or guided by Contractor personnel. The Contractor shall be responsible for traffic control to and from the various construction areas on the site, and for the operation and security of the access gate to the site. A Contractor's flagman or traffic control person shall monitor and coordinate all Contractor traffic at the access gate with Airport Security. The Contractor shall not permit any unauthorized construction personnel or traffic on the site. Access gates to the site shall be locked and secured at all times when not attended by the Contractor. If the Contractor chooses to leave any access gate open, it shall be attended by Contractor personnel who are familiar with the requirements of the Airport Security Program. The Contractor is responsible for the immediate cleanup of any debris deposited along the access route as a result of his construction traffic. Directional signing from the access gate along the delivery route to the storage area, plant site or work site shall be as directed by the Engineer. In addition, the following requirements are applicable:

a. All Contractor traffic authorized to travel on the airport shall have been briefed as part of the Contractor's construction safety and security orientation program, be thoroughly familiar with the access procedures and route for travel or be escorted by personnel authorized by the Contractor Safety and Security Officer (CSSO).

b. The Contractor shall install work site identification signs at the authorized access point(s). If, in the opinion of the Engineer, directional signs are needed for clarity, they shall be installed along the route authorized for access to each construction site.

c. Under no circumstance will Contractor personnel be permitted to drive their individually owned vehicles to any construction site on the airport. All vehicles must be parked in the area designated for employee parking and out of secured airport property.

d. In addition to the inspection and cleanup required at the end of each shift, the Contractor is responsible for the immediate cleanup of any debris generated along the construction site access route(s) as a result of construction related traffic or operations whether or not created by Contractor personnel.

102-5.3 MATERIAL SUPPLIERS. All material suppliers, subcontractors and visitors to the work site are obligated to follow the same safety and security operating procedures as the Contractor. All material

suppliers shall make their deliveries using the same access points and routes as the Contractor and shall be advised of the appropriate delivery procedures at the time the materials order is placed. The Contractor shall not use the Airport address for any delivery but shall use the street address appropriate to the location of the entrance of the work site. If it is not practical to conform to the vehicle identification requirements of Section 102-5.1 and the safety and security operations program requirements of Section 102-2.2, the Contractor shall be prepared to escort all suppliers, subcontractors and visitors while they are on the airport.

102-5.4 PERSONNEL IDENTIFICATION. All employees, agents, vendors, invitees, etc. of the Contractor or subcontractors requiring access to the construction site shall, conform to the Security Program.

GENERAL SAFETY REQUIREMENTS

102-6.1 All Contractor vehicles that are authorized to operate on the airport outside of the designated construction area limits or haul routes as defined herein shall display in full view above the vehicle a flashing amber (yellow) dome-type light or a three-foot by three-foot, or larger, orange and white checkerboard flag, each checkerboard color being one-foot square. Vehicles must be under control of a Contractor mobile (two-way) radio operator (flagmen) monitoring the Airport frequency. Vehicle operators must be vigilant for conflict with any aircraft and give way to any operating aircraft.

All Contractor vehicles that are required to operate outside of the construction area limits as defined herein and cross active runways, taxiways, aprons, or runway approach clear zones shall do so under the direct control of a flagman who is monitoring the Airport frequency. Flagmen and two-way radios shall be furnished by the Contractor. Flagmen shall be instructed in the use of two-way radios prior to use. All aircraft traffic on runways, taxiways and aprons shall have priority over Contractor's traffic.

Construction vehicles not in use for extended periods during the work day, or during nights and weekends (nonwork periods) shall be parked away from active runways, taxiways, and aprons in designated vehicle marshalling areas.

102-6.2 In order to protect all aircraft traffic, aviation related businesses, terminal apron areas, etc. from potential damage caused by foreign object debris (FOD) generated by construction activities, the Contractor shall provide a vacuum truck as required at the startup of construction to daily vacuum all pavements affected by construction. The vacuum truck shall remain on-site for the duration of the project and shall be available at the discretion of the Owner to vacuum pavement areas adjacent to the construction areas to ensure no FOD is present on pavements within 500 feet of any construction area. Protecting the aircraft, airport tenants, users, public, etc. against FOD is a critical safety issue therefore the cost of the vacuum truck will be included in the cost established for this specification item.

CONSTRUCTION CONTROL

102-7.1 A primary and alternate responsible Contractor's representative shall be designated by the Contractor. The Contractor's representatives shall be available locally on a 24-hour basis. Names of the primary and alternate, including phone number, shall be made available to the Engineer by the Contractor. The Contractor shall insure that the names and phone numbers are kept current and made available to the Engineer.

CONSTRUCTION TECHNIQUES

102-8.1 Construction shall be planned and conducted throughout this project in such a manner as to allow the maintenance of completely safe airport operations. Every effort shall be made to reduce the

impact of construction activity on overall airport operations. To this end the Contractor's activities shall be conducted in such a manner so as to preclude, except where absolutely required, open excavations, trenches, ditches and above ground obstacles such as booms on cranes or obstacle markers such as wooden saw horses. The primary responsibility for assuring that the safest possible construction techniques are followed rests with the Contractor Safety and Security Officer (CSSO).

METHOD OF MEASUREMENT

102-9.1 The item of Safety and Security shall be measured as a lump sum item when required and furnished for the life of the Contract.

BASIS OF PAYMENT

102-10.1 Payment shall be made for airport safety and security measures for personnel or materials related to this specification item and incidentally required to satisfy the specified objective(s) under item P-102-10.0, Safety and Security. This compensation shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

PARTIAL PAYMENTS. Partial payments will be made in accordance with the following:

<u>Percentage of Original Contract Earned</u>	<u>Allowable Percent of the Lump Sum Price for the Item</u>
5	15
15	20
25	25
50	50
75	75
100 (or Contract Completion)	100

Payment shall be made under:

Item P-102-10.1	Safety and Security - Per Lump Sum.
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TESTING REQUIREMENTS

102-11.1 None.

END OF ITEM P-102

ITEM P-104 PROJECT SURVEY AND STAKEOUT

DESCRIPTION

104-1.1 Under this item, the Contractor shall do all necessary surveying required to construct all elements of the work as shown on the Contract Drawings and specified in the proposal and specifications. This shall include but not be limited to stakeout, layout and elevations for pavements, structures, forms and appurtenances as shown and required, consistent with the current practices and shall be performed by qualified personnel acceptable to the Engineer. The stakeout survey shall proceed immediately following the award of the Contract or as soon as authorized by the Owner and shall be expeditiously progressed to completion in a manner and at a rate satisfactory to the Engineer. The Contractor shall keep the Engineer fully informed as to the progress of the stakeout survey. All survey work shall be provided under the direction of a licensed land surveyor.

MATERIALS

104-2.1 All instruments, equipment, stakes and any other material necessary to perform the work satisfactorily shall be provided by the Contractor.

All stakes used shall be of a type approved by the Engineer. It shall be the Contractor's responsibility to maintain these stakes in their proper position and location at all times.

The Contractor shall supply to the Engineer a rod, level and tripod for his exclusive use during the entire project. The rod shall be 15 feet in length with hundredth-of-a-foot graduation. The level shall be self-leveling and have documentation demonstrating it has been calibrated within one month of the work commencement. All provided equipment shall be in good working order and maintained by the Contractor throughout the course of the project.

CONSTRUCTION METHODS

104-3.1 The Contractor shall trim trees, brush and other interfering objects, not inconsistent with the Contract Drawings, from survey lines in advance of all survey work to permit accurate and unimpeded work by his stakeout survey crews.

The exact position of all work shall be established from control points, baseline transit points or other points of similar nature that are shown on the Contract Drawings and/or modified by the Engineer. Any error, apparent discrepancy or absence in or of data shown or required for accurately accomplishing the stakeout survey shall be referred to the Engineer for interpretation or furnishing when such is observed or required.

The Contractor shall place two offset stakes or references at each centerline station and at such intermediate locations as the Engineer may direct. From computations and measurements made by the Contractor, these stakes shall be clearly and legibly marked with the correct centerline station number, offset and cut or fill so as to permit the establishment of the exact centerline location and elevation during construction. If markings become faded or blurred for any reason, the markings shall be restored by the Contractor at the request of the Engineer. He shall locate and place all cut, fill, slope, fine grade or other stakes and points, as the Engineer may direct, for the proper progress of the work. All control points shall be properly guarded and flagged for easy identification.

Drainage structures shall be staked out by the Contractor at the locations and elevations shown on the Contract Drawings or specified by the Engineer.

Reference points, baselines, stakes and benchmarks for borrow pits shall be established by the Contractor.

Permanent survey marker locations shall be established and referenced by the Contractor.

The Contractor shall be responsible for the accuracy of his work and shall maintain all reference points, stakes, etc., throughout the life of the work. Damaged or destroyed points, benchmarks or stakes, or any reference points made inaccessible by the progress of the construction, shall be replaced or transferred by the Contractor. Any of the above points which may be destroyed or damaged shall be transferred by the Contractor before they are damaged or destroyed. All control points shall be referenced by ties to acceptable objects and recorded. Any alterations or revisions in the ties shall be so noted and the information furnished to the Engineer immediately. All stakeout survey work shall be referenced to the centerlines shown on the Contract Drawings. All computations necessary to establish the exact position of the work from control points shall be made and preserved by the Contractor. All computations, survey notes and other records necessary to accomplish the work, shall be neatly made. Such computations, survey notes and other records shall be made available to the Engineer upon request and shall become the property of the Owner and delivered to the Engineer not later than the date of acceptance of the Contract.

The Contractor shall furnish, at his expense, all horizontal and vertical control, all staking and layout of construction work called for on the plans and the Engineer and Owner shall not be responsible for such work. However, the Owner and Engineer reserve the right to check all said lines, grades, and measurements with their appointed surveyor. Should the Owner's surveyor detect errors in said lines, grades, and measurements, the Contractor shall pay for all said surveying costs and subsequent surveying costs performed to verify correction of errors found in said lines, grades and measurements. Included in this are all blue top staking for subgrade and base course installation. Definition of an error shall be a discrepancy of 1/4" or more. In the case of a discrepancy between the technical specifications and this defined tolerance, this tolerance shall govern.

Prior to the final cross-section survey of the work by the Contractor, the Contractor shall reestablish centerline or baseline points and stationing as required by the Engineer.

Prior to the final cross-section survey of any borrow pits, the Contractor shall reestablish the baseline points and stationing, as well as any necessary benchmarks as required by the Engineer.

During the progress of the construction work, the Contractor will be required to furnish all of the surveying and stakeout incidental to the proper location by line and grade for each phase of the work. For paving and any other operation requiring extreme accuracy, the Contractor will restake with pins or other acceptable hubs located directly adjacent to the work at a spacing directed by the Engineer.

Any existing stakes, iron pins, survey monuments or other markers defining property lines which may be disturbed during construction shall be properly tied into fixed reference points before being disturbed and accurately reset in their proper position upon completion of the work.

Just prior to completion of the work, the Contractor shall reestablish, if necessary, and retie all control points as permanently as possible and to the satisfaction of the Engineer.

104-3.2 The Contractor shall be required to submit cross sectional data to the Engineer at monthly intervals prior to the Contractor submittal of the monthly application for payment so that the Engineer can verify the quantities of various earthwork and materials volumes for payment. All cross sectional data provided at any time will be in AutoCad 2000 or higher format only. No other formats will be accepted. If the data is submitted in another format other than AutoCad, no earthwork or other materials volumes will be calculated and approved for payment. The earthwork shall include, but not be limited to, unclassified

excavation, embankment, new or existing subbase courses, new or existing base courses, sand/asphalt subgrade, topsoil, etc.

METHOD OF MEASUREMENT

104-4.1 Payment will be made at the lump sum price bid for this item.

BASIS OF PAYMENT

104-5.1 The lump sum price bid shall include the cost of furnishing all labor, equipment, instruments and all other material necessary to satisfactorily complete the work's surveying and stakeout. Partial payments will be made at the discretion of the Engineer as the work progresses based generally on the percentage of actual work completed compared to the total construction cost.

Payment will be made under:

Item P-104-5.1

Project Survey and Stakeout - Per Lump Sum.

TESTING REQUIREMENTS

104-6.1 None.

END OF ITEM P-104

ITEM P-105 TEMPORARY CONSTRUCTION ITEMS

DESCRIPTION

105-1.1 This item consists of furnishing all labor, materials and equipment for temporary construction items necessary for the safe and proper execution of work and not otherwise included in other contract bid items. The Contractor will be expected to supply and utilize the items listed below and other items contained in the plans and specifications. Temporary construction items to be provided include, but are not limited to the following: flaggers, portable floodlighting, steel plates for temporary covering of excavations and structures as required, construction barricades, test pitting, and men and equipment as needed to keep all areas free of debris.

MATERIALS

105-2.1 CONSTRUCTION BARRICADES. Construction barricades shall be constructed in accordance with the details shown in the plans and shall be placed in accordance with the phasing plans and phasing notes drawings.

105-2.2 PORTABLE FLOODLIGHTING. Portable floodlighting shall be provided, as required, for construction that must occur during nighttime operations. The Contractor shall provide sufficient units so that all work areas are illuminated to a level of 5 horizontal footcandles. The lighting levels shall be calculated and measured in accordance with the current standards of the Illumination Engineering Society.

105-2.3 STEEL PLATES. Steel plates of adequate size and thickness shall be furnished as necessary to cover temporary excavations, unfinished structures or surfaces requiring protection or for safety purposes. Plates shall be securely fastened down and shall be adequate to safely support any anticipated loadings to be imposed.

105-2.4 OTHER MISCELLANEOUS ITEMS. Any other items not listed herein but which are associated directly or indirectly with temporary construction related work shall, by reference, be included in the requirements of this specification. No additional payment will be made for any temporary construction related item not specifically listed herein. The Contractor shall be responsible for providing any and all items necessary to ensure a safe, secure and functioning project construction site.

CONSTRUCTION METHODS

105-3.1 CONSTRUCTION BARRICADES. Barricades shall be placed around each phase of the work in accordance with the phasing plans and shall remain in place until completion of work in each phase.

105-3.2 FLAGGERS. Flaggers shall be provided, as necessary, to control the Contractor's traffic during the prosecution of work. All Contractor vehicles or equipment that are required to cross active airfield pavement or safety areas shall do so under the direct control of a competent flagger.

105-3.3 PORTABLE FLOODLIGHTING. Portable floodlighting is required for construction during periods of limited visibility (i.e., nighttime). Illumination requirements shall be those contained in Paragraph 105-2.2.

METHOD OF MEASUREMENT

105-4.1 No direct measurement will be made for this item. Payment will be made on a lump sum basis.

BASIS OF PAYMENT

105-5.1 Payment will be made at the lump sum bid price for "Temporary Construction Items." This payment shall be full compensation for furnishing all materials and labor for placing, moving and removing construction barricades and steel plates, providing flaggers, furnishing portable floodlighting, test pitting, and for any other labor, materials, equipment, tools and incidentals necessary for temporary items required for construction of this work.

Payment for these items will be made in installments. The first payment of 10 percent of the lump sum price will be included in the first progress estimate following the initiation of construction work. The remaining 90 percent of the lump sum price will be included as installments in subsequent progress estimates. Each such installment will be determined based on the ratio of the total work completed to date of the total contract amount.

Payment will be made under:

Item P-105-5.1

Temporary Construction Items - Per Lump Sum.

TESTING REQUIREMENTS

105-6.1 As required.

END OF ITEM P-105

ITEM P-106 REMOVAL OF PAINTED PAVEMENT MARKING

DESCRIPTION

106-1.1 This item shall consist of furnishing all labor, materials and equipment required for the removal of markings which are no longer appropriate, including the removal of temporary painted pavement markings installed under this contract, as directed by the Engineer.

EQUIPMENT

106-2.1 Equipment, tools and machines used in the performance of the removal operation shall be safe and in satisfactory working condition at all times. The Contractor shall provide satisfactory evidence that the Contractor's equipment has been used in the performance of similar work.

106-2.2 The water blasting equipment shall be truck mounted and shall be capable of water pressures of 2,000 to 40,000 psi. The equipment shall be capable of adjusting the pressure to accomplish paint removal without damaging the paving surface. The equipment shall be capable of following a straight line and be maneuverable to accommodate various pavement markings. The spray width needs to be able to accommodate lines from 4" to 8" wide. If water blasting is used to remove lines on active airfield pavements, a vacuum system will be provided to allow for timely repainting and the prevention of any debris being ingested into propellers or turbine engines once the water blasting equipment has exited the active pavements.

106-2.3 The Contractor shall submit the proposed water blasting equipment to the Engineer as a formal submittal for his review and approval prior to use of the equipment on the project.

PERFORMANCE

106-3.1 This removal operation will be accomplished with high pressure water blasting. Milling, grinding and sandblasting are prohibited for the removal of either temporary or permanent markings on finished pavement surfaces. The use of chemicals will also not be permitted. The Contractor shall furnish all equipment, water trucks and labor for delivery of water to the job site. Water is available for the Contractor's use from hydrants on airport property. If the Contractor chooses to use water from this source, he shall provide and attach a water meter to the hydrant(s). The Contractor shall obtain any and all permits, pay any and all fees and provide to the Engineer the written approval of the authority having jurisdiction over the water source that all requirements for its use have been met. The quantity of water used, as measured by the meter, shall be charged to the Contractor at the Owner's prevailing rate.

106-3.2 The removal method applied to the surface shall not be damaging to portland cement or asphaltic concrete surfaces, joint sealing material or light fixtures. If it is deemed by the Engineer that damage to any existing facility is caused by an operational error, such as permitting a pressure water jet to dwell in one location for an extensive time, the Contractor shall repair said damage without additional compensation from the Owner.

106-3.3 Paint removal shall be defined as the removal of at least 95 percent of the existing markings. The 95 percent removal will be determined by the Engineer by visual inspection. In addition to the visual determination, the 95 percent removal level is defined such that there will not be any remaining surface of undisturbed paint or individual contiguous areas larger than one square inch where the surface of the pavement material is not clearly exposed.

106-3.4 The water blasting method used shall not materially damage the structural integrity of the pavement. Any damage caused by the Contractor's operations shall be corrected at the Contractor's expense and in a manner approved by the Engineer. The Contractor shall take precautions to protect the

public from any damage due to his operations. Accumulation of sand, water, dust, or other residue resulting from the removal operation shall be removed as the work progresses and legally disposed of off airport property.

METHOD OF MEASUREMENT

106-4.1 The quantity of painted pavement marking removal to be paid shall be the number of square feet of painted pavement marking removed in accordance with the specifications and accepted by the Engineer.

BASIS OF PAYMENT

106-5.1 Payment shall be at the contract unit price per square foot for removal of painted pavement markings. The price shall be full compensation for furnishing all materials and for all labor, equipment, tools and incidentals necessary to complete the item.

Payment will be made under:

Item P-106-5.1

Painted Pavement Marking Removal - Per Square Foot.

TESTING REQUIREMENTS

106-6.1 None.

END OF ITEM P-106

ITEM P-107 PAVEMENT DEMOLITION

DESCRIPTION

107-1.1 This item consists of the demolition of existing portland cement and/or bituminous concrete pavement as shown on the plans. Removal of demolished pavements shall be as specified herein.

CONSTRUCTION METHODS

107-2.1 Existing pavements shall be broken into pieces of such size easily handled by power-driven machinery or other suitable means.

107-2.2 Where only a portion of the existing pavement is to be demolished, special care shall be exercised to avoid damage to that portion of the pavement to remain in place. The existing pavement shall be cut to the neat lines shown on the plans or established by the Engineer, and any existing pavement beyond the neat lines so established which is damaged or destroyed by these operations shall be replaced at the Contractor's expense with no additional compensation from the Owner.

107-2.3 Portland cement and bituminous concrete pavements which are demolished shall be legally disposed of off Airport property. The cost of removal and disposal of all demolished pavement shall be included in the unit price for Bituminous Concrete Pavement or Portland Cement Concrete Pavement Demolition.

Pavement demolition will include but not necessarily be limited to, any existing foundations, slabs, footings, etc. either made of concrete or asphalt which must, in the opinion of the Engineer, be removed to install new pavements, earthwork, seeding, sod, perform proper site grading, provide for positive site grading, etc. to complete the project to the intent established within the plans and specifications. Any of the above mentioned demolition related items are to be removed regardless of which bid item is utilized for payment. It is incumbent upon the Contractor to visit the site and include all such existing conditions in the bid item provided for in the bid schedule.

In the event the demolished portland cement concrete and/or bituminous concrete pavements are used either as recycled asphalt pavement (RAP) or pavement that will be crushed and utilized as base or subbase material on the project, the cost for removal and operations performed to reuse the demolished pavements shall be included in the unit prices for which the material will be used.

MEASUREMENT

107-3.1 Existing portland cement and/or bituminous concrete pavement demolition as prescribed above will be measured by the square yard of pavement material demolished regardless of its thickness.

BASIS OF PAYMENT

107-4.1 The work performed as prescribed by this item will be paid for at the contract unit price bid per square yard for Portland Cement Concrete Pavement Demolition and/or Bituminous Concrete Pavement Demolition, which prices shall be full compensation for saw cutting, breaking up the pavement and for all labor, tools, equipment, manipulation, and incidentals necessary to complete the work.

Payment shall be made under:

Item P-107-4.1	Remove and Dispose Composite Pavement Full Depth (Includes Concrete and Asphalt Airfield Pavement) - Per Square Yard
Item P-107-4.2	Remove and Dispose Concrete Sidewalk - Per Square Yard.
Item P-107-4.3	Remove and Dispose Asphalt Pavement Full Depth- Per Square Yard
Item P-107-4.4	Remove Concrete Curb and Gutter – Per Linear Foot
Item P-107-4.5	Remove Street Signs – Per Each

TESTING REQUIREMENTS

107-5.1 None.

END OF ITEM P-107

ITEM P-109 SAWCUTTING

DESCRIPTION

109-1.1 This work shall consist of sawcutting the edge of existing portland cement and/or asphaltic concrete pavements to provide a uniform joint alignment in sound material, as shown on the Plans or as directed by the Engineer.

EQUIPMENT

109-2.1 Saws shall be power-driven, self-propelled, wheel or track-mounted, and capable of cutting to a depth of at least three (3) inches in one pass. The Contractor shall make the necessary number of passes to cut through the portland cement and/or bituminous concrete pavement. The use of a cutting wheel mounted on a roller, grader or similar equipment, or the use of pneumatically driven hand-held tools, will only be approved if the Contractor can demonstrate to the satisfaction of the Engineer that such equipment can consistently produce satisfactory results. Multi-blade arbor saws shall be used to construct sealant reservoirs.

CONSTRUCTION METHODS

109-3.1 The Contractor shall establish the line to be cut using chalkline or similar means in accordance with the details shown on the Plans or as directed by the Engineer. The finished cut shall be true to line, smooth and vertical and shall not deviate from the established line more than 1/2-inch from side to side or end to end of the pavement being sawcut.

109-3.2 The existing paving material beyond the saw cut on the construction side shall be removed to the depth of the final cut and disposed of legally off Airport property. The saw cut depth shall be full depth so that spalling or other breakage of the existing pavement along the bottom of the pavement does not occur. If spalling or other breakage of the existing pavement along the bottom of the pavement does occur, the Contractor shall relocate the saw cut line to a point deeper in the existing pavement to remove completely any spalled or broken pavement so that the subbase under the existing pavement is not damaged and the new pavement can be constructed up against the existing pavement without either the new or existing pavement strength and pavement section being compromised.

109-3.3 All dust, chips, slurry, or waste material shall be carefully collected and removed from the site in accordance with the general safety requirements of the Contract and disposed of legally off the airport property.

METHOD OF MEASUREMENT

109-4.1 ~~Sawcutting will not be measured for payment~~ on existing pavements will be measured by the linear foot for asphaltic concrete and Portland cement pavements. The quantity of sawcutting will be determined by surface measurement.

BASIS OF PAYMENT

109-5.1 Payment shall be made at the contract unit price per linear foot for pavement sawcutting of asphaltic concrete. This payment shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all work involved in sawcutting, removing and disposing of the residue and cleaning the pavement in accordance with these specifications and as shown on the Plans. No separate payment will be made for Portland concrete cement sawcutting.

Payment will be made under:

- | | |
|----------------|--|
| Item P-109-5.1 | Sawing Concrete Pavement (Full Depth) – per Linear Foot. |
| Item P-109-5.2 | Sawing Bituminous Pavement (Full Depth) – per Linear Foot. |

TESTING REQUIREMENTS

109-6.1 None.

END OF ITEM P-109

ITEM P-152 EXCAVATION AND EMBANKMENT

DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 CLASSIFICATION. All material excavated shall be classified as defined below:

a. Unclassified Excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature, which is not otherwise classified and paid for under the following items.

b. Rock Excavation. ~~Rock excavation shall include all solid rock in ledges, in bedded deposits, in unstratified masses, and conglomerate deposits which are so firmly cemented they cannot be removed without blasting or using rippers. All boulders containing a volume of more than 1/2 cubic yard (0.4 cubic meter) will be classified as "rock excavation."~~

c. Muck Excavation. ~~Muck excavation shall consist of the removal and disposal of deposits or mixtures of soils and organic matter not suitable for foundation material. Muck shall include materials that will decay or produce subsidence in the embankment. It may be made up of decaying stumps, roots, logs, humus, or other material not satisfactory for incorporation in the embankment.~~

d. Drainage Excavation. ~~Drainage excavation shall consist of all excavation made for the primary purpose of drainage and includes drainage ditches, such as intercepting, inlet or outlet, temporary levee construction; or any other type as shown on the plans.~~

e. Borrow Excavation. Borrow excavation shall consist of approved material required for the construction of embankment or for other portions of the work in excess of the quantity of usable material available from required excavations. Borrow material shall be obtained from areas within the limits of the airport property but outside the normal limits of necessary grading, or from areas outside the airport.

152-1.3 Unsuitable Excavation. Any material containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material, when approved by the Engineer as suitable to support vegetation, may be used on the embankment slope.

152-1.4 CONTAMINATED MATERIAL. All borrow material shall be naturally occurring and originate from a source that has not been impacted from any known or unknown environmental concern, industrial process, or other uncontrolled activities such as, but not limited to, emergency responses, hazardous material incidents or discharges of any regulated/adverse chemical compounds.

The borrow material shall be free of any industrial waste, sanitary waste, household waste or solid waste, and shall not exhibit any signs of sludge, staining, pitting, strong pungent noxious odors, non-aqueous phase liquids, foreign debris, and hazardous substance and petroleum product containers or other pollutants.

The borrow material shall not contain or have come in contact with asbestos, polychlorinated biphenyl's (PCBs), petroleum wastes, medical wastes, radioactive waste or other classified waste.

The borrow material shall not be classified as a listed hazardous waste as defined by the United States Environmental Protection Agency (USEPA) in 40 CFR Part 261 Subpart D or having the characteristics of hazardous waste (ignitability, corrosivity, reactivity or toxicity) defined in 40 CFR Part 261 Subpart C. In addition, the borrow material shall be free of petroleum contaminants of concern as defined in Table II of Chapter 62-777 Florida Administrative Code, other pollutants identified by the Florida Department of Environmental Protection Waste Management Rules or other regulated substances that have State Cleanup Standard requirements.

Prior to bringing any borrow material on-site, the Contractor shall identify the intended source(s) of borrow material he proposes to use in the project, and notify the Engineer of those locations. The Engineer shall visit the proposed borrow site(s) and perform an inspection of the site(s), perform the necessary testing of the borrow materials identified by the Contractor for use in the project to establish that the materials meet the requirements of the specifications, and to establish the boundaries of the borrow stockpiles.

The Contractor shall be required to perform limited Phase I Site Assessment of the proposed borrow materials to establish a benchmark of acceptable materials to be used in the project. The Contractor shall also perform a soil characterization study of the borrow material before such material is approved for use on-site. The Contractor shall also certify, in writing, to the Engineer and Owner that the materials delivered to the site are from the approved borrow sources.

The Engineer, at his discretion, will perform random soil characterization testing of individual truck loads of borrow materials as they enter the project site to verify they are from the approved borrow sources based upon the soil characterizations of the approved sources and those of the random tested materials.

If test results determine that soils are contaminated, construction activities will cease and the Florida Department of Environmental Protection (FDEP) and the Federal Environmental Protection Agency (EPA) shall be notified of the violation(s). There may also be fines and/or penalties levied against the Contractor by any jurisdiction having authority over the project site as well as the FDEP and EPA. Any fines or penalties levied against the Owner due to the contaminated soil shall be passed on to the Contractor who shall be solely responsible for payment of those fines. Any costs associated with the testing by the Engineer that determines that contaminated soils of materials brought to the site are present shall be paid by the Contractor. Also, any material brought to the site that is determined to be contaminated shall be removed in its totality by the Contractor at no additional cost to the Owner and remediation and/or disposal of contaminated soils shall be required in accordance with the rules and regulations of the jurisdiction(s) having authority.

CONSTRUCTION METHODS

152-2.1 General. ~~Before beginning excavation, grading, and embankment operations in any area, the area shall be completely cleared and grubbed in accordance with Item P-151.~~

The suitability of material to be placed in embankments shall be subject to approval by the Engineer. All unsuitable material shall be disposed of in waste areas shown on the plans or disposed of legally off airport property. All waste areas shall be graded to allow positive drainage of the area and of adjacent areas. When disposed of on the airport, the surface elevation of waste areas shall not extend above the surface elevation of adjacent usable areas of the airport, unless specified on the plans or approved by the Engineer.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued. At the direction of the Engineer, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Those areas outside of the pavement areas in which the top layer of soil material has become compacted, by hauling or other activities of the Contractor shall be scarified and disked to a depth of 4 in (100 mm), in order to loosen and pulverize the soil.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the Engineer, who shall arrange for their removal if necessary. The Contractor shall, at his/her own expense, satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

152-2.2 EXCAVATION. No excavation shall be started until the work has been staked out by the Contractor and the Engineer has reviewed and approved obtained elevations and measurements of the ground surface provided by the Contractor. All Only suitable excavated material shall be used in the formation of embankment, subgrade, or for other purposes shown on the plans. All unsuitable material, as defined in paragraph 152-1.3, shall be disposed of legally as shown on the plans at locations off airport.

When the volume of the excavation exceeds that required to construct the embankments to the grades indicated, the excess shall be used to grade the areas of ultimate development or disposed of as directed by the Owner/Engineer. When the volume of excavation is not sufficient for constructing the fill to the grades indicated, the deficiency shall be obtained from borrow areas.

The grade shall be maintained so that the surface is well drained at all times. When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the work. Such temporary drains and drainage ditches shall be the responsibility of the Contractor and shall not be paid for separately but shall be included in other items of work.

a. Selective Grading. When selective grading is indicated on the plans, the more suitable material as designated by the Engineer as approved in paragraphs 1.3 and/or 1.4 shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas so that it can be measured for payment for rehandling as specified in paragraph 3.3.

b. Undercutting. Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turfing shall be excavated to a minimum depth of 12 in (300 mm), or to the depth specified by the Engineer, below the subgrade. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed of at locations shown on the plans. This excavated material shall be paid for at the contract unit price per cubic yard (per cubic meter) for [rock excavation]. The excavated area shall be refilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary refilling will constitute a part of the embankment. Where rock cuts are made and refilled with selected material, any pockets created in the rock surface shall be drained in accordance with the details shown on the plans. A material that is high in moisture content and which yields under proof rolling does not necessarily classify as unsuitable material unless so classified in accordance with Section 152-1.3. Undercutting of suitable but wet material does not constitute unsuitable material. The Contractor is required to manipulate and dry the material unless the material is classified as unsuitable in accordance with Section 152-1.3. If the material is classified as unsuitable material, then the Contractor shall remove the material to the depth directed by the Engineer but not greater than 3-feet below subgrade. The backfill of such areas shall not begin until the volume of the excavation is determined by cross sections or other means acceptable to the Engineer. The backfill shall be accomplished in the same manner as other embankment called out in this section with regard to the thickness and compaction requirements. The payment for the backfill shall be in accordance with a specific pay item designated for use as a backfill material and acceptable for use by

the Engineer. The backfill material may consist of borrow excavation, unclassified excavation or select backfill and may be P-154, P-209, milled bituminous concrete, crushed recycled portland cement concrete or other materials acceptable to the Engineer. All select backfill shall pass 1-1/2-inch sieve.

c. Overbreak. Overbreak, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the Engineer. The Engineer shall determine if the displacement of such material was unavoidable and his/her decision shall be final. All overbreak shall be graded or removed by the Contractor and disposed of as directed; however, payment will not be made for the removal and disposal of overbreak that the Engineer determines as avoidable. Unavoidable overbreak will be classified as "Unclassified Excavation."

d. Removal of Utilities. The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by someone other than the Contractor, for example, the utility authority having jurisdiction unless otherwise shown on the plans. All existing foundations shall be excavated for at least 2 feet (60 cm) below the top of subgrade or as indicated on the plans, and the material disposed of as directed. All foundations thus excavated shall be backfilled with suitable material and compacted as specified herein.

e. Compaction Requirements. The subgrade under areas to be paved shall be compacted to a depth of **[12 inches]** and to a density of not less than **[100]** percent of the maximum density as determined by the modified Proctor Compaction Test ASTM **[D1557]**. The material to be compacted shall be within +/- 2 percent of optimum moisture content before rolled to obtain the prescribed compaction (except for expansive soils).

~~The in-place field density shall be determined in accordance with ASTM D 1556 or ASTM D 2167. The in-place field densities shall be determined in accordance with ASTM D 6938/D 3017 with verification by ASTM D 1556. Stones or rock fragments larger than 4 in (100 mm) in their greatest dimension will not be permitted in the top 6 in (150 mm) of the subgrade. The finished grading operations, conforming to the typical cross section, shall be completed and maintained at least 1,000 feet (300 m) ahead of the paving operations or as directed by the Engineer.~~

In cuts, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line of finished grade of slope, before installation of topsoil. All cut-and-fill slopes shall be uniformly dressed to the slope, cross section, and alignment shown on the plans or as directed by the Engineer.

~~Blasting will be permitted only when proper precautions are taken for the safety of all persons, the work, and the property. All damage done to the work or property shall be repaired at the Contractor's expense. All operations of the Contractor in connection with the transportation, storage, and use of explosives shall conform to all state and local regulations and explosive manufacturers' instructions, with applicable approved permits reviewed by the Engineer. Any approval given, however, will not relieve the Contractor of his/her responsibility in blasting operations.~~

~~Where blasting is approved, the Contractor shall employ a vibration consultant, approved by the Engineer, to advise on explosive charge weights per delay and to analyze records from seismograph recordings. The seismograph shall be capable of producing a permanent record of the three components of the motion in terms of particle velocity, and in addition shall be capable of internal dynamic calibration.~~

~~In each distinct blasting area, where pertinent factors affecting blast vibrations and their effects in the area remain the same, the Contractor shall submit a blasting plan of the initial blasts to the Engineer for approval. This plan must consist of hole size, depth, spacing, burden, type of explosives, type of delay sequence, maximum amount of explosive on any one delay period, depth of rock, and depth of overburden if any. The maximum explosive charge weights per delay included in the plan shall not be increased without the approval of the engineering.~~

~~The Contractor shall keep a record of each blast fired its date, time and location; the amount of explosives used, maximum explosive charge weight per delay period, and, where necessary, seismograph records identified by instrument number and location.~~

~~These records shall be made available to the Engineer on a monthly basis or in tabulated form at other times as required.~~

152-2.3 BORROW EXCAVATION. ~~Borrow areas within the airport property are indicated on the plans. Borrow excavation shall be made only at these designated locations and within the horizontal and vertical limits as staked or as directed. Unless specifically identified on the plans, there are no on-airport borrow areas available on airport property for use by the Contractor.~~

When borrow sources are outside the boundaries of the airport property, it shall be the Contractor's responsibility to locate and obtain the supply, subject to the approval of the Engineer. The Contractor shall notify the Engineer, at least 15 days prior to beginning the excavation, so necessary measurements and tests can be made. All unsuitable material shall be disposed of by the Contractor. All borrow pits shall be opened up to expose the vertical face of various strata of acceptable material to enable obtaining a uniform product. Borrow pits shall be excavated to regular lines to permit accurate measurements, and they shall be drained and left in a neat, presentable condition with all slopes dressed uniformly. Prior to any borrow source being utilized on the project, the Contractor shall submit test reports of material properties for the borrow source. The Engineer shall approve all sources and test results prior to any material from the borrow source being installed. The Engineer shall also have the opportunity to visit the borrow source and perform any testing, on the behalf of the Owner, to verify Contractor supplied test reports. If the tests conducted at the proposed borrow site fail the specification requirements, the cost for such testing will be the responsibility of the Contractor.

152-2.4 DRAINAGE EXCAVATION. Drainage excavation shall consist of excavating for drainage ditches such as intercepting; inlet or outlet, for temporary levee construction; or for any other type as designed or as shown on the plans. The work shall be performed in the proper sequence with the other construction. All satisfactory material shall be placed in fills; unsuitable material shall be placed in waste areas or as directed. Intercepting ditches shall be constructed prior to starting adjacent excavation operations. All necessary work shall be performed to secure a finish true to line, elevation, and cross section.

The Contractor shall maintain ditches constructed on the project to the required cross section and shall keep them free of debris or obstructions until the project is accepted. The Contractor shall also be required to meet the requirements of any erosion and sedimentation control methods defined by the State in which the project is being constructed has established.

152-2.5 PREPARATION OF EMBANKMENT AREA. Where an embankment is to be constructed to a height of 4 feet (120 cm) or less, all sod and vegetable matter shall be removed from the surface upon which the embankment is to be placed, and the cleared surface shall be completely broken up by plowing or scarifying to a minimum depth of 6 in (150 mm). This area shall then be compacted as indicated in paragraph 2.6. When the height of fill is greater than 4 feet (120 cm), sod not required to be removed shall be thoroughly disked and recompacted to the density of the surrounding ground before construction of embankment.

Where embankments are to be placed on natural slopes steeper than 3 to 1, horizontal benches shall be constructed as shown on the plans.

No direct payment shall be made for the work performed under this section. The necessary clearing and clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-2.6 FORMATION OF EMBANKMENTS. Embankments shall be formed in successive horizontal layers of not more than 8 in (200 mm) in loose depth for the full width of the cross section, unless otherwise approved by the Engineer.

The grading operations shall be conducted, and the various soil strata shall be placed, to produce a soil structure as shown on the typical cross section or as directed. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Operations on earthwork shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing, or other unsatisfactory conditions of the field. The Contractor shall drag, blade, or slope the embankment to provide proper surface drainage.

The material in the layer shall be within +/-2 percent of optimum moisture content before rolling to obtain the prescribed compaction. In order to achieve a uniform moisture content throughout the layer, wetting or drying of the material and manipulation shall be required when necessary. Should the material be too wet to permit proper compaction or rolling, all work on all of the affected portions of the embankment shall be delayed until the material has dried to the required moisture content. Sprinkling of dry material to obtain the proper moisture content shall be done with approved equipment that will sufficiently distribute the water. Sufficient equipment to furnish the required water shall be available at all times. Samples of all embankment materials for testing, both before and after placement and compaction, will be taken for each [1,000 cubic yards]. Based on these tests, the Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content in order to achieve the correct embankment density.

Rolling operations shall be continued until the embankment is compacted to not less than the density shown in Table 1, Subgrade Compaction Requirements for Flexible Pavements 95 percent of maximum density for noncohesive soils, and 90 percent of maximum density for cohesive soils as determined by ASTM []. Under all areas to be paved, the embankments shall be compacted to a depth of [] and to a density of not less than [] percent of the maximum density as determined by ASTM [].

On all areas outside of the pavement areas, no compaction will be required on the top 4 in (100 mm).

~~The in-place field density shall be determined in accordance with ASTM D 1556 or ASTM D 2167.~~ The in-place field densities shall be determined in accordance with ASTM D 6938/D 3017 with verification by ASTM D 1556.

Compaction areas shall be kept separate, and no layer shall be covered by another until the proper density is obtained.

During construction of the embankment, the Contractor shall route his/her equipment at all times, both when loaded and when empty, over the layers as they are placed and shall distribute the travel evenly over the entire width of the embankment. The equipment shall be operated in such a manner that hardpan, cemented gravel, clay, or other chunky soil material will be broken up into small particles and become incorporated with the other material in the layer.

In the construction of embankments, layer placement shall begin in the deepest portion of the fill; as placement progresses, layers shall be constructed approximately parallel to the finished pavement grade line.

When rock and other embankment material are excavated at approximately the same time, the rock shall be incorporated into the outer portion of the embankment and the other material shall be incorporated under the future paved areas. Stones or fragmentary rock larger than 4 in (100 mm) in their greatest dimensions will not be allowed in the top 6 in (150 mm) of the subgrade. Rockfill shall be brought up in

layers as specified or as directed and every effort shall be exerted to fill the voids with the finer material forming a dense, compact mass. Rock or boulders shall not be disposed of outside the excavation or embankment areas, except at places and in the manner designated by the Engineer.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in layers of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in layers not exceeding 2 feet (60 cm) in thickness. Each layer shall be leveled and smoothed with suitable leveling equipment and by distribution of spalls and finer fragments of rock. These type lifts shall not be constructed above an elevation 4 feet (120 cm) below the finished subgrade.

Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material.

There will be no separate measurement of payment for compacted embankment, and all costs incidental to placing in layers, compacting, diskings, watering, mixing, sloping, and other necessary operations for construction of embankments will be included in the contract price for excavation, borrow, or other items.

152-2.7 FINISHING AND PROTECTION OF SUBGRADE. After the subgrade has been substantially completed the full width shall be conditioned by removing any soft or other unstable material that will not compact properly. The resulting areas and all other low areas, holes or depressions shall be brought to grade with suitable select material. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans.

Grading of the subgrade shall be performed so that it will drain readily. The Contractor shall take all precautions necessary to protect the subgrade from damage. ~~He/she~~ The Contractor shall limit hauling over the finished subgrade to that which is essential for construction purposes.

All ruts or rough places that develop in a completed subgrade shall be smoothed and recompacted. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been approved by the Engineer.

152-2.8 HAUL. All hauling will be considered a necessary and incidental part of the work. Its cost shall be considered by the Contractor and included in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

152-2.9 TOLERANCES. In those areas upon which a subbase or base course is to be placed, the top of the subgrade shall be of such smoothness that, when tested with a 16 ft (4.8 m) straightedge applied parallel and at right angles to the centerline, it shall not show any deviation in excess of ~~1/2-inch (12 mm)~~ 1/4-inch (6 mm), or shall not be more than 0.05 ft (0.015 m) from true grade as established by grade hubs or pins. Any deviation in excess of these amounts shall be corrected by loosening, adding, or removing materials; reshaping; and recompacting by sprinkling and rolling.

On safety areas, intermediate and other designated areas, the surface shall be of such smoothness that it will not vary more than 0.10 ft (0.03 m) from true grade as established by grade hubs. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.10 TOPSOIL. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-905. If, at the time of excavation or stripping, the topsoil cannot be placed in its proper and final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall not be placed within [250] feet of runway pavement or [160] feet of taxiway pavement and shall not be placed on areas that subsequently will require any excavation or embankment. If, in the judgment of the Engineer, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further rehandling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as directed, or as required in Item T-905.

No direct payment will be made for topsoil as such under Item P-152. The quantity removed and placed directly or stockpiled shall be paid for at the contract unit price per cubic yard (cubic meter) for "Unclassified Excavation."

When stockpiling of topsoil and later rehandling of such material is directed by the Engineer, the material so rehandled shall be paid for at the contract unit price per cubic yard (cubic meter) for "Topsoiling," as provided in Item T-905.

152-2.11 ACCEPTANCE SAMPLING AND TESTING FOR DENSITY. "Subgrade shall be accepted for density on a lot basis. A lot will consist of one day's production where it is not expected to exceed 2,400 square yards (2,000 square meters). A lot will consist of one-half day's production where a day's production is expected to consist of between 2,400 and 4,800 square yards (2,000 and 4,000 square meters).

Each lot shall be divided into two equal sublots. One test shall be made for each subplot. Sampling locations will be determined by the Engineer on a random basis in accordance with statistical procedures contained in ASTM D 3665.

Each lot will be accepted for density when the field density is at least the density as specified in Table No. 1 – Subgrade Compaction Requirements of the maximum density of laboratory specimens prepared from samples of the subgrade material delivered to the job site. The specimens shall be compacted and tested in accordance with ASTM D 698 or ASTM D 1557. The in-place field density shall be determined in accordance with ASTM D 1556 or D 6938. If the specified density is not attained, the entire lot shall be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached.

In lieu of the core method of field density determination, acceptance testing may be accomplished using a nuclear gage in accordance with ASTM D 6938. The gage should be field calibrated in accordance with Paragraph 4 of ASTM D 6938. Calibration tests shall be conducted on the first lot of material placed that meets the density requirements.

Use of ASTM D 6938 results in a wet unit weight, and when using this method, ASTM D 3017 shall be used to determine the moisture content of the material. The calibration curve furnished with the moisture gages shall be checked as described in Paragraph 7 of ASTM D 3017. The calibration checks of both the density and moisture gages shall be made at the beginning of a job and at intervals as determined by the Engineer and or materials testing laboratory.

If a nuclear gage is used for density determination, two random readings shall be made for each subplot. There shall be no less than six density/moisture tests performed for each 2,000 square yards of subgrade. At least one test shall be by the sand cone method and at least five evenly distributed nuclear density/moisture tests will be taken in the area covering the 2,000 square yards of which one nuclear density/moisture test shall be taken at the sand cone test location so that calibration of the nuclear to sand cone test can be verified.

TABLE NO. 1 - SUBGRADE COMPACTION REQUIREMENTS

DESIGN AIRCRAFT	Gross Weight (Lbs.)	NON-COHESIVE SOILS Depth of Compaction in Inches				COHESIVE SOILS Depth of Compaction in Inches			
		100%	95%	90%	85%	100%	95%	90%	85%
Single Wheel	30,000	8	8-18	18-32	32-44	6	6-9	9-12	12-17
	50,000	10	10-24	24-36	36-48	6	6-9	9-16	16-20
	75,000	12	12-30	30-40	40-52	6	6-12	12-19	19-25
Dual Wheel (Incls. C-130)	50,000	12	12-28	28-38	38-50	6	6-10	10-17	17-22
	100,000	17	17-30	30-42	42-55	6	6-12	12-19	19-25
	150,000	19	19-32	32-46	46-60	7	7-14	14-21	21-28
	200,000	21	21-37	37-53	53-69	9	8-16	16-24	24-32
Dual Tandem (Incls. 757, 767, A-300)	100,000	14	14-26	26-38	38-49	12	12-15	15-22	22-30
	200,000	17	17-30	30-43	43-56	12	12-16	12-26	26-36
	300,000	20	20-34	34-48	48-63	12	12-17	12-30	30-42
	400,000	23	23-41	41-59	59-76	12	12-18	18-36	36-48
DC-10, L-1011, 747	400,000	21	21-36	36-55	55-70	12	12-18	18-32	32-48
	600,000	23	23-41	41-59	59-76	12	12-22	22-36	36-54
	800,000	23	23-41	41-59	59-76	12	12-24	24-40	40-60

Notes:

1. Noncohesive soils, for the purpose of determining compaction control, are those with a plasticity index (P.I.) of less than 6.
2. Tabulated values denote depths below the finished subgrade above which densities should equal or exceed the indicated percentage of the maximum dry density as specified herein.
3. Note that for any gross weight equal to or less than 60,000 pounds, Standard Density requirements per ASTM D 698 shall be required. For any gross weights in excess of 60,000 pounds, Modified Proctor Density requirements per ASTM D 1557 shall be required. Field testing of in-place densities shall be done pursuant to ASTM D 1556 or ASTM D 6938 as approved by the Engineer.
4. The subgrade in cut areas shall be compacted to the same requirements as specified above.
5. For any depths below those shown on this chart, compaction shall be to a minimum of 80%.
6. The bolded row defined above establishes the depths for which specific densities will be required for this project.

METHOD OF MEASUREMENT

152-3.1 The quantity of excavation to be paid for shall be the number of cubic yards (cubic meters) measured in its original position.

Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

~~**152-3.2** Borrow material shall be paid for on the basis of the number of cubic yards (cubic meters) measured in its original position at the borrow pit.~~

~~152-3.3 Stockpiled material shall be paid for on the basis of the number of cubic yards (cubic meters) measured in the stockpiled position as soon as the material has been stockpiled.~~

152-3.3 For payment specified by the cubic yard (cubic meter), measurement for all **[borrow]** shall be computed by the average end area method. The end area is that bound by the original ground line which shall include the area where the top 4-inches of existing topsoil was removed established by field cross sections and the final theoretical pay line without new topsoil established by **[borrow]** cross sections shown on the plans, subject to verification by the Engineer. After completion of all **[borrow]** operations and prior to the placing of base or subbase material, the final **[borrow]** shall be verified by the Engineer ~~by means of field cross sections taken randomly at intervals not exceeding 500 linear feet (150 meters)~~. Contractor who will provide final in-place earthwork cross sections for the entire project site affected by earthwork operations with the detailed calculations as to as-built excavation and/or embankment. The Contractor shall provide cross sections at intervals of not exceeding 50 linear feet (15 meters) in an electronic format of AutoCad Release 2004 or higher.

In the event the borrow operations are performed in phases, the Contractor shall provide the required cross sections and calculations for each phase prior to installation of topsoil and sod or seeding so that final in-place earthwork quantities can be established and approved prior to starting another phase of work.

152-3.4 For payment specified by the cubic yard (cubic meter), measurement for all **[excavation]** shall be computed by the average end area method. The end area is that bound by the original ground line which includes the existing top 4-inches of topsoil established by field cross sections and the final theoretical pay line without topsoil established by **[excavation]** cross sections shown on the plans, subject to verification by the Engineer. After completion of all **[excavation]** operations and prior to the placing of base or subbase material, the final **[excavation]** shall be verified by the Engineer ~~by means of field cross sections taken randomly at intervals not exceeding 500 linear feet (150 meters)~~. Contractor who will provide final in-place earthwork cross sections for the entire project site affected by earthwork operations with the detailed calculations as to as-built excavation and/or embankment. The Contractor shall provide cross sections at intervals of not exceeding 50 linear feet (15 meters) in an electronic format of AutoCad Release 2004 or higher.

In the event the excavation and/or embankment operations are performed in phases, the Contractor shall provide the required cross sections and calculations for each phase prior to installation of topsoil and sod or seeding so that final in-place earthwork quantities can be established and approved prior to starting another phase of work.

Final field cross sections shall be employed if the following changes have been made:

~~a. Plan width of embankments or excavations are changed by more than plus or minus 1.0 ft (0.3 meter); or~~

~~b. Plan elevations of embankments or excavations are changed by more than plus or minus 0.5 ft (0.15 meter).~~

152-3.5 For payment specified by the cubic yard (cubic meter), measurement for all **[embankment]** shall be computed by the average end area method. The end area is that bound by the original ground line which shall include the area where the top 4-inches of existing topsoil was removed established by field cross sections and the final theoretical pay line without new topsoil established by **[embankment]** cross sections shown on the plans, subject to verification by the Engineer. After completion of all **[embankment]** operations and prior to the placing of base or subbase material, the final **[embankment]** shall be verified by the Engineer ~~by means of field cross sections taken randomly at intervals not~~

~~exceeding 500 linear feet (150 meters)~~ Contractor who will provide final in-place earthwork cross sections for the entire project site affected by earthwork operations with the detailed calculations as to as-built excavation and/or embankment. The Contractor shall provide cross sections at intervals of not exceeding 50 linear feet (15 meters) in an electronic format of AutoCad Release 2004 or higher.

In the event the excavation and/or embankment operations are performed in phases, the Contractor shall provide the required cross sections and calculations for each phase prior to installation of topsoil and sod or seeding so that final in-place earthwork quantities can be established and approved prior to starting another phase of work.

BASIS OF PAYMENT

152-4.1 For "Unclassified excavation" payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.2 For "Rock Excavation" payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.3 For "Unsuitable Excavation and Sand Backfill" payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

~~**152-4.4** For "Geotextile Fabric Type V" payment shall be made at the contract unit price per square yard (square meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.~~

152-4.5 For "Excavation From Holding Ponds" payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.6 For "Contaminated Soil Disposal" payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

~~**152-4.7** For "Embankment in Place" payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.~~

Payment will be made under:

Item P-152-4.1	Unclassified Excavation -- Per Cubic Yard (Cubic Meter)
Item P-152-4.2	Rock Excavation -- Per Cubic Yard (Cubic Meter)
Item P-152-4.3	Unsuitable Excavation and Sand Backfill -- Per Cubic Yard (Cubic Meter)
Item P-152-4.4	Geotextile Fabric Type V -- Per Square Yard (Square Meter)
Item P-152-4.5	Excavation From Holding Ponds -- Per Cubic Yard (Cubic Meter)
Item P-152-4.6	Contaminated Soil Disposal -- Per Cubic Yard (Cubic Meter)

~~Item P-152-4.7~~ ~~Embankment in Place — Per Cubic Yard (Cubic Meter)~~

TESTING REQUIREMENTS

ASTM D 698	Test for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-pound (2.49 kg) Rammer and 12 in (305 mm) Drop
ASTM D 1556	Test for Density of Soil In Place by the Sand-Cone Method
ASTM D 1557	Test for Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D 2167	Test for Density and Unit Weight of Soil In Place by the Rubber Balloon Method.
ASTM D 6938	In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D 3017	Moisture Content of Soil and Soil Aggregate in Place by Nuclear Methods

END OF ITEM P-152

ITEM P-154 SUBBASE COURSE

DESCRIPTION

154-1.1 This item shall consist of a subbase course composed of granular materials constructed on a prepared subgrade or underlying course in accordance with these specifications, and in conformity with the dimensions and typical cross section(s) shown on the plans and with the lines and grades established by the Engineer.

MATERIALS

154-2.1 MATERIALS. The subbase material shall consist of hard durable particles or fragments of granular aggregates. This material will be mixed or blended with fine sand, clay, stone dust, or other similar binding or filler materials produced from approved sources. This mixture must be uniform and shall comply with the requirements of these specifications as to gradation, soil constants, and shall be capable of being compacted into a dense and stable subbase. The material shall be free from vegetable matter, lumps or excessive amounts of clay, and other objectionable or foreign substances. Pit-run material may be used, provided the material meets the requirements specified.

Table 1 Gradation Requirements

Sieve designation (square openings) as per ASTM C 136 and ASTM D 422	Percentage by weight passing sieves
3 in (75.0 mm)	100
No. 10 (2.0 mm)	20-100
No. 40 (0.450 mm)	5-60
No. 200 (0.075 mm)	0-8

The portion of the material passing the No. 40 (0.450 mm) sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than 6 when tested in accordance with ASTM D 4318.

The maximum amount of material finer than 0.02 mm in diameter shall be less than 3%.

Of particles retained on a 1/2-inch square sieve, not more than 30 percent by weight shall consist of particles so flat or elongated, or both, that the ratio between the maximum and the minimum dimensions of a circumscribing rectangular prism exceeds 5:1 when tested in accordance with ASTM D 4791.

The magnesium sulphate soundness loss shall not exceed 20 percent, after 4 cycles when tested in accordance with ASTM C 88. The material shall have a lab soaked and remolded CBR value of at least 35 when tested in accordance with ASTM D 1883 using a surcharge load of 10 lbs.

a. Sampling and Testing. Aggregates for preliminary testing shall be furnished by the Contractor prior to the start of production. All tests for initial aggregate submittals necessary to determine compliance with the specification requirements will be made by the Engineer at no expense to the Contractor. All retesting shall be at the expense of the Contractor.

Samples of aggregates shall be furnished by the Contractor at the start of production and at intervals during production. The sampling points and intervals will be designated by the Engineer. The samples will be the basis of approval of specific lots of aggregates from the standpoint of the quality requirements of this section.

In lieu of testing, the Engineer may accept certified DOT test results indicating that the aggregate meets specification requirements.

Sampling shall be in accordance with ASTM D 75. Testing shall be in accordance with ASTM C 136 and C 117. When deemed necessary to the Engineer, the Contractor shall furnish aggregate samples to the Engineer for testing to verify compliance with the requirements specified herein.

b. Gradation Requirements. The gradation of the final mixture shall fall within the range indicated in Table 1, when tested in accordance with ASTM C 117 and C 136. The final gradation shall be continuously well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on an adjacent sieve or vice versa.

SUBMITTALS AND CERTIFICATIONS

154-3.1 SUBMITTALS AND CERTIFICATIONS. Submittals of "Shop and Setting Drawings", "Working Drawings", "Catalogue Data" and "Certifications" for review shall be submitted in accordance with appropriate sections of the General Provisions. Submittals and Certifications required are as follows:

a. Certification that aggregate meets the requirements specified or Certified Test Results.

b. Sieve analysis

c. Aggregate samples when requested by the Engineer prior to the start of production.

~~**d.** Certification that the soils provided are not contaminated as defined in P 152 Excavation and Embankment, paragraph 152-1.4, Contaminated Borrow Material.~~

CONSTRUCTION METHODS

~~**154-3.1**~~ **154-4.1 GENERAL.** The subbase course shall be placed where designated on the plans or as directed by the Engineer. The material shall be shaped and thoroughly compacted within the tolerances specified.

Granular subbases which, due to grain sizes or shapes, are not sufficiently stable to support without movement the construction equipment, shall be mechanically stabilized to the depth necessary to provide such stability as directed by the Engineer. The mechanical stabilization shall principally include the addition of a fine-grained medium to bind the particles of the subbase material sufficiently to furnish a bearing strength, so that the course will not deform under the traffic of the construction equipment. The addition of the binding medium to the subbase material shall not increase the soil constants of that material above the limits specified.

~~**154-3.2**~~ **154-4.2 OPERATION IN PITS.** All work involved in clearing and stripping pits and handling unsuitable material encountered shall be performed by the Contractor at his/her own expense. The subbase material shall be obtained from pits or sources that have been approved. The material in the pits shall be excavated and handled in such manner that a uniform and satisfactory product can be secured.

154-4.3 EQUIPMENT. All equipment necessary for the proper construction of this work shall be on the project, of appropriate size and type for the materials to be handled and site conditions, in first-class working condition, and shall have been approved by the Engineer before construction is permitted to start.

Provisions shall be made by the Contractor for furnishing water at the site of the work using equipment of ample capacity and design to assure uniform application.

The processing equipment shall be designed, constructed, and operated and shall have sufficient capacity to thoroughly mix all materials and water in the proportions required to produce a subbase course of the gradation and consistency required.

154-3.3 154-4.4 PREPARING UNDERLYING COURSE. Before any subbase material is placed, the underlying course shall be prepared and conditioned as specified. The course shall be checked and accepted by the Engineer before placing and spreading operations are started.

Grade control between the edges of the pavement shall be by means of grade stakes, steel pins, or forms placed in lanes parallel to the centerline of the pavement and at intervals which will permit string lines or check boards to be placed between the stakes, pins, or forms.

To protect the subgrade and to ensure proper drainage, the spreading of the subbase shall begin along the centerline of the pavement on a crowned section or on the high side of pavements with a one-way slope.

154-3.4 154-4.5 MATERIALS ACCEPTANCE IN EXISTING CONDITION. When the entire subbase material is secured in a uniform and satisfactory condition and contains approximately the required moisture, such approved material may be moved directly to the spreading equipment for placing. The material may be obtained from gravel pits, stockpiles, or may be produced from a crushing and screening plant with the proper blending. The materials from these sources shall meet the requirements for gradation, quality, and consistency. It is the intent of this section of the specifications to secure materials that will not require further mixing. The moisture content of the material shall be approximately that required to obtain maximum density. Any minor deficiency or excess of moisture may be corrected by surface sprinkling or by aeration. In such instances, some mixing or manipulation may be required, immediately preceding the rolling, to obtain the required moisture content. The final operation shall be blading or dragging, if necessary, to obtain a smooth uniform surface true to line and grade.

154-3.5 154-4.6 PLANT MIXING. When materials from several sources are to be blended and mixed, the subbase material shall be processed in a central or travel mixing plant. The subbase material, together with any blended material, shall be thoroughly mixed with the required amount of water. After the mixing is complete, the material shall be transported to and spread on the underlying course without undue loss of the moisture content.

154-3.5.1 154-4.6.1 MIXED IN PLACE. When materials from different sources are to be proportioned and mixed or blended in place, the relative proportions of the components of the mixture shall be as designated by the Engineer.

The subbase material shall be deposited and spread evenly to a uniform thickness and width. Then the binder, filler or other material shall be deposited and spread evenly over the first layer. There shall be as many layers of materials added as the Engineer may direct to obtain the required subbase mixture.

When the required amount of materials have been placed, they shall be thoroughly mixed and blended by means of graders, discs, harrows, rotary tillers, supplemented by other suitable equipment if necessary. The mixing shall continue until the mixture is uniform throughout. Areas of segregated material shall be corrected by the addition of binder or filler material and by thorough remixing. Water in the amount and as directed by the Engineer shall be uniformly applied prior to and during the mixing operations, if necessary, to maintain the material at its required moisture content. When the mixing and blending has been completed, the material shall be spread in a uniform layer which, when compacted, will meet the requirements of thickness and typical cross section.

154-3.6 154-4.7 GENERAL METHODS FOR PLACING. The subbase course shall be constructed in layers. Any layer shall be not less than 3 in (75 mm) nor more than 8 in (200 mm) of compacted thickness. The subbase material shall be deposited and spread evenly to a uniform thickness and width. The material, as spread, shall be of uniform gradation with no pockets of fine or coarse materials. The subbase, unless otherwise permitted by the Engineer, shall not be spread more than 2,000 sq yd (1700 sq m) in advance of the rolling. Any necessary sprinkling shall be kept within this limit. No material shall be placed in snow or on a soft, muddy, or frozen course. When more than one layer is required, the construction procedure described herein shall apply similarly to each layer.

During the placing and spreading, sufficient caution shall be exercised to prevent the incorporation of subgrade, shoulder, or foreign material in the subbase course mixture.

154-3.7 154-4.8 FINISHING AND COMPACTING. After spreading or mixing, the subbase material shall be thoroughly compacted by rolling and sprinkling, when necessary. Sufficient rollers shall be furnished to adequately handle the rate of placing and spreading of the subbase course.

~~The field density of the compacted material shall be at least 100 percent of the maximum density of laboratory specimens prepared from samples of the subbase material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with []. The in place field density shall be determined in accordance with ASTM D 1556 or ASTM D 6938. The moisture content of the material at the start of compaction shall not be below nor more than 2 percentage points above the optimum moisture content.~~

When nuclear density gauges are to be used for density determination, testing shall be in accordance with Section 120 and ASTM D 6938.

The course shall not be rolled when the underlying course is soft or yielding or when the rolling causes undulation in the subbase. When the rolling develops irregularities that exceed 1/2 in (12 mm) when tested with a 16 ft (4.8 m) straightedge, the irregular surface shall be loosened and then refilled with the same kind of material as that used in constructing the course and again rolled as required above.

Rolling shall progress gradually from the sides to the center of the lane under construction, or from one side toward previously placed material, by lapping uniformly each preceding track by at least 12-inches. Blading and rolling shall be done alternately, as required or directed, to obtain a smooth, even, and uniformly compacted subbase.

Along places inaccessible to rollers, the subbase material shall be tamped thoroughly with mechanical or hand tampers.

To check the surface for fine grade, the Contractor shall pin and stringline the surface with a 50-foot grid along straight sections of typical grade. In transition areas and curved sections, the Contractor shall pin and stringline the surface with a 25-foot grid. Alternate methods of checking the fine grade may be used only when authorized by the Engineer.

Sprinkling during rolling, if necessary, shall be in the amount and by equipment approved by the Engineer. Water shall not be added in such a manner or quantity that free water will reach the underlying layer and cause it to become soft.

154-4.9 ACCEPTANCE SAMPLING AND TESTING FOR DENSITY. Subbase course shall be accepted for density on a lot basis. A lot will consist of one day's production where it is not expected to exceed 2,400 square yards (2,000 square meters). A lot will consist of one-half day's production where a day's

production is expected to consist of between 2,400 and 4,800 square yards (2,000 and 4,000 square meters).

Each lot shall be divided into two equal sublots. One test shall be made for each subplot. Sampling locations will be determined by the Engineer on a random basis in accordance with statistical procedures contained in ASTM D3665.

Each lot will be accepted for density when the field density is at least 100 percent of the maximum density of laboratory specimens prepared from samples of the subbase course material delivered to the job site. The specimens shall be compacted and tested in accordance with ASTM D1557. The in-place field density shall be determined in accordance with ASTM D1556 or D 6938. If the specified density is not attained, the entire lot shall be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached.

In lieu of the core method of field density determination, acceptance testing may be accomplished using a nuclear gage in accordance with ASTM D 6938. The gage should be field calibrated in accordance with Paragraph 4 of ASTM D 6938. Calibration tests shall be conducted on the first lot of material placed that meets the density requirements.

Use of ASTM D 6938 results in a wet unit weight, and when using this method, ASTM D 3017 shall be used to determine the moisture content of the material. The calibration curve furnished with the moisture gages shall be checked as described in Paragraph 7 of ASTM D 3017. The calibration checks of both the density and moisture gages shall be made at the beginning of a job and at intervals as determined by the Engineer and or materials testing laboratory.

If a nuclear gage is used for density determination, two random readings shall be made for each subplot.

There shall be no less than six density/moisture tests performed for each 4,000 square yards of subbase material. At least one test shall be by the sand cone method and at least five evenly distributed nuclear density/moisture tests will be taken in the area covering the 4,000 square yards of which one nuclear density/moisture test shall be taken at the sand cone test location so that calibration of the nuclear to sand cone test can be verified.

154-3.8 154-4.10 SURFACE TEST. After the course is completely compacted, and immediately prior to paving, the surface shall be tested for smoothness and accuracy of grade and crown; any portion found to lack the required smoothness or to fail in accuracy of grade or crown shall be scarified, reshaped, recompacted, and otherwise manipulated as the Engineer may direct until the required smoothness and accuracy re obtained. The finished surface shall not vary more than 1/2 in (12 mm) when tested with a 16 ft (4.8 m) straightedge applied parallel with, and at right angles to, the centerline.

154-3.9 154-4.11 THICKNESS. The thickness of the completed subbase course shall be determined by depth tests or sample holes taken at intervals so each test shall represent no more than 500 sq yd (420 sq m). When the deficiency in thickness is more than 1/2 in (12 mm), the Contractor shall correct such areas by scarifying, adding satisfactory mixture, rolling, sprinkling, reshaping, and finishing in accordance with these specifications. The Contractor shall replace at his/her expense the subbase material where borings are taken for test purposes.

154-3.10 154-4.12 PROTECTION. Work on subbase course shall not be conducted during freezing temperature nor when the subgrade is wet. When the subbase material contains frozen material or when the underlying course is frozen, the construction shall be stopped.

154-3.14 154-4.13 MAINTENANCE. Following the final shaping of the material, the subbase shall be maintained throughout its entire length by the use of standard motor graders and rollers until, in the

judgment of the Engineer, the subbase meets all requirements and is acceptable for the construction of the next course.

METHOD OF MEASUREMENT

~~154-4.1~~ **154-5.1** The yardage of subbase course to be paid for shall be the number of cubic yards (cubic meters) of subbase course material placed, compacted, and accepted in the completed course. The quantity of subbase course material shall be measured in final position based upon depth tests or cores taken as directed by the Engineer, or at the rate of 1 depth test for each 500 sq yd (420 sq m) of subbase course, or by means of average end areas on the complete work computed from elevations to the nearest 0.01 ft (3 mm). On individual depth measurements, thicknesses more than 1/2 in (12 mm) in excess of that shown on the plans shall be considered as the specified thickness plus 1/2 in (12 mm) in computing the yardage for payment. Subbase materials shall not be included in any other excavation quantities.

154-5.2 The quantity of stockpiling, placing, rescarify and recompact existing subbase course to be paid for will be determined by measurement of the number of square yards of material actually constructed and accepted by the Engineer and complying with the plans and specifications.

BASIS OF PAYMENT

~~154-5.1~~ **154-6.1** Payment shall be made at the contract unit price per cubic yard (cubic meter) for subbase course. This price shall be full compensation for furnishing all materials; for all preparation, hauling, and placing of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment shall be made at the contract unit price per square yard for stockpiling, placing, rescarify and recompact existing subbase course. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-154-5.1	Subbase Course -- Per Cubic Yard (Cubic Meter)
Item P-154-6.1	Sand Subbase Course -- Per Cubic Yard (Cubic Meter)

TESTING REQUIREMENTS

ASTM C 88	Soundness of Aggregates by Use of Sodium Sulfate and Magnesium Sulfate
ASTM C 117	Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine
ASTM C 136	Sieve Analysis of Fine and Coarse Aggregates
ASTM D 75	Sampling Aggregate
ASTM D 422	Particle Size Analysis of Soils
ASTM D 698	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb (2.49 kg) Rammer and 12-in (305 mm) Drop

ASTM D 1556	Density of Soil in Place by the Sand-Cone Method
ASTM D 1557	Test for Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D 1883	Test Method for Bearing Ratio of Laboratory Compacted Soils (CBR)
ASTM D 6938	In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D 3017	Moisture Content of Soil and Soil Aggregate in Place by Nuclear Methods
ASTM D 3665	Random Sampling of Paving Materials
ASTM D 4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 4791	Flat or Elongated Particles in Coarse Aggregate

END OF ITEM P-154

ITEM P-156 TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL

DESCRIPTION

156-1.1 This item shall consist of temporary control measures as shown on the plans or as ordered by the Engineer during the life of a contract to control water pollution, soil erosion, and siltation through the use of berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

156-1.2 Any permits which the Owner has obtained for any purpose such as NPDES, SPCC, etc., does not include nor cover the Contractor's haul routes, equipment access points, staging areas, office compounds, materials stockpiles, blending and batch plant areas and operations or other project related activity areas outside the project limits or off site.

156-1.3 The Contractor shall prepare all required documentation, pay all fees and perform all services and work necessary to obtain all permits and approvals from any and all local, state and federal regulatory agencies for the Contractor's staging, stockpile, blending and batch plant areas and operations. The cost of all permitting shall be subsidiary to other items of work.

156-1.4 The Contractor shall develop a Pollution Prevention Plan to supplement the Owner's Stormwater Pollution Prevention Plan (SWPPP) as contained in the drawings. The plan shall be in strict compliance with the National Pollutant Discharge Elimination System (NPDES) permit issued or approved by the U.S. Environmental Protection Agency (EPA) pursuant to 40 CFR Part 122.6. The Plan shall address all measures to dispose of, control, or prevent the discharge of solid, hazardous and sanitary wastes to the waters of the U.S. The plan shall include procedures to control offsite tracking of soil by vehicles and construction equipment and procedures for cleanup and reporting of non-storm water discharges such as contaminated groundwater or accidental spills.

The Contractor shall also be required to submit a written documentation that all required permits have been obtained to the Engineer prior to start up of construction activities.

MATERIALS

156-2.1 GRASS. Grass that will not compete with the grasses sown later for permanent cover shall be a quick-growing species (such as ryegrass, Italian ryegrass, or cereal grasses) suitable to the area providing a temporary cover. Expressly prohibited from use at all times is Millet seed in any combination or percentage with other seeds.

156-2.2 MULCHES. Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials.

156-2.3 FERTILIZER. Fertilizer shall be a standard commercial grade and shall conform to all Federal and state regulations and to the standards of the Association of Official Agricultural Chemists.

156-2.4 SLOPE DRAINS. Slope drains may be constructed of pipe, fiber mats, rubble, Portland Cement Concrete, bituminous concrete, or other materials that will adequately control erosion.

156-2.5 OTHER. All other materials shall meet commercial grade standards and shall be approved by the Engineer before being incorporated into the project.

156-2.6 SOIL STABILIZATION MAT. Soil Stabilization mat as specified in the plans shall be installed at the locations called for and shall be paid for by the square yard and shall include all materials, equipment, preparation, excavation, placing of materials and for all equipment, tools and incidentals necessary to complete the installation.

156-2.7 OPEN BURNING OF COMBUSTIBLE WASTES. The following requirements shall govern open burning of combustible wastes on airport property:

- a. No tires, oils, asphalt, paint, or coated metals will be permitted to be burned at any time.
- b. Burning will not be permitted within 1,000 feet of a residential or built-up area or within 100 feet of standing timber or flammable growth.
- c. Burning will not be permitted unless the prevailing wind is away from any nearby town or built-up area.
- d. Burning will not be permitted during a local air inversion or other climatic condition as would result in a pall of smoke over a nearby town or built-up area.
- e. Burning will not be permitted when the danger of brush or forest fires is made known by State, local or Federal officials.
- f. No open pile burning will be allowed at any time.
- g. Burning shall be authorized only when the proposed process for burning is submitted to the Owner and Engineer prior to bid opening and the process is approved by the Owner. The submittal for the burning process shall include the mechanical system proposed, temperatures, smoke discharge levels expected, and any other requirement that the process may be inherent to the process.
- h. If burning is not allowed, all debris including combustible wastes will be removed from the airport and disposed of off-airport at a location acceptable to the Owner.

CONSTRUCTION REQUIREMENTS

156-3.1 GENERAL. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other Federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

The Engineer shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

156-3.2 SCHEDULE. Prior to the start of construction, the Contractor shall submit a Pollution Control Plan including schedules for accomplishment of temporary and permanent erosion control work, as are applicable for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the Engineer.

156-3.3 AUTHORITY OF ENGINEER. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, to limit the surface area of erodible earth material exposed by excavation, borrow and fill operations, and to direct the Contractor to provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment.

156-3.4 CONSTRUCTION DETAILS. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the accepted schedule. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion is likely to be a problem, clearing and grubbing operations should be scheduled and performed so that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise, temporary erosion control measures may be required between successive construction stages.

The Engineer will limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.

In the event that temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or are ordered by the Engineer, such work shall be performed by the Contractor at his/her own expense. The Engineer may increase or decrease the area of erodible earth material to be exposed at one time as determined by analysis of project conditions.

The erosion control features installed by the Contractor shall be acceptably maintained by the Contractor during the construction period.

Whenever construction equipment must cross watercourses at frequent intervals, and such crossings will adversely affect the sediment levels, temporary structures should be provided.

Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into or near rivers, streams, and impoundments or into natural or manmade channels leading thereto.

The Contractor shall provide equipment wash out areas and these areas will be so constructed and protected to not allow any discharge of silt, fuels, lubricants and other harmful materials into nearby impoundments, ponds or surface water drainage systems.

The Contractor shall periodically inspect the pollution control features at the intervals stated in the approved Pollution Control Plan, and immediately after each rainfall and at least daily during prolonged rainfall and immediately correct any deficiencies. The Contractor shall review the location of pollution control features for effectiveness. If deficiencies exist, the Contractor shall correct as directed by the Engineer.

Remove sediment deposits when the deposit reaches approximately 1/3 of the volume capacity of the sediment control feature, or as otherwise required. Remove all sediment deposits when the sediment control feature is removed. Grade and dress area to restore to preconstruction condition or finish grade as called for on the plans.

Operate and maintain turbidity barriers as required by permit to contain turbidity that may occur as a result of construction operations.

In compliance with the General Provisions Section 50, Control of Work, the Contractor shall continuously maintain permanent and temporary pollution control features. Maintenance shall include periodic watering and mowing of grassed areas. There shall be no additional or separate compensation paid to the Contractor for such work.

If construction is suspended, the Contractor shall inspect, maintain and operate temporary and permanent pollution control features during such suspension. If suspension is part of the project phasing and sequencing plan, or if the suspension is requested by the Contractor, the Contractor shall not be paid additional or separate compensation for the Contractor to inspect, maintain and operate the pollution control facilities.

The Contractor is also responsible for the removal of all temporary erosion/pollution control facilities and the restoration of those sites. This work will include the repair of any trenching for silt fence, removal of all silt build-up, the removal of fencing, barriers and silt bales and the associated stakes and appurtenances, and the placing of seeding or sodding to restore those sites. All inlets, catch basins and manholes constructed for this project shall be cleaned and the new drainage pipes flushed. All materials taken from the facilities or flushed from the new piping system shall be collected by the Contractor and disposed of off site.

METHOD OF MEASUREMENT

156-4.1 Temporary erosion and pollution control work required which is not attributed to the Contractor's negligence, carelessness, or failure to install permanent controls will be performed as scheduled or ordered by the Engineer. Completed and accepted work will be measured as follows:

- ~~a. Temporary seeding and mulching will be measured by the square yard (square meter).~~
- ~~b. Temporary slope drains will be measured by the linear foot (meter).~~
- ~~c. Temporary benches, dikes, dams, and sediment basins will be measured by the cubic yard (cubic meter) of excavation performed, including necessary cleaning of sediment basins, and the cubic yard (cubic meter) of embankment placed at the direction of the Engineer, in excess of plan lines and elevations.~~
- ~~d. All fertilizing will be measured by the ton (kg).~~
- a. Erosion and sedimentation control will be measured by the lump sum.
- b. Silt fence will be measured by the linear foot (meter).
- c. Inlet and outlet protection will be measured by each.
- d. Soil stabilization mat will be measured by the square yard.

156-4.2 Control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor with costs included in the contract prices bid for the items to which they apply.

BASIS OF PAYMENT

156-5.1 Accepted quantities of temporary water pollution, soil erosion, and siltation control work ordered by the Engineer and measured as provided in paragraph 156-4.1 will be paid for under:

~~Item P-156-5.1 ——— Temporary seeding and mulching — per square yard (square meter)~~

~~Item P-156-5.2 ——— Temporary slope drains — per linear foot (meter)~~

~~Item P-156-5.3 ——— Temporary benches, dikes, dams and sediment basins — per cubic yard (cubic meter)~~

~~Item P-156-5.4 ——— Fertilizing — per ton (kg)~~

Item P-156-5.1 Erosion Control – Inlet Protection On Pavement -- Per Each

Item P-156-5.2 Erosion Control – Inlet Protection Off Pavement -- Per Each

Item P-156-5.3 Erosion Control – Silt Fence -- Per Linear Foot

Item P-156-5.4 Erosion Control – Rip Rap, Class III -- Per Square Yard

Where other directed work falls within the specifications for a work item that has a contract price, the units of work shall be measured and paid for at the contract unit price bid for the various items.

Temporary control features not covered by contract items that are ordered by the Engineer will be paid for in accordance with Section 90-05.

END OF ITEM P-156

ITEM P-209 CRUSHED AGGREGATE BASE COURSE

DESCRIPTION

209-1.1 This item consists of a base course composed of crushed aggregates constructed on a prepared course in accordance with these specifications and in conformity to the dimensions and typical cross sections shown on the plans.

MATERIALS

209-2.1 AGGREGATE. Aggregates shall consist of clean, sound, durable particles of crushed stone, crushed gravel, ~~or crushed slag~~ and shall be free from coatings of clay, silt, vegetable matter, and other objectionable materials and shall contain no clay balls. Fine aggregate passing the No. 4 (4.75 mm) sieve shall consist of fines from the operation of crushing the coarse aggregate. If necessary, fine aggregate may be added to produce the correct gradation. The fine aggregate shall be produced by crushing stone, gravel, or slag that meet the requirements for wear and soundness specified for coarse aggregate.

~~The crushed slag shall be an air cooled, blast furnace slag and shall have a unit weight of not less than 70 pounds per cubic foot (1.12 Mg/cubic meter) when tested in accordance with ASTM C 29.~~

The coarse aggregate portion, defined as the material retained on the No. 4 (4.75 mm) sieve and larger, shall contain no more than 15 percent, by weight, of flat or elongated pieces as defined in ASTM D 693 and shall have at least 90 percent by weight of particles with at least two fractured faces and 100 percent with at least one fractured face. The area of each face shall be equal to at least 75 percent of the smallest midsectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 to count as two fractured faces.

The percentage of wear shall not be greater than 45 percent when tested in accordance with ASTM C 131. The sodium sulfate soundness loss shall not exceed 12 percent, after 5 cycles, when tested in accordance with ASTM C 88.

The fraction passing the No. 40 (0.42 mm) sieve shall have a liquid limit no greater than 25 and a plasticity index of not more than 4 when tested in accordance with ASTM D 4318. The fine aggregate shall have a minimum sand equivalent value of 35 when tested in accordance with ASTM D 2419.

a. Sampling and Testing. Aggregates for preliminary testing shall be furnished by the Contractor prior to the start of production. All tests for initial aggregate submittals necessary to determine compliance with the specification requirements will be made by the Contractor ~~Engineer at no expense to the Contractor.~~

Samples of aggregates shall be furnished by the Contractor at the start of production and at intervals during production. The sampling points and intervals will be designated by the Engineer. The samples will be the basis of approval of specific lots of aggregates from the standpoint of the quality requirements of this section.

In lieu of testing, the Engineer may accept certified state DOT test results indicating that the aggregate meets specification requirements. Certified test results shall be less than 6 months old.

Samples of aggregates to check gradation shall be taken by the Engineer at least two per lot. The lot will be consistent with acceptable sampling for density. The samples shall be taken from the in-place,

compacted material. Sampling shall be in accordance with ASTM D 75, and testing shall be in accordance with ASTM C 136 and ASTM C 117.

b. Gradation Requirements. The gradation (job mix) of the final mixture shall fall within the design range indicated in Table 11, when tested in accordance with ASTM C 117 and ASTM C 136. The final gradation shall be continuously well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on an adjacent sieve or vice versa. Where environmental conditions (temperature and availability of free moisture) indicate potential damage due to frost action, the maximum percent of material by weight of particles smaller than 0.02 mm shall be 3 percent when tested in accordance with ASTM D 422.

Table 1 Requirements For Gradation Of Aggregate

Sieve Size	Design Range Percentage by Weight	Job Mix Tolerances Percent
2 in (50.0 mm)	100	0
1-1/2 (37.0 mm)	95-100	+/- 5
1 in (25.0 mm)	70-95	+/- 8
3/4 in (19.0 mm)	55-85	+/- 8
No. 4 (4.75 mm)	30-60	+/- 8
No. 30 (0.60 mm)	12-30	+/- 5
No. 200 (0.075 mm)	0-8	+/- 3

The job mix tolerances in Table 1 shall be applied to the job mix gradation to establish a job control grading band. The full tolerance still will apply if application of the tolerances results in a job control grading band outside the design range.

The fraction of the final mixture that passes the No. 200 (0.075 mm) sieve shall not exceed 60 percent of the fraction passing the No. 30 (0.60 mm) sieve.

CONSTRUCTION METHODS

209-3.1 PREPARING UNDERLYING COURSE. The underlying course shall be checked and accepted by the Engineer before placing and spreading operations are started. Any ruts or soft yielding places caused by improper drainage conditions, hauling, or any other cause shall be corrected at the Contractor's expense before the base course is placed thereon. Material shall not be placed on frozen subgrade.

209-3.2 MIXING. The aggregate shall be uniformly blended during crushing operations or mixed in a plant. The plant shall blend and mix the materials to meet the specifications and to secure the proper moisture content for compaction.

209-3.3 PLACING. The crushed aggregate base material shall be placed on the moistened subgrade in layers of uniform thickness with a mechanical spreader. The maximum depth of a compacted layer shall be 6 in (150 mm). If the total depth of the compacted material is more than 6 in (150 mm), it shall be constructed in two or more layers. In multi-layer construction, the base course shall be placed in approximately equal-depth layers.

The previously constructed layer should be cleaned of loose and foreign material prior to placing the next layer. The surface of the compacted material shall be kept moist until covered with the next layer.

209-3.4 COMPACTION. Immediately upon completion of the spreading operations, the crushed aggregate shall be thoroughly compacted. The number, type, and weight of rollers shall be sufficient to compact the material to the required density.

The moisture content of the material during placing operations shall not be below, nor more than 2 percentage points above, the optimum moisture content as determined by ASTM [1557].

209-3.5 ACCEPTANCE SAMPLING AND TESTING FOR DENSITY. Aggregate base course shall be accepted for density on a lot basis. A lot will consist of one day's production where it is not expected to exceed 2400 sq yd (2000 sq m). A lot will consist of one-half day's production where a day's production is expected to consist of between 2400 and 4800 sq yd (2000 and 4000 sq m).

Each lot shall be divided into two equal sublots. One test shall be made for each subplot. Sampling locations will be determined by the Engineer on a random basis in accordance with statistical procedures contained in ASTM D 3665.

Each lot will be accepted for density when the field density is at least 100 percent of the maximum density of laboratory specimens prepared from samples of the base course material delivered to the job site. The specimens shall be compacted and tested in accordance with ASTM [1557]. The in-place field density shall be determined in accordance with ASTM D 1556 or D 2167. If the specified density is not attained, the entire lot shall be reworked and/or recompact and two additional random tests made. This procedure shall be followed until the specified density is reached.

In lieu of the core method of field density determination, acceptance testing may be accomplished using a nuclear gauge in accordance with ASTM D 6938. The gauge should be field calibrated in accordance with Section 120 and ASTM standards. Calibration tests shall be conducted on the first lot of material placed that meets the density requirements.

When using the nuclear method ASTM D 6938 shall be used to determine the moisture content of the material. The calibration curve furnished with the nuclear gauges shall be checked in accordance with ASTM standards. The calibration checks shall be made at the beginning of a job and at regular intervals. If a nuclear gauge is used for density determination, two random readings shall be made and averaged for each subplot.

209-3.6 FINISHING. The surface of the aggregate base course shall be finished by blading or with automated equipment especially designed for this purpose.

In no case will the addition of thin layers of material be added to the top layer of base course to meet grade. If the elevation of the top layer is 1/2 in (12 mm) or more below grade, the top layer of base shall be scarified to a depth of at least 3 in (75 mm), new material added, and the layer shall be blended and recompact to bring it to grade. If the finished surface is above plan grade, it shall be cut back to grade and rerolled.

209-3.7 SURFACE TOLERANCES. The finished surface shall not vary more than 3/8 in (9 mm) when tested with a 16 ft (4.8 m) straightedge applied parallel with or at right angles to the centerline. Any deviation in excess of this amount shall be corrected by the Contractor at the Contractor's expense.

209-3.8 THICKNESS CONTROL. The completed thickness of the base course shall be within 1/2 in (12 mm) of the design thickness. Four determinations of thickness shall be made for each lot of material placed. The lot size shall be consistent with that specified in paragraph 3.5. Each lot shall be divided into four equal sublots. One test shall be made for each subplot. Sampling locations will be determined by the

Engineer on a random basis in accordance with procedures contained in ASTM D 3665. Where the thickness is deficient by more than 1/2 in (12 mm), the Contractor shall correct such areas at no additional cost by excavating to the required depth and replacing with new material. Additional test holes may be required to identify the limits of deficient areas.

209-3.9 MAINTENANCE. The base course shall be maintained in a condition that will meet all specification requirements until the work is accepted. Equipment used in the construction of an adjoining section may be routed over completed portions of the base course, provided no damage results and provided that the equipment is routed over the full width of the base course to avoid rutting or uneven compaction.

The Contractor shall remove all survey and grade hubs from the base courses prior to placing any bituminous surface course.

METHOD OF MEASUREMENT

209-4.1 The quantity of crushed aggregate base course to be paid for will be determined by measurement of the number of ~~[square yards (square meters)]~~ ~~[cubic yards (cubic meters)]~~ of material actually constructed and accepted by the Engineer as complying with the plans and specifications. ~~[On individual depth measurements, thicknesses more than 1/2 in (12 mm) in excess of the design thickness shall be considered as the specified thickness, plus 1/2 in (12 mm) in computing the number of cubic yards (cubic meters) for payment.]~~ The Contractor shall be paid for neat line quantities in place at the depth and width specified.

BASIS OF PAYMENT

209-5.1 Payment shall be made at the contract unit price per ~~[square yard (square meter)]~~ ~~[cubic yard (cubic meter)]~~ for crushed aggregate base course. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-209-5.1	Crushed Aggregate Base Course -- Per [square yard (square meter)] [cubic yard (cubic meter)]
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TESTING REQUIREMENTS

ASTM C 29	Unit Weight of Aggregate
ASTM C 88	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C 117	Materials Finer than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 131	Resistance to Degradation of Small-Size Coarse Aggregate by abrasion and impact in the Los Angeles Machine
ASTM C 136	Sieve Analysis of Fine and Coarse Aggregates

ASTM D 75	Sampling Aggregate
ASTM D 422	Particle Size Analysis of Soils
ASTM D 693	Crushed Aggregate for Macadam Pavements
ASTM D 698	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb (2.49-kg) Rammer and 12 in (305 mm) Drop
ASTM D 1556	Density of Soil in Place by the Sand-Cone Method
ASTM D 1557	Test for Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D 2167	Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2419	Sand Equivalent Value of Soils and Fine Aggregate
ASTM D 6938	In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods
ASTM D 3665	Random Sampling of Construction Materials
ASTM D 4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils

END OF ITEM P-209

ITEM P-401 PLANT MIX BITUMINOUS PAVEMENTS

DESCRIPTION

401-1.1 This item shall consist of pavement courses composed of mineral aggregate and bituminous material mixed in a central mixing plant and placed on a prepared course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

MATERIALS

401-2.1 AGGREGATE. Aggregates shall consist of crushed stone, crushed gravel, or crushed slag with or without natural sand or other inert finely divided mineral aggregate. The portion of combined materials retained on the No. 4 (4.75 mm) sieve is coarse aggregate. The portion of combined materials passing the No. 4 (4.75 mm) sieve and retained on the No. 200 (0.075 mm) sieve is fine aggregate, and the portion passing the No. 200 (0.075 mm) sieve is mineral filler.

a. Coarse Aggregate. Coarse aggregate shall consist of sound, tough, durable particles, free from adherent films of matter that would prevent thorough coating and bonding with the bituminous material and be free from organic matter and other deleterious substances. The percentage of wear shall not be greater than 40 percent when tested in accordance with ASTM C 131. The sodium sulfate soundness loss shall not exceed 10 percent, or the magnesium sulfate soundness loss shall not exceed 13 percent, after five cycles, when tested in accordance with ASTM C 88.

Aggregate shall contain at least **[70]** percent by weight of individual pieces having two or more fractured faces and **[85]** percent by weight having at least one fractured face. The area of each face shall be equal to at least 75 percent of the smallest midsectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces. Fractured faces shall be obtained by crushing.

The aggregate shall not contain more than a total of 8 percent, by weight, of flat particles, elongated particles, and flat and elongated particles, when tested in accordance with ASTM D 4791 with a value of 5:1.

~~Slag shall be air-cooled, blast furnace slag, and shall have a compacted weight of not less than 70 pounds per cubic foot (1.12 mg/cubic meter) when tested in accordance with ASTM C 29.~~

b. Fine Aggregate. Fine aggregate shall consist of clean, sound, durable, angular shaped particles produced by crushing stone, slag, or gravel that meets the requirements for wear and soundness specified for coarse aggregate. The aggregate particles shall be free from coatings of clay, silt, or other objectionable matter and shall contain no clay balls. The fine aggregate, including any blended material for the fine aggregate, shall have a plasticity index of not more than 6 and a liquid limit of not more than 25 when tested in accordance with ASTM D 4318.

Natural (nonmanufactured) sand may be used to obtain the gradation of the aggregate blend or to improve the workability of the mix. The amount of sand to be added will be adjusted to produce mixtures conforming to requirements of this specification. **[The fine aggregate shall not contain more than 15 percent natural sand by weight of total aggregates.]** If used, the natural sand shall meet the requirements of ASTM D 1073 and shall have a plasticity index of not more than 6 and a liquid limit of not more than 25 when tested in accordance with ASTM D 4318.

The aggregate shall have sand equivalent values of **[45]** or greater when tested in accordance with ASTM D 2419.

c. Sampling. ASTM D 75 shall be used in sampling coarse and fine aggregate, and ASTM C 183 shall be used in sampling mineral filler.

401-2.2 MINERAL FILLER. If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D 242.

401-2.3 BITUMINOUS MATERIAL. Bituminous material shall conform to the following requirements: **[PG 64-34]**.

The Contractor shall furnish vendor's certified test reports for each lot of bituminous material shipped to the project. The vendor's certified test report for the bituminous material can be used for acceptance or tested independently by the Engineer.

401-2.4 PRELIMINARY MATERIAL ACCEPTANCE. Prior to delivery of materials to the job site, the Contractor shall submit certified test reports to the Engineer for the following materials:

a. Coarse Aggregate.

- (1). Percent of wear.
- (2). Soundness.
- ~~(3). Unit weight of slag.~~
- (4). Percent fractured faces.

b. Fine Aggregate.

- (1) Liquid limit.
- (2) Plasticity index.
- (3) Sand equivalent.

c. Mineral Filler.

d. Bituminous Material. Test results for bituminous material shall include temperature/viscosity charts for mixing and compaction temperatures.

The certifications shall show the appropriate ASTM tests for each material, the test results, and a statement that the material meets the specification requirement. The contractor shall submit the name and address of each material source.

The Engineer may request samples for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

401-2.5 ANTI-STRIPPING AGENT. Any anti-stripping agent or additive if required shall be heat stable, shall not change the asphalt cement viscosity beyond specifications, shall contain no harmful ingredients, shall be added in recommended proportion by approved method, and shall be a material approved by the Department of Transportation of the State in which the project is located.

COMPOSITION

401-3.1 COMPOSITION OF MIXTURE. The bituminous plant mix shall be composed of a mixture of well-graded aggregate, filler and anti-strip agent if required, and bituminous material. The several aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

401-3.2 JOB MIX FORMULA. No bituminous mixture for payment shall be produced until a job mix formula has been approved in writing by the Engineer. The bituminous mixture shall be designed using procedures contained in Chapter 5, Marshall Method of Mix Design, of the Asphalt Institute's Manual Series No. 2 (MS-2), Mix Design Methods for Asphalt Concrete, sixth edition.

The design criteria in Table 1 are target values necessary to meet the acceptance requirements contained in paragraph 401-5.2b. The criteria is based on a production process which has a material variability with the following standard deviations:

Stability = 270 lb
Flow (0.01 in) = 1.5 in
Air Voids = 0.65%

If material variability exceeds the standard deviations indicated, the job mix formula and subsequent production targets shall be based on a stability greater than shown in Table 1 and the flow and air voids shall be targeted close to the mid-range of the criteria in order to meet the acceptance requirements.

Tensile Strength Ratio (TSR) of the composite mixture, as determined by ASTM D 4867, shall not be less than 75. Anti-stripping agent shall be added to the asphalt, as necessary, to produce a TSR of not less than 75. If an anti-strip agent is required, it will be provided by the Contractor at no additional cost to the Owner.

The job mix formula shall be submitted in writing by the Contractor to the Engineer at least **[30]** days prior to the start of paving operations and shall include as a minimum:

a. Percent passing each sieve size for total combined gradation, individual gradation of all aggregate stockpiles and percent by weight of each stockpile used in the job mix formula.

b. Percent of asphalt cement.

c. Asphalt performance, viscosity or penetration grade, and type of modifier if used.

d. Number of blows of hammer compaction per side of molded specimen.

e. Mixing temperature.

f. Compaction temperature.

g. Temperature of mix when discharged from the mixer.

h. Temperature-viscosity relationship of the asphalt cement.

i. Plot of the combined gradation on the Federal Highway Administration (FHWA) 45 power gradation curve.

j. Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content.

k. Percent natural sand.

l. Percent fractured faces.

m. Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).

n. Tensile Strength Ratio (TSR).

o. Anti-strip agent (if required).

p. Date the job mix formula was developed.

The Contractor shall submit to the Engineer the results of verification testing of three (3) asphalt samples prepared at the optimum asphalt content. The average of the results of this testing shall indicate conformance with the job mix formula requirements specified in Tables 1, 2, and 3.

When the project requires asphalt mixtures of differing aggregate gradations, a separate job mix formula and the results of job mix formula verification testing must be submitted for each mix.

The job mix formula for each mixture shall be in effect until a modification is approved in writing by the Engineer. Should a change in sources of materials be made, a new job mix formula must be submitted within [14] days and approved by the Engineer in writing before the new material is used. After the initial production job mix formula has been approved by the Engineer and a new or modified job mix formula is required for whatever reason, the subsequent cost of the Engineer's approval of the new or modified job mix formula will be borne by the Contractor. There will be no time extension given or considerations for extra costs associated with the stoppage of production paving or restart of production paving due to the time needed for the Engineer to approve the initial, new or modified job mix formula.

Table 1. Marshall Design Criteria

Test Property	75
Number of blows	2150 (9564)
Stability, pounds (Newtons) minimum	10-14
Flow, 0.01 in. (0.25 mm)	2.8-4.2
Air voids (%)	*
Percent voids in mineral aggregate, minimum	See Table 2.

Table 2. Minimum Percent Voids In Mineral Aggregate

Maximum Particle Size		Minimum Voids in Mineral Aggregate
½ in	12.5 mm	16%
¾ in	19.0 mm	15%
1 in	25.0 mm	14%
1 ½ in	37.5 mm	13%

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 3 when tested in accordance with ASTM C 136 and C 117.

The gradations in Table 3 represent the limits that shall determine the suitability of aggregate for use from the sources of supply. The aggregate, as selected (and used in the JMF), shall have a gradation within the limits designated in Table 3 and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa, but shall be well graded from coarse to fine.

Deviations from the final approved mix design for bitumen content and gradation of aggregates shall be within the action limits for individual measurements as specified in paragraph 401-6.5a. The limits still will apply if they fall outside the master grading band in Table 3.

The maximum size aggregate used shall not be more than one-half of the thickness of the course being constructed except where otherwise shown on the plans or ordered by the Engineer.

Table 3 Aggregate - Bituminous Pavements

Sieve Size	Percentage by Weight Passing Sieve	
	1" max	¾" max
1 ½ in. (37.50 mm)	--	--
1 in. (25.0 mm)	100	--
¾ in. (19.0 mm)	76-98	100
½ in. (12.5 mm)	66-86	79-99
⅜ in. (9.5 mm)	57-77	68-88
No. 4 (4.75 mm)	40-60	48-68
No. 8 (2.36 mm)	26-46	33-53
No. 16 (1.18 mm)	17-35	20-40
No. 30 (0.60 mm)	11-27	14-30
No. 50 (0.30 mm)	7-19	9-21
No. 100 (0.15 mm)	6-16	6-16
No. 200 (0.075 mm)	3-6	3-6
Asphalt Percent:		
Stone or gravel	4.5-7.0	5.0-7.5
Slag	*	

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute Manual Series No. 2 (MS-2), Chapter 3, latest edition.

401-3.3 RECYCLED ASPHALT CONCRETE. Recycled HMA shall consist of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, and asphalt cement. The RAP shall be of a consistent gradation and asphalt content and properties. When RAP is fed into the plant, the maximum RAP chunk size shall not exceed 2 in. The recycled HMA mix shall be designed using procedures contained in AI MS-02. The recycled asphalt concrete mix shall be designed using procedures contained in the Asphalt Institute's Manual Series Number 2 (MS-2). The percentage of asphalt in the RAP shall be established for the mixture design according to ASTM D 2172 using the appropriate dust correction procedure. The job mix shall meet the requirements of paragraph 401-3.2

RAP should only be used for shoulder surface course mixes and for any intermediate courses. The amount of RAP shall be limited to [0] percent. The use of RAP will not be allowed in any of the surface course lifts.

In addition to the requirements of paragraph 401-3.2, the job mix formula shall indicate the percent of reclaimed asphalt pavement and the percent and viscosity performance grade (PG) grade of new asphalt. The Contractor shall submit documentation to the Engineer, indicating that the mixing equipment proposed for use is adequate to mix the percent of RAP shown in the job mix formula and meet all local and national environmental regulations. The dynamic shear rheometer and bending beam tests shall be used to test the PG asphalt binder.

The blend of new asphalt cement and the RAP asphalt binder shall meet the requirements in paragraph 401-2.3. The virgin asphalt cement shall not be more than two standard asphalt material grades different than that specified in paragraph 401-2.3. RAP containing coal tars shall not be utilized.

401-3.4 TEST SECTION. Prior to full production, the Contractor shall prepare and place a quantity of bituminous mixture according to the job mix formula. The amount of mixture shall be sufficient to construct a test section [300 feet] long and [50 feet] wide, placed in two lanes, with a longitudinal cold joint, and shall be of the same depth specified for the construction of the course which it represents. A cold joint is an exposed construction joint at least 4 hours old or whose mat has cooled to less than 160 °F. The underlying grade or pavement structure upon which the test section is to be constructed shall be the same as the remainder of the course represented by the test section. The equipment used in construction of the test section shall be the same type and weight to be used on the remainder of the course represented by the test section.

The test section shall be evaluated for acceptance as a single lot in accordance with the acceptance criteria in paragraph 401-5.1 and 401-6.3. The test section shall be divided into equal sublots. As a minimum the test section shall consist of 3 sublots.

The test section shall be considered acceptable if; 1) stability, flow, mat density, air voids, and joint density are 90 percent or more within limits, 2) gradation and asphalt content are within the action limits specified in paragraphs 401-6.5a and 5b, and 3) the voids in the mineral aggregate are within the limits of Table 2.

If the initial test section should prove to be unacceptable, the necessary adjustments to the job mix formula, plant operation, placing procedures, and/or rolling procedures shall be made. A second test section shall then be placed. If the second test section also does not meet specification requirements, both sections shall be removed at the Contractor's expense. Additional test sections, as required, shall be constructed and evaluated for conformance to the specifications. Any additional sections that are not acceptable shall be removed at the Contractor's expense. Full production shall not begin until an acceptable section has been constructed and accepted in writing by the Engineer. Once an acceptable test section has been placed, payment for the initial test section and the section that meets specification requirements shall be made in accordance with paragraph 401-8.1 and 401-8.2.

Job mix control testing shall be performed by the Contractor at the start of plant production and in conjunction with the calibration of the plant for the job mix formula. If aggregates produced by the plant do not satisfy the gradation requirements or produce a mix that meets the JMF. It will be necessary to reevaluate and redesign the mix using plant-produced aggregates. Specimens shall be prepared and the optimum bitumen content determined in the same manner as for the original design tests.

Contractor will not be allowed to place the test section until the Contractor Quality Control Program, showing conformance with the requirements of Paragraph 401-6.1, has been approved reviewed and acknowledgement of the review is submitted, in writing, by the Engineer. The Engineer shall not be

responsible for approving a Contractor Quality Control Program since the program is an internal obligation of the Contractor and an element of means and methods.

401-3.5 Job Mix Formula (JMF) Laboratory. The Contractor's laboratory used to develop the job mix formula shall meet the requirements of ASTM D 3666. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for developing the JMF must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction.

401-3.6 PAVING PLAN. The Contractor shall submit a Paving Plan prior to the start of paving operations. The Paving Plan shall clearly indicate paving lanes, paving lane width, length of pulls (stations of starts and stops) and direction of pulls. The Contractor shall not start paving until the Engineer has reviewed the plan.

The Contractor shall select his paving distance each day in accordance with the provisions of this specification to allow for the entire width of the runway, taxiway or apron to be paved. The Contractor shall match up each lane so that a single transverse joint is made at the end of each day's installation.

401-3.7 SUBMITTALS AND CERTIFICATIONS. Submittals of "Shop and Setting Drawings," "Working Drawings," "Catalogue Data" and "Certifications" for review shall be submitted in accordance with appropriate sections of the General Provisions and Special Conditions. Submittals and Certifications required are as follows:

- Certification and test results showing that Coarse Aggregate meets the requirements specified.
- Certification and test results showing that Fine Aggregate meets the requirements specified.
- Certification that filler meets the requirements specified.
- Certification that bituminous material meets the requirements specified.
- Job Mix Formula in accordance with the FAA's ERLPM for each bituminous mix developed.
- Contractor's Quality Control Plan.
- Certification that the batch plant meets the State DOT Standard Specification requirements.
- Certification that the plant testing laboratory meets the requirements specified.
- Paving Plan showing widths of paving lanes, direction of pulls and length of pulls.

CONSTRUCTION METHODS

401-4.1 WEATHER LIMITATIONS. The bituminous mixture shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the Engineer, if requested; however, all other requirements including compaction shall be met.

Table 4. Base Temperature Limitations

Mat Thickness	Base Temperature (Minimum)	
	Deg. F	Deg. C
3 in. (7.5 cm) or greater	40	4
Greater than 1 in. (2.5 cm) but less than 3 in. (7.5 cm)	45	7
1 in. (2.5 cm) or less	50	10

401-4.2 BITUMINOUS MIXING PLANT. Plants used for the preparation of bituminous mixtures shall conform to the requirements of ASTM D 995 with the following changes:

Requirements for all plants include:

(1) Truck Scales. The bituminous mixture shall be weighed on approved scales furnished by the Contractor, or on certified public scales at the Contractor's expense. Scales shall be inspected and sealed as often as the Engineer deems necessary to assure their accuracy. Scales shall conform to the requirements of the General Provisions, Section 90-01.

In lieu of scales, and as approved by the Engineer, asphalt mixture weights may be determined by the use of an electronic weighing system equipped with an automatic printer that weighs the total paving mixture. Contractor must furnish calibration certification of the weighing system prior to mix production and as often thereafter as requested by the Engineer.

(2) Testing Facilities. The Contractor shall provide laboratory facilities at the plant for the use of the Engineer's acceptance testing and the Contractor's quality control testing. The Engineer will always have priority in the use of the laboratory. The lab shall have sufficient space and equipment so that both testing representatives (Engineer's and Contractor's) can operate efficiently. The lab shall also meet the requirements of ASTM D 3666.

The plant testing laboratory shall have a floor space area of not less than 150 sq ft, with a ceiling height of not less than 7-½ feet. The laboratory shall be weather tight, sufficiently heated in cold weather, air-conditioned in hot weather to maintain temperatures for testing purposes of 70 °F +/- 5 °F. The plant testing laboratory shall be located on the plant site to provide an unobstructed view, from one of its windows, of the trucks being loaded with the plant mix materials.

Laboratory facilities shall be kept clean, and all equipment shall be maintained in proper working condition. The Engineer shall be permitted unrestricted access to inspect the Contractor's laboratory facility and witness quality control activities. The Engineer will advise the Contractor in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

As a minimum, the plant testing laboratory shall have:

- a. Adequate artificial lighting
- b. Electrical outlets sufficient in number and capacity for operating the required testing equipment and drying samples.
- c. Fire extinguishers (2), Underwriter's Laboratories approved

- d. Work benches for testing, minimum 2-½ feet by 10 feet.
- e. Desk with 2 chairs
- f. Sanitary facilities convenient to testing laboratory
- g. Exhaust fan to outside air, minimum 12 in blade diameter
- h. A direct telephone line and telephone including a FAX machine operating 24 hours per day, seven days per week
- i. File cabinet with lock for Engineer
- j. Sink with running water, attached drain board and drain capable of handling separate material
- k. Metal stand for holding washing sieves
- l. Two element hot plate or other comparable heating device, with dial type thermostatic controls for drying aggregates
- m. Mechanical shaker and appropriate sieves (listed in JMF, Table 3) meeting the requirements of ASTM E-11 for determining the gradation of coarse and fine aggregates in accordance with ASTM C 136
- n. Marshall testing equipment meeting ASTM D 6926, ASTM D 6927, automatic compaction equipment capable of compacting three specimens at once and other apparatus as specified in ASTM C 127, D 2172, D 2726, and D 2041
- o. Oven, thermostatically controlled, inside minimum 1 cubic foot
- p. Two volumetric specific gravity flasks, 500 cc
- q. Other necessary hand tools required for sampling and testing
- r. Library containing contract specifications, latest ASTM volumes 4.01, 4.02, 4.03 and 4.09, AASHTO standard specification parts I and II, and Asphalt Institute Publication MS-2.
- s. Equipment for Theoretical Specific Gravity testing including a 4,000 cc pycnometer, vacuum pump capable of maintaining 30 ml mercury pressure and a balance, 16-20 gm with accuracy of 0.5 grams
- t. Extraction equipment, centrifuge and reflux types and Rotoflex equipment
- u. A masonry saw with diamond blade for trimming pavement cores and samples
- v. Telephone

Approval of the plant and testing laboratory by the Engineer requires all facilities and equipment to be in good working order during production, sampling and testing. Failure to provide the specified facilities shall be sufficient cause for disapproving bituminous plant operations.

The Owner shall have access to the lab and the plant whenever Contractor is in production.

(3) Inspection of Plant. The Engineer, or Engineer's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.

(4) Storage Bins and Surge Bins. Use of surge and storage bins for temporary storage of hot bituminous mixtures will be permitted as follows:

- a. The bituminous mixture may be stored in surge bins for a period of time not to exceed 3 hours.

~~b. The bituminous mixture may be stored in insulated storage bins for a period of time not to exceed 24 hours.~~

The bins shall be such that mix drawn from them meets the same requirements as mix loaded directly into trucks.

~~If the Engineer determines that there is an excessive amount of heat loss, segregation, or oxidation of the mixture due to temporary storage, no temporary storage will be allowed.~~

401-4.3 HAULING EQUIPMENT. Trucks used for hauling bituminous mixtures shall have tight, clean, and smooth metal beds. To prevent the mixture from adhering to them, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other approved material. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

401-4.4 BITUMINOUS PAVERS. Bituminous pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of bituminous plant mix material that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The paver shall be capable of operating at forward speeds consistent with satisfactory laying of the mixture.

The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed without segregation. The screed shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.

The Contractor shall provide a bituminous paver capable of paving 25-foot wide paving lanes. Additional screed sections shall be provided with heating units and vibratory screed extensions. If the Contractor cannot provide a 25-foot wide paving machine, he shall provide a minimum of two (2) 12-1/2-foot paving machines able to pave dual contiguous lanes at the same time.

Automatic transverse and longitudinal grade screed control devices are required. On pavers with a screed width greater than 17-feet, controls that operate from references on both sides of the paver shall be provided.

The paver shall be equipped with a control system capable of automatically maintaining the specified screed elevation. The control system shall be automatically actuated from either a reference line and/or through a system of mechanical sensors or sensor-directed mechanisms or devices that will maintain the paver screed at a predetermined transverse slope and at the proper elevation to obtain the required surface. The transverse slope controller shall be capable of maintaining the screed at the desired slope within plus or minus 0.1 percent.

The controls shall be capable of working in conjunction with any of the following attachments:

- a. Ski-type device of not less than 30 feet (9.14 m) in length.
- b. Taut stringline (wire) set to grade.
- c. Short ski or shoe.
- d. Laser control.

If, during construction, it is found that the spreading and finishing equipment in use leaves tracks or indented areas, or produces other blemishes in the pavement that are not satisfactorily corrected by the

scheduled operations, the use of such equipment shall be discontinued and satisfactory equipment shall be provided by the Contractor.

401-4.5 ROLLERS. Rollers of the vibratory, steel wheel, and pneumatic-tired type shall be used. They shall be in good condition, capable of operating at slow speeds to avoid displacement of the bituminous mixture. The number, type, and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable condition. A vibrating roller will be required for compaction on cold joints on hot or fresh joints.

All rollers shall be specifically designed and suitable for compacting hot mix bituminous concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used. Depressions in pavement surfaces caused by rollers shall be repaired by the Contractor at its own expense.

The use of equipment that causes crushing of the aggregate will not be permitted.

a. Nuclear Densometer. The Contractor shall have on site a nuclear densometer during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall also supply a qualified technician during all paving operations to calibrate the nuclear densometer and obtain accurate density readings for all new bituminous concrete. These densities shall be supplied to the Engineer upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician. Refer to Section 120 of the General Provisions.

401-4.6 PREPARATION OF BITUMINOUS MATERIAL. The bituminous material shall be heated in a manner that will avoid local overheating and provide a continuous supply of the bituminous material to the mixer at a uniform temperature. The temperature of the bituminous material delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles, but shall not exceed 325 °F (160 °C), unless otherwise required by the manufacturer.

401-4.7 PREPARATION OF MINERAL AGGREGATE. The aggregate for the mixture shall be heated and dried prior to introduction into the mixer. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350 °F (175 °C) when the asphalt is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

401-4.8 PREPARATION OF BITUMINOUS MIXTURE. The aggregates and the bituminous material shall be weighed or metered and introduced into the mixer in the amount specified by the job mix formula.

The combined materials shall be mixed until the aggregate obtains a uniform coating of bitumen and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D 2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95 percent of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all bituminous mixtures upon discharge shall not exceed 0.5 percent.

401-4.9 PREPARATION OF THE UNDERLYING SURFACE. Immediately before placing the bituminous mixture, the underlying course shall be cleaned of all dust and debris. A prime coat or tack coat shall be applied in accordance with Item P-602 or P-603, if shown on the plans.

401-4.10 LAYDOWN PLAN, TRANSPORTING, PLACING, AND FINISHING. Prior to the placement of the bituminous mixture, the Contractor shall prepare a laydown plan for approval by the Engineer. This is to minimize the number of cold joints in the pavement. The laydown plan shall include the sequence of paving laydown by stations, width of lanes, temporary ramp locations, and laydown temperature. The laydown plan shall also include estimated time of completion for each portion of the work (that is, milling, paving, rolling, cooling, etc.). Modifications to the laydown plan shall be approved by the Engineer.

The bituminous mixture shall be transported from the mixing plant to the site in vehicles conforming to the requirements of paragraph 401-4.3. Deliveries shall be scheduled so that placing and compacting of mixture is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to atmospheric temperature.

The Contractor may elect to use a material transfer vehicle to deliver mix to the paver if there is a continuous supply of mix available from the asphalt plant and/or long paving lanes are anticipated.

Paving during nighttime construction shall require the following:

a. All paving machines, rollers, distribution trucks and other vehicles required by the Contractor for his operations shall be equipped with artificial illumination sufficient to safely complete the work.

b. Minimum illumination level shall be twenty (20) horizontal foot candles and maintained in the following areas:

(1) An area of 30 feet wide by 30 feet long immediately behind the paving machines during the operations of the machines.

(2) An area 15 feet wide by 30 feet long immediately in front and back of all rolling equipment, during operation of the equipment.

(3) An area 15 feet wide by 15 feet long at any point where an area is being tack coated prior to the placement of pavement.

c. As partial fulfillment of the above requirements, the Contractor shall furnish and use, complete artificial lighting units with a minimum capacity of 3,000 watt electric beam lights, affixed to all equipment in such a way to direct illumination on the area under construction.

d. In addition, the Contractor shall furnish [necessary] portable floodlight units similar or equal to each individual unit having at a minimum; four 1,000 watt lights, 25+ foot tower height, 5,000+ watt generator, and a 50+ hour operational capacity.

If the Contractor places any out of specification mix in the project work area, the Contractor is required to remove it at its own expense, to the satisfaction of the Engineer. If the Contractor has to continue placing non-payment bituminous concrete, as directed by the Engineer, to make the surfaces safe for aircraft operations, the Contractor shall do so to the satisfaction of the Engineer. It is the Contractor's responsibility to leave the facilities to be paved in a safe condition ready for aircraft operations. No consideration for extended closure time of the area being paved will be given. As a first order of work for the next paving shift, the Contractor shall remove all out of specification material and replace with approved material to the satisfaction of the Engineer. When the above situations occur, there will be no consideration given for additional construction time or payment for extra costs.

The initial placement and compaction of the mixture shall occur at a temperature suitable for obtaining density, surface smoothness, and other specified requirements but not less than 250 °F (121 °C). Placing of the mixture shall be continuous at a desired rate of 100 tons per hour, unless otherwise approved by the Engineer.

The first pass shall be made using a taut stringline on both sides of the paver. Subsequent passes shall be made using a short ski or shoe on the previously placed lane and taut stringline on the other side. The stringline shall be mounted on sensor brackets every 25-feet on straight sections and laid out in cords along curves. Cord length will be dependent on the radius of the curve. The shorter radius curves shall have closer spacing of sensor brackets. The stringline shall extend onto the existing pavement, or the previous mat, at least 50-feet prior to pullout, so that the paver runs on automation.

Setting grade stakes and taut stringline includes establishing all of the conditions necessary for the stringline to adequately serve for grade referencing. The factors include but are not limited to:

- a. Setting grades away from the mat edge an additional distance to compensate for the extended distance of the wire from the stake.
- b. Setting the stringline at an established height, or relative height above finished grade.
- c. Stringline shall be anchored at both ends of the wire to reduce sagging.
- d. Additional anchors shall be used along curved sections to assist in keeping the stringline attached to the crossarm of the grade stake.
- e. Stringline shall be set as low as practical to help avoid disturbance by workers.

Edges of existing bituminous pavement abutting the new work shall be saw cut and carefully removed as shown on the drawings and painted with bituminous tack coat before new material is placed against it.

Upon arrival, the mixture shall be placed to the full width by a bituminous paver. It shall be struck off in a uniform layer of such depth that, when the work is completed, it shall have the required thickness and conform to the grade and contour indicated. The speed of the paver shall be regulated to eliminate pulling and tearing of the bituminous mat. Unless otherwise permitted, placement of the mixture shall begin along the centerline of a crowned section or on the high side of areas with a one-way slope. The mixture shall be placed in consecutive adjacent strips having a minimum width of [11'] except where edge lanes require less width to complete the area. Additional screed sections shall not be attached to widen paver to meet the minimum lane width requirements specified above unless additional auger sections are added to match. The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least 1 ft (30 cm); however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet (3 m) from transverse joints in the previous course.

~~Transverse joints in adjacent lanes shall be offset a minimum of 10 feet (3 m).~~

On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture may be spread and luted by hand tools. Areas of segregation in the surface course, as determined by the Engineer, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of 2 in deep. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet long.

No course shall be placed on top of a previous placed course until the lower course has cooled to ambient temperature and acceptable test results have been achieved.

The Contractor shall be required to utilize Material Transfer Vehicles (MTV) to supply the asphalt mix to the paving machines. This will allow the pavers to be operated almost continuously without stopping between truckloads of mix. The Contractor shall ensure the MTV equipment meets the following requirements:

a. Has a truck unloading system which receives mixture from the hauling equipment and independently delivers mixtures from the hauling equipment to the paving equipment.

b. Has mixture remixing capability by either a storage bin in the MTV with a minimum capacity of 14 tons of mixture and a remixing system in the bottom of the MTV storage bin, or a dual pug mill system located in the paver hopper insert with two full length transversely mounted paddle mixers to continuously blend the mixture as it discharges to a conveyor system.

c. Provides to the paver(s) a homogeneous, non-segregated mixture of uniform temperature with no more than 20 degrees F difference between the highest and lowest temperatures when measured transversely across the width of the mat in a straight line at a distance of one foot to three feet from the screed while the paver is operating.

401-4.11 COMPACTION OF MIXTURE. After placing, the mixture shall be thoroughly and uniformly compacted by power rollers. The surface shall be compacted as soon as possible when the mixture has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected at once.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross section, and the required field density is obtained. To prevent adhesion of the mixture to the roller, the wheels shall be equipped with a scraper and kept properly moistened but excessive water will not be permitted.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power driven tampers. Tampers shall weigh not less than 275 pounds, have a tamping plate width not less than 15 in, be rated at not less than 4,200 vibrations per minute, and be suitably equipped with a standard tamping plate wetting device.

Any mixture that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

401-4.12 JOINTS. The formation of all joints shall be made in such a manner as to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid mixture except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be given a tack coat of bituminous material before placing any fresh mixture against the joint.

On longitudinal joints, the Contractor shall not pave a distance to exceed ten times the ambient temperature, or a distance as directed by the Engineer. Longitudinal joints which are allowed to cool below 150 degrees F, are irregular, damaged, uncompacted or otherwise defective, shall be cut back a minimum of 6-inches by a method approved by the Engineer to form a vertical face. Tack shall be

applied to the joint prior to the placement of the adjacent lane. Material removed to facilitate construction of longitudinal joints shall be deducted from the total daily tonnage.

The Contractor shall select his paving distance each day in accordance with the provisions of this specification to allow for the entire width of the runway or taxiway to be paved. The Contractor shall match up each lane so that a single transverse joint is made at the end of each day's installation.

Upon completion of paving operations, all transverse paving joints and all joints between existing pavement and new pavement shall be sawed and sealed in accordance with the plans and as directed by the Engineer. In addition, the Contractor shall saw cut using a walk behind saw (at least 9 HP) and seal new joints in the final surface, at locations shown on the plans. Joint sealing shall be performed in accordance with Item P-605, Joint Sealing Filler. The transverse joints in both lifts of surface course shall align vertically and horizontally to provide a single joint line perpendicular to the centerline of the runway.

Longitudinal joints which are irregular, damaged, uncompacted, or otherwise defective [or which have been left exposed for more than 4 hours, or whose surface temperature has cooled to less than 160 °F] shall be cut back at least 1-inch and not more than 6-inches to expose a clean, sound surface for the full depth of the course. All contact surfaces shall be cleaned and dry prior and given a tack coat of bituminous material prior to placing any fresh mixture against the joint. The cost of this work and tack coat shall be considered incidental to the cost of the bituminous course.

401-4.13 SHAPING EDGES. While the surface is being compacted and finished, the Contractor shall carefully trim the outside edges of the pavement to the proper alignment. Edges so formed shall be beveled while still hot with the back of a rake or a smoothing iron and thoroughly compacted by tampers or by other satisfactory methods, providing a neat, smooth and straight edge.

401-4.13 SKID RESISTANT SURFACES/SAW-CUT GROOVING. If shown on the plans, skid resistant surfaces for asphalt pavements shall be provided by construction of saw-cut grooves. Saw-cut grooves must meet the requirements of Item P-621.

MATERIAL ACCEPTANCE

401-5.1 ACCEPTANCE SAMPLING AND TESTING. Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the Engineer at no cost to the Contractor except that coring [and profilograph testing] as required in this section shall be completed and paid for by the Contractor.

Testing organizations performing these tests [except profilograph] shall meet the requirements of ASTM D 3666. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction. All equipment in Contractor furnished laboratories shall be calibrated by an independent testing organization prior to the start of operations at the Contractor's expense.

a. Plant-Produced Material. Plant-produced material shall be tested for stability, flow, and air voids on a lot basis. Sampling shall be from material deposited into trucks at the plant or from trucks at the job site. Samples shall be taken in accordance with ASTM D 979. A lot will consist of:

- One day or shift's production not to exceed 2,000 tons (1,814 t), or
- a half day or shift's production where a day's production is expected to consist of between 2,000 and 4,000 tons (1, 814 t and 3,628 t), or
- Similar subdivisions for tonnages over 4,000 tons (3,628, t).

Where more than one plant is simultaneously producing material for the job, the lot sizes shall apply separately for each plant.

(1) Sampling. Each lot will consist of four equal sublots. Sufficient material for preparation of test specimens for all testing will be sampled by the Engineer on a random basis, in accordance with the procedures contained in ASTM D 3665. One set of laboratory compacted specimens will be prepared for each subplot in accordance with ASTM D 6926, at the number of blows required by paragraph 401-3.2, Table 1. Each set of laboratory compacted specimens will consist of three test portions prepared from the same sample increment.

The sample of bituminous mixture may be put in a covered metal tin and placed in an oven for not less than 30 minutes nor more than 60 minutes to stabilize to compaction temperature. The compaction temperature of the specimens shall be as specified in the job mix formula.

(2) Testing. Sample specimens shall be tested for stability and flow in accordance with ASTM D 6927. Air voids will be determined by the Engineer in accordance with ASTM D 3203.

Prior to testing, the bulk specific gravity of each test specimen shall be measured by the Engineer in accordance with ASTM D 2726 using the procedure for laboratory-prepared thoroughly dry specimens, or ASTM D 1188, whichever is applicable, for use in computing air voids and pavement density.

For air voids determination, the theoretical maximum specific gravity of the mixture shall be measured one time for each subplot in accordance with ASTM D 2041, Type C, D or E container. The value used in the air voids computation for each subplot shall be based on theoretical maximum specific gravity measurement for the subplot.

The stability and flow for each subplot shall be computed by averaging the results of all test specimens representing that subplot.

(3) Acceptance. Acceptance of plant produced material for stability, flow, and air voids shall be determined by the Engineer in accordance with the requirements of paragraph 401-5.2b.

b. Field Placed Material. Material placed in the field shall be tested for mat and joint density on a lot basis.

(1) Mat Density. The lot size shall be the same as that indicated in paragraph 401-5.1a and shall be divided into four equal sublots. One core of finished, compacted materials shall be taken by the Contractor from each subplot. Core locations will be determined by the Engineer on a random basis in accordance with procedures contained in ASTM D 3665. Cores shall not be taken closer than 1 ft from a transverse or longitudinal joint.

(2) Joint Density. The lot size shall be the total length of longitudinal joints constructed by a lot of material as defined in paragraph 401-5.1a. The lot shall be divided into four equal sublots. One core of finished, compacted materials shall be taken by the Contractor from each subplot. Core locations will be determined by the Engineer on a random basis in accordance with procedures contained in ASTM D 3665. All coring shall be centered on the joint. The minimum core diameter for joint density determination shall be 5 in.

(3) Sampling. Samples shall be neatly cut with a core drill. The cutting edge of the core drill bit shall be of hardened steel or other suitable material with diamond chips embedded in the metal cutting edge. The minimum diameter of the sample shall be 5 in. Samples that are clearly defective, as a result of sampling, shall be discarded and another sample taken. The Contractor shall furnish all tools, labor, and

materials for cutting samples, cleaning, and filling the cored pavement. Cored pavement shall be cleaned and core holes shall be filled in a manner acceptable to the Engineer and within one day after sampling.

(4) Testing. The bulk specific gravity of each cored sample will be measured by the Engineer in accordance with ASTM D 2726 or ASTM D 1188, whichever is applicable. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each subplot sample by the average bulk specific gravity of all laboratory prepared specimens for the lot, as determined in paragraph 401-5.1a(2). The bulk specific gravity used to determine the joint density at joints formed between different lots shall be the lowest of the bulk specific gravity values from the two different lots.

(5) Acceptance. Acceptance of field placed material for mat density will be determined by the Engineer in accordance with the requirements of paragraph 401-5.2b(1). Acceptance for joint density will be determined in accordance with the requirements of paragraph 401-5.2b(3).

c. Partial Lots - Plant-Produced Material. When operational conditions cause a lot to be terminated before the specified number of tests have been made for the lot, or when the Contractor and Engineer agree in writing to allow overages or other minor tonnage placements to be considered as partial lots, the following procedure will be used to adjust the lot size and the number of tests for the lot.

The last batch produced where production is halted will be sampled, and its properties shall be considered as representative of the particular subplot from which it was taken. In addition, an agreed to minor placement will be sampled, and its properties shall be considered as representative of the particular subplot from which it was taken. Where three sublots are produced, they shall constitute a lot. Where one or two sublots are produced, they shall be incorporated into the next lot, and the total number of sublots shall be used in the acceptance plan calculation, that is, $n = 5$ or $n = 6$, for example. Partial lots at the end of asphalt production on the project shall be included with the previous lot.

d. Partial Lots - Field Placed Material. The lot size for field placed material shall correspond to that of the plant material, except that, in no cases, shall less than three (3) cored samples be obtained, that is, $n = 3$.

401-5.2 ACCEPTANCE CRITERIA.

a. General. Acceptance will be based on the following characteristics of the bituminous mixture and completed pavement as well as the implementation of the Contractor Quality Control Program and test results:

- (1) Stability**
- (2) Flow**
- (3) Air voids**
- (4) Mat density**
- (5) Joint density**
- (6) Thickness**
- (7) Smoothness**
- (8) Grade**

Mat density and air voids will be evaluated for acceptance in accordance with paragraph 401-5.2b(1). Stability and flow will be evaluated for acceptance in accordance with paragraph 401-5.2b(2). Joint density will be evaluated for acceptance in accordance with paragraph 401-5.2b(3).

Thickness will be evaluated by the Engineer for compliance in accordance with paragraph 401-5.2b(4). Acceptance for smoothness will be based on the criteria contained in paragraph 401-5.2b(5). Acceptance for grade will be based on the criteria contained in paragraph 401-5.2b(6).

The Engineer may at any time, notwithstanding previous plant acceptance, reject and require the Contractor to dispose of any batch of bituminous mixture which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or improper mix temperature. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the Engineer, and if it can be demonstrated in the laboratory, in the presence of the Engineer, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

b. Acceptance Criteria.

(1) Mat Density and Air Voids. Acceptance of each lot of plant produced material for mat density and air voids shall be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90 percent, the lot shall be acceptable. Acceptance and payment shall be determined in accordance with paragraph 401-8.1.

(2) Stability and Flow. Acceptance of each lot of plant produced material for stability and flow shall be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90 percent, the lot shall be acceptable. If the PWL is less than 90 percent, the Contractor shall determine the reason and take corrective action. If the PWL is below 80 percent, the Contractor must stop production until the reason for poor stability and/or flow has been determined and adjustments to the mix are made

(3) Joint Density. Acceptance of each lot of plant produced material for joint density shall be based on the percentage of material within specification limits (PWL). If the PWL of the lot is equal to or exceeds 90 percent, the lot shall be considered acceptable. If the PWL is less than 90 percent, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80 percent, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71 percent, the pay factor for the lot used to complete the joint shall be reduced by 5 percentage points. This lot pay factor reduction shall be incorporated and evaluated in accordance with paragraph 401-8.1.

(4) Thickness. Thickness of each lift of surface course shall be evaluated by the Engineer for compliance to the requirements shown on the plans. Measurements of thickness shall be made by the Engineer using the cores extracted for each subplot for density measurement. The maximum allowable deficiency at any point shall not be more than $\frac{1}{4}$ in less than the thickness indicated for the lift. Average thickness of lift, or combined lifts, shall not be less than the indicated thickness. Where the thickness tolerances are not met, the lot or subplot shall be corrected by the Contractor at his expense by removing the deficient area and replacing with new pavement. The Contractor, at his expense, may take additional cores as approved by the Engineer to circumscribe the deficient area.

(5) Smoothness. The final surface shall be free from roller marks. The finished surfaces of each course of the pavement, except the finished surface of the final course, shall not vary more than $\frac{3}{8}$ in when evaluated with a 16 ft straightedge. The finished surface of the final course of pavement shall not vary more than $\frac{1}{4}$ in when evaluated with a 16 ft straightedge. The lot size shall be [2,000] square yards (sq m). Smoothness measurements shall be made at 50 ft intervals and as determined by the Engineer. In the longitudinal direction, a smoothness reading shall be made at the center of each paving lane. In the transverse direction, smoothness readings shall be made continuously across the full width of the pavement. However, transverse smoothness readings shall not be made across designed grade changes. At warped transition areas, straightedge position shall be adjusted to measure surface smoothness and not design grade transitions. When more than 15 percent of all measurements within a

lot exceed the specified tolerance, the Contractor shall remove the deficient area to the depth of the final course of pavement and replace with new material. Skin patching shall not be permitted. Isolated high points may be ground off providing the course thickness complies with the thickness specified on the plans. High point grinding will be limited to 15 sq yd. Areas in excess of 15 sq yd will require removal and replacement of the pavement in accordance with the limitations noted above.

(6) Grade. The finished surface of the pavement shall not vary from the gradeline elevations and cross sections shown on the plans by more than $\frac{1}{2}$ in (12.70 mm). The finished grade of each lot will be determined by running levels at intervals of 50 feet (15.2 m) or less longitudinally and all breaks in grade transversely (not to exceed 50 feet) to determine the elevation of the completed pavement. The Contractor shall pay the cost of surveying of the level runs that shall be performed by a licensed surveyor. The documentation, stamped and signed by a licensed surveyor, shall be provided by the Contractor to the Engineer. The lot size shall be **[2,000]** square yards (square meters). When more than 15 percent of all the measurements within a lot are outside the specified tolerance, or if any one shot within the lot deviates $\frac{3}{4}$ in or more from planned grade, the Contractor shall remove the deficient area to the depth of the final course of pavement and replace with new material. Skin patching shall not be permitted. Isolated high points may be ground off providing the course thickness complies with the thickness specified on the plans. The surface of the ground pavement shall have a texture consisting of grooves between 0.090 and 0.130 in wide. The peaks and ridges shall be approximately $\frac{1}{32}$ in higher than the bottom of the grooves. The pavement shall be left in a clean condition. The removal of all of the slurry resulting from the grinding operation shall be continuous. The grinding operation should be controlled so the residue from the operation does not flow across other lanes of pavement. High point grinding will be limited to 15 sq yd. Areas in excess of 15 sq yd will require removal and replacement of the pavement in accordance with the limitations noted above. Repairs shall be performed at no cost to the Owner.

(7) Absence of Ponding. The final surface of the pavement shall not demonstrate ponding of water. At completion of paving of the final surface course, the Contractor shall thoroughly cover the pavement with water using a water distribution vehicle. In areas that do not adequately drain the water from the surface, or otherwise hold water, the Contractor, at his expense, shall remove the deficient area to the depth of the final course of pavement and replace with new material. Skin patching shall not be permitted. Isolated high points may be ground off providing the course thickness complies with the thickness specified on the plans. High point grinding will be limited to 15 square yards. Areas in excess of 15 square yards will require removal and replacement of the pavement in accordance with the limitations noted above.

c. Percentage of Material Within Specification Limits (PWL). The percentage of material within specification limits (PWL) shall be determined in accordance with procedures specified in Section 110 of the General Provisions. The specification tolerance limits (L) for lower and (U) for upper are contained in Table 5.

d. Outliers. All individual tests for mat density and air voids shall be checked for outliers (test criterion) in accordance with ASTM E 178, at a significance level of 5 percent. Outliers shall be discarded, and the PWL shall be determined using the remaining test values.

Table 5. Marshall Acceptance Limits For Stability, Flow, Air Voids, Density

TEST PROPERTY	Pavements Designed for aircraft Gross Weights of 60,000 LB or More or Tire Pressures of 100 PSI or More*	
Number of Blows	75 blows	
	Specification Tolerance	
	L	U
Stability, minimum (pounds)	1800	--
Flow, 0.01-inch	8	16
Air Voids Total Mix (%)	2	5
Surface Mat Density	96.3	--
Base Mat Density (%)	95.5	--
Joint Density (%)	93.3	--

The criteria in Table 5 is based on production processes which have a variability with the following standard deviations:

Surface Course Mat Density (%), 1.30

Base Course Mat Density (%), 1.55

Joint Density (%), 2.1

The Contractor should note that (1) 90 PWL is achieved when consistently producing a surface course with an average mat density of at least 98 percent with 1.30% or less variability, (2) 90 PWL is achieved when consistently producing a base course with an average mat density of at least 97.5 percent with 1.55% or less variability, and (3) 90 PWL is achieved when consistently producing joints with an average joint density of at least 96 percent with 2.1% or less variability.

401-5.3 RESAMPLING PAVEMENT FOR MAT DENSITY.

a. General. Resampling of a lot of pavement will only be allowed for mat density, and then, only if the Contractor requests same, in writing, within 48 hours after receiving the written test results from the Engineer. A retest will consist of all the sampling and testing procedures contained in paragraphs 401-5.1b and 401-5.2b(1). Only one resampling per lot will be permitted.

(1) A redefined PWL shall be calculated for the resampled lot. The number of tests used to calculate the redefined PWL shall include the initial tests made for that lot plus the retests.

(2) The cost for resampling and retesting shall be borne by the Contractor.

b. Payment for Resampled Lots. The redefined PWL for a resampled lot shall be used to calculate the payment for that lot in accordance with Table 6.

c. Outliers. Check for outliers in accordance with ASTM E 178, at a significance level of 5 percent.

~~**401-5.4 LEVELING COURSE.** Any course used for truing and leveling shall meet the requirements of paragraph 401-3.2, 401-5.2b(1) for air voids and 401-5.2b(2), but shall not be subject to the density requirements of paragraph 401-5.2b(1) for mat density and 401-5.2b(3). The leveling course shall be compacted with the same effort used to achieve density of the test section. The truing and leveling course~~

~~shall not exceed a nominal thickness of 1 ½ in (37.5 mm). The leveling course is the first variable thickness lift of an overlay placed prior to subsequent courses.]~~

CONTRACTOR QUALITY CONTROL

401-6.1 GENERAL. The Contractor shall develop a Quality Control Program in accordance with Section 100 of the General Provisions. The program shall address all elements that affect the quality of the pavement including, but not limited to:

- a. Mix Design
- b. Aggregate Grading
- c. Quality of Materials
- d. Stockpile Management
- e. Proportioning
- f. Mixing and Transportation
- g. Placing and Finishing
- h. Joints
- i. Compaction
- j. Surface Smoothness
- k. Personnel
- l. Laydown Plan

The Contractor shall perform quality control sampling, testing, and inspection during all phases of the work and shall perform them at a rate sufficient to ensure that the work conforms to the contract requirements, and at minimum test frequencies required by paragraph 401-6.3 and Section 100 of the General Provisions. As a part of the process for approving the Contractor's plan, the Engineer may require the Contractor's technician to perform testing of samples to demonstrate an acceptable level of performance.

No partial payment will be made for materials that are subject to specific quality control requirements without an approved plan.

401-6.2 TESTING LABORATORY. The Contractor shall provide a fully equipped asphalt laboratory meeting the requirements of paragraph 401-3.5 and 401-4.2a(2) located at the plant or job site. The Contractor shall provide the Engineer with certification stating that all of the testing equipment to be used is properly calibrated and will meet the specifications applicable for the specified test procedures. All costs associated with the testing laboratory shall be included in the unit prices for P-401.8.1 and P-401-8.2.

401-6.3 QUALITY CONTROL TESTING. The Contractor shall perform all quality control tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved Quality Control Program. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field

compaction, and surface smoothness. A Quality Control Testing Plan shall be developed as part of the Quality Control Program.

a. Asphalt Content. A minimum of two tests shall be performed per lot in accordance with ASTM D 6307 or ASTM D 2172 for determination of asphalt content. The weight of ash portion of the test, as described in ASTM D 2172, shall be determined as part of the first test performed at the beginning of plant production; and as part of every tenth test performed thereafter, for the duration of plan production. The last weight of ash value obtained shall be used in the calculation of the asphalt content for the mixture. The asphalt content for the lot will be determined by averaging the test results.

The use of the nuclear method for determining asphalt content in accordance with ASTM D 4125 is permitted, provided that it is calibrated for the specific mix being used.

b. Gradation. Aggregate gradations shall be determined a minimum of twice per lot from mechanical analysis of extracted aggregate in accordance with ASTM D 5444 and ASTM C 136 (dry sieve). When asphalt content is determined by the nuclear method, aggregate gradation shall be determined from hot bin samples on batch plants, or from the cold feed on drum mix or continuous mix plants, and tested in accordance with ASTM C 136 (dry sieve) using actual batch weights to determine the combined aggregate gradation of the mixture.

c. Moisture Content of Aggregate. The moisture content of aggregate used for production shall be determined a minimum of once per lot in accordance with ASTM C 566.

d. Moisture Content of Mixture. The moisture content of the mixture shall be determined once per lot in accordance with ASTM D 1461 [or AASHTO T 110].

e. Temperatures. Temperatures shall be checked, at least four times per lot, at necessary locations to determine the temperatures of the dryer, the bitumen in the storage tank, the mixture at the plant, and the mixture at the job site.

f. In-Place Density Monitoring. The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D 2950.

g. Additional Testing. Any additional testing that the Contractor deems necessary to control the process may be performed at the Contractor's option.

h. Monitoring. The Engineer reserves the right to monitor any or all of the above testing.

401-6.4 SAMPLING. When directed by the Engineer, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

401-6.5 CONTROL CHARTS. The Contractor shall maintain linear control charts both for individual measurements and range (that is, difference between highest and lowest measurements) for aggregate gradation and asphalt content.

Control charts shall be posted in a location satisfactory to the Engineer and shall be kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the Engineer may suspend production or acceptance of the material.

a. Individual Measurements. Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation and asphalt content. The control charts shall use the job mix formula target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

Control Chart Limits for Individual Measurements				
	SURFACE COURSE		BASE COURSE	
<u>Sieve</u>	<u>Action Limit</u>	<u>Suspension Limit</u>	<u>Action Limit</u>	<u>Suspension</u>
1 1/4-inch (31.75mm)	N/A	N/A	0%	0%
3/4-inch (19.0 mm)	0%	0%	+/-6%	+/-11%
1/2-inch (12.5 mm)	+/-6%	+/-9%	+/-6%	+/-9%
3/8-inch (9.5 mm)	+/-6%	+/-9%	+/-6%	+/-9%
No. 4 (4.75 mm)	+/-6%	+/-9%	+/-6%	+/-9%
No. 16 (1.18 mm)	+/-5%	+/-7.5%	+/-5%	+/-7.5%
No. 50 (0.30 mm)	+/-3%	+/-4.5%	+/-3%	+/-4.5%
No. 200 (0.075 mm)	+/-2%	+/-3%	+/-2%	+/-3%
Asphalt Content	+/-0.45%	+/-0.70%	+/-0.45%	+/-0.70%

b. Range. Control charts for range shall be established to control process variability for the test parameters and Suspension Limits listed below. The range shall be computed for each lot as the difference between the two test results for each control parameter. The Suspension Limits specified below are based on a sample size of $n = 2$. Should the Contractor elect to perform more than two tests per lot, the Suspension Limits shall be adjusted by multiplying the Suspension Limit by 1.18 for $n = 3$ and by 1.27 for $n = 4$.

Control Chart Limits Based On Range (Based On $n = 2$)	
Sieve	Suspension Limit
1/2 in (12.5 mm)	11 percent
3/8 in (9.5 mm)	11 percent
No. 4 (4.75 mm)	11 percent
No. 16 (1.18 mm)	9 percent
No. 50 (0.30 mm)	6 percent
No. 200 (0.075 mm)	3.5 percent
Asphalt Content	0.8 percent

c. Corrective Action. The Contractor Quality Control Program shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain sets of rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:

- (1) One point falls outside the Suspension Limit line for individual measurements or range; or
- (2) Two points in a row fall outside the Action Limit line for individual measurements.

401-6.6 QUALITY CONTROL REPORTS. The Contractor shall maintain records and shall submit reports of quality control activities daily, in accordance with the Contractor Quality Control Program described in General Provisions, Section 100.

METHOD OF MEASUREMENT

401-7.1 MEASUREMENT. Plant mix bituminous concrete pavement shall be measured by the number of tons (kg) of bituminous mixture used in the accepted work. Recorded batch weights or truck scale weights will be used to determine the basis for the tonnage.

BASIS OF PAYMENT

401-8.1 PAYMENT. Payment for a lot of bituminous concrete pavement surface course meeting all acceptance criteria as specified in Paragraph 401-5.2 shall be made based on results of tests for [smoothness,] mat density and air voids. Payment for acceptable lots shall be adjusted according to paragraph 401-8.1a for mat density and air voids and ~~401-8.1c for smoothness~~, subject to the limitation that:

401-8.2 Payment for an accepted lot of bituminous concrete pavement base course shall be made at the contract unit price per ton (kg) for bituminous mixture adjusted according to paragraph 401-8.1a, subject to the limitation that:

401-8.3 Payment for an accepted lot of bituminous concrete pavement leveling course shall be made at the contract unit price per ton (kg) for bituminous mixture adjusted according to paragraph 401-8.1a, and paragraph 401-5.4 subject to the limitation that:

The total project payment for plant mix bituminous concrete pavement shall not exceed **[100]** percent of the product of the contract unit price and the total number of tons (kg) of bituminous mixture used in the accepted work (See Note 1 under Table 6).

The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

a. Basis of Adjusted Payment. The pay factor for each individual lot shall be calculated in accordance with Table 6. A pay factor shall be calculated for both mat density and air voids. The lot pay factor shall be the higher of the two values when calculations for both mat density and air voids are 100 percent or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either mat density or air voids is 100 percent or higher. The lot pay factor shall be the lower of the two values when calculations for both mat density and air voids are less than 100 percent.

Table 6. Price Adjustment Schedule¹

Percentage of Material Within Specification Limits (PWL)	Lot Pay Factor (Percent of Contract Unit Price)
96 – 100	106
90 – 95	PWL + 10
75 – 89	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject ²
¹ Although it is theoretically possible to achieve a pay factor of 106 percent for each lot,	

Percentage of Material Within Specification Limits (PWL)	Lot Pay Factor (Percent of Contract Unit Price)
actual payment above 100 percent shall be subject to the total project payment limitation specified in paragraph 401-8.1. Please review Paragraph 401-8.1.	
² The lot shall be removed and replaced. However, the Engineer may decide to allow the rejected lot to remain. In that case, if the Engineer and Contractor agree in writing that the lot shall not be removed, it shall be paid for at 50 percent of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.	

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 401-8.1 and 401-8.2. ~~Payment in excess of 100 percent for accepted lots of bituminous concrete pavement shall be used to offset payment for accepted lots of bituminous concrete pavement that achieve a lot pay factor less than 100 percent.~~

b. Payment. Payment will be made under:

Item P-401-8.1	Bituminous Base Course (1-inch Maximum Aggregate) -- Per Ton (kg)
Item P-401-8.2	Bituminous Surface Course (3/4-inch Maximum Aggregate) -- Per Ton (kg)

TESTING REQUIREMENTS

ASTM C 29	Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C 88	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C 117	Materials Finer than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 127	Specific Gravity and Absorption of Coarse Aggregate
ASTM C 131	Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	Sieve Analysis of Fine and Coarse Aggregates
ASTM C 183	Sampling and the Amount of Testing of Hydraulic Cement
ASTM C 566	Total Evaporable Moisture Content of Aggregate by Drying
ASTM D 75	Sampling Aggregates
ASTM D 979	Sampling Bituminous Paving Mixtures
ASTM D 995	Mixing Plants for Hot-Mixed Hot-Laid Bituminous Paving Mixtures
ASTM D 1073	Fine Aggregate for Bituminous Paving Mixtures
ASTM D 1188	Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-

Coated Specimens

ASTM D 1461	Moisture or Volatile Distillates in Bituminous Paving Mixtures
ASTM D 2041	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D 2172	Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2419	Sand Equivalent Value of Soils and Fine Aggregate
ASTM D 2489	Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D 2726	Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D 2950	Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D 3203	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D 3665	Random Sampling of Construction Materials
ASTM D 3666	Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D 4125	Asphalt Content of Bituminous Mixtures by the Nuclear Method
ASTM D 4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 4791	Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D 4867	Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D 5444	Mechanical Size Analysis of Extracted Aggregate
ASTM D 6926	Preparation of Bituminous Specimens Using MARSHALL Apparatus
ASTM D 6927	MARSHALL Stability and Flow of Bituminous Mixtures
ASTM E 11	Wire-Cloth Sieves for Testing Purposes
ASTM E 178	Dealing with Outlying Observations
ASTM E 1274	Measuring Pavement Roughness Using a Profilograph
AASHTO T 30	Mechanical Analysis of Extracted Aggregate
AASHTO T 110	Moisture or Volatile Distillates in Bituminous Paving Mixtures

The Asphalt Institute's Mix Design Methods for Asphalt Concrete Manual No. 2 (MS-2)

MATERIAL REQUIREMENTS

ASTM D 242	Mineral Filler for Bituminous Paving Mixtures
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ASTM D 946	Penetration Graded Asphalt Cement for Use in Pavement Construction
ASTM D 3381	Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D 4552	Classifying Hot-Mix Recycling Agents
AASHTO M320	Performance Graded Asphalt Binder

END OF ITEM P-401

ITEM P-603 BITUMINOUS TACK COAT

DESCRIPTION

603-1.1 This item shall consist of preparing and treating a bituminous or concrete surface with bituminous material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

MATERIALS

603-2.1 BITUMINOUS MATERIALS. The bituminous material shall be either cutback asphalt, emulsified asphalt, or tar and shall conform to the requirements of Table 1. The type, grade, controlling specification, and application temperature of bituminous material to be used shall be specified by the Engineer.

TABLE 1. BITUMINOUS MATERIAL

Type and Grade	Specification	Application Temperature	
		Deg. F	Deg. C
Emulsified Asphalt			
SS-1, SS-1h	ASTM D 977	75-130	25-55
CSS-1, CSS-1h	ASTM D 2397	75-130	25-55
Cutback Asphalt			
RC-70	ASTM D 2028	120-160	50-70
Tar			
RTCB 5, RTCB 6	AASHTO M 52	60-120	15-50

CONSTRUCTION METHODS

603-3.1 WEATHER LIMITATIONS. The tack coat shall be applied only when the existing surface is dry and the atmospheric temperature is above 60°F (15°C). The temperature requirements may be waived, but only when so directed by the Engineer.

603-3.2 EQUIPMENT. The Contractor shall provide equipment for heating and applying the bituminous material.

The distributor shall be designed, equipped, maintained, and operated so that bituminous material at even heat may be applied uniformly on variable widths of surface at the specified rate. The allowable variation from the specified rate shall not exceed 10 percent. Distributor equipment shall include a tachometer, pressure gages, volume-measuring devices or a calibrated tank, and a thermometer for measuring temperatures of tank contents. The distributor shall be self-powered and shall be equipped with a power unit for the pump and full circulation spray bars adjustable laterally and vertically.

If the distributor is not equipped with an operable quick shut off valve, the tack operations shall be started and stopped on building paper. The Contractor shall remove blotting sand prior to asphalt concrete lay down operations at no additional expense to the owner.

A power broom and/or blower shall be provided for any required cleaning of the surface to be treated.

603-3.3 APPLICATION OF BITUMINOUS MATERIAL. Immediately before applying the tack coat, the full width of surface to be treated shall be swept with a power broom and/or airblast to remove all loose dirt and other objectionable material.

Emulsified asphalt shall be diluted by the addition of water when directed by the Engineer and shall be applied a sufficient time in advance of the paver to ensure that all water has evaporated before any of the overlying mixture is placed on the tacked surface.

The bituminous material including vehicle or solvent shall be uniformly applied with a bituminous distributor at the rate of 0.05 to 0.15 gallons per square yard (0.24 to 0.72 liters per square meter) depending on the condition of the existing surface. The type of bituminous material and application rate shall be approved by the Engineer prior to application.

Following the application, the surface shall be allowed to cure without being disturbed for such period of time as may be necessary to permit drying out and setting of the tack coat. This period shall be determined by the Engineer. The surface shall then be maintained by the Contractor until the next course has been placed. Suitable precautions shall be taken by the Contractor to protect the surface against damage during this interval.

603-3.4 BITUMINOUS MATERIAL CONTRACTOR'S RESPONSIBILITY. Samples of the bituminous material that the Contractor proposes to use, together with a statement as to its source and character, must be submitted and approved before use of such material begins. The Contractor shall require the manufacturer or producer of the bituminous material to furnish material subject to this and all other pertinent requirements of the contract. Only satisfactory materials so demonstrated by service tests, shall be acceptable.

The Contractor shall furnish the vendor's certified test reports for each carload, or equivalent, of bituminous material shipped to the project. The tests reports shall contain all the data required by the applicable specification. If the Contractor applies the material prior to receipt of the tests reports, payment for the material shall be withheld until they are received. If the material does not pass the specifications it shall be replaced at the contractor's expense. The report shall be delivered to the Engineer before permission is granted for use of the material. The furnishing of the vendor's certified test report for the bituminous material shall not be interpreted as a basis for final acceptance. All such test reports shall be subject to verification by testing samples of material received for use on the project.

603-3.5 FREIGHT AND WEIGH BILLS. Before the final estimate is allowed, the Contractor shall file with the Engineer receipted bills when railroad shipments are made, and certified weigh bills when materials are received in any other manner, of the bituminous materials actually used in the construction covered by the contract. The Contractor shall not remove bituminous material from the tank car or storage tank until the initial outage and temperature measurements have been taken by the Engineer, nor shall the car or tank be released until the final outage has been taken by the Engineer. Copies of freight bills and weigh bills shall be furnished to the Engineer during the progress of the work.

METHOD OF MEASUREMENT

603-4.1 The bituminous material for tack coat shall be measured by the ~~[gallon (liter)]~~ ~~[ton (kg)]~~. Volume shall be corrected to the volume at 60°F (15°C) in accordance with ASTM D 1250 for cutback asphalt, ASTM D 633 for tar, and Table IV-3 of The Asphalt Institute's Manual MS-6 for emulsified asphalt. Water added to emulsified asphalt will not be measured for payment.

BASIS OF PAYMENT

603-5.1 Payment shall be made at the contract unit price per ~~[gallon (liter)] [ton (kg)]~~ of bituminous material. This price shall be full compensation for furnishing all materials, for all preparation, delivery, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-603-5.1 Bituminous Tack Coat -- Per ~~[gallon (liter)] [ton (kg)]~~

MATERIAL REQUIREMENTS

ASTM D 633 Volume Correction Table for Road Tar

ASTM D 977 Emulsified Asphalt

ASTM D 1250 Petroleum Measurement Tables

ASTM D 2028 Cutback Asphalt (Rapid-Curing Type)

ASTM D 2397 Cationic Emulsified Asphalt

Asphalt Institute Manual MS-6 Asphalt Pocketbook of Useful Information (Temperature-Volume Corrections for Emulsified Asphalts)
Table IV-3

END ITEM P-603

ITEM P-610 STRUCTURAL PORTLAND CEMENT CONCRETE

DESCRIPTION

610-1.1 This item shall consist of ~~[plain]~~~~[reinforced]~~ **plain or reinforced** structural portland cement concrete, prepared and constructed in accordance with these specifications, at the locations and of the form and dimensions shown on the plans.

MATERIALS

610-2.1 GENERAL. Only approved materials, conforming to the requirements of these specifications, shall be used in the work. They may be subjected to inspection and tests at any time during the progress of their preparation or use. The source of supply of each of the materials shall be approved by the Engineer before delivery or use is started. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be scored and handled to insure the preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed therein.

In no case shall the use of pit-run or naturally mixed aggregates be permitted. Naturally mixed aggregate shall be screened and washed, and all fine and coarse aggregates shall be stored separately and kept clean. The mixing of different kinds of aggregates from different sources in one storage pile or alternating batches of different aggregates will not be permitted.

Aggregates shall be tested for deleterious reactivity with alkalis in the cement that may cause excessive expansion of the concrete. Acceptance of aggregates shall be based upon satisfactory evidence furnished by the Contractor that the aggregates, combined with other mixture constituents, do not produce excessive expansion in the concrete. This evidence shall include service records of concrete of comparable properties under similar conditions or exposure and certified records of tests by a testing laboratory that meets the requirements of ASTM C 1077. Tests shall be made in accordance with ASTM C 1260. Test specimens shall be produced using all components (e.g. coarse aggregate, fine aggregate, cement and fly ash...) to be included in the produced concrete. If the mean expansion of the test specimens, tested in accordance with ASTM C 1260, does not exceed 0.10 % at 16 days from casting the aggregates shall be accepted. If the mean expansion at 16 days is greater than 0.10% but less than 0.15%, the aggregate may be accepted based upon satisfactory service records and acceptance of the aggregate by a State Highway Department specifically addressing Alkali-Silica Reactivity. If the expansion is greater than 0.15%, the aggregate shall not be accepted for use.

610-2.2 COARSE AGGREGATE. The coarse aggregate for concrete shall meet the requirements of ASTM C 33. Crushed stone aggregate shall have a durability factor, as determined by ASTM C 666, greater than or equal to 95. The Engineer may consider and reserve final approval of other State classification procedures addressing aggregate durability.

Coarse aggregate shall be well graded from coarse to fine and shall meet one of the gradations shown in Table 1, using ASTM C 136.

610-2.3 FINE AGGREGATE. The fine aggregate for concrete shall meet the requirements of ASTM C 33.

The fine aggregate shall be well graded from fine to coarse and shall meet the requirements of Table 2 when tested in accordance with ASTM C 136:

TABLE 1. GRADATION FOR COARSE AGGREGATE

Sieve Designation (square openings)	Percentage by Weight Passing Sieves						
	2"	1-1/2"	1"	3/4"	1/2"	3/8"	No.4
No. 4 to 3/4 in. (4.75-19.0 mm)			100	90-100		20-55	0-10
No. 4 to 1 in. (4.75-25.0 mm)		100	90-100		25-60		0-10
No. 4 to 1-1/2 in. (4.75-38.1 mm)	100	95-100		35-70		10-30	0-5

TABLE 2. GRADATION FOR FINE AGGREGATE

Sieve Designation (square openings)	Percentage by Weight Passing Sieves
3/8 inch (9.5 mm)	100
No. 4 (4.75 mm)	95-100
No. 16 (1.18 mm)	45-80
No. 30 (0.60 mm)	25-55
No. 50 (0.30 mm)	10-30
No. 100 (0.15 mm)	2-10

Blending will be permitted, if necessary, in order to meet the gradation requirements for fine aggregate. Fine aggregate deficient in the percentage of material passing the No. 50 mesh sieve may be accepted, provided that such deficiency does not exceed 5% and is remedied by the addition of pozzolanic or cementitious materials other than portland cement, as specified in 610-2.6 on admixtures, in sufficient quantity to produce the required workability as approved by the Engineer.

610-2.4 CEMENT. Cement shall conform to the requirements of [ASTM C 150,] Type [I or II].

The Contractor shall furnish vendors' certified test reports for each carload, or equivalent, of cement shipped to the project. The report shall be delivered to the Engineer before permission to use the cement is granted. All such test reports shall be subject to verification by testing sample materials received for use on the project.

610-2.5 WATER. The water used in concrete shall be free from sewage, oil, acid, strong alkalis, vegetable matter, and clay and loam. If the water is of questionable quality, it shall be tested in accordance with AASHTO T 26.

610-2.6 ADMIXTURES. The use of any material added to the concrete mix shall be approved by the Engineer. Before approval of any material, the Contractor shall be required to submit the results of complete physical and chemical analyses made by an acceptable testing laboratory. Subsequent tests shall be made of samples taken by the Engineer from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

Pozzolanic admixtures shall be fly ash or raw or calcined natural pozzolons meeting the requirements of ASTM C 618.

Air-entraining admixtures shall meet the requirements of ASTM C 260. Air-entraining admixtures shall be added at the mixer in the amount necessary to produce the specified air content.

Water-reducing, set-controlling admixtures shall meet the requirements of ASTM C 494, Type A, water-reducing or Type D, water-reducing and retarding. Water-reducing admixtures shall be added at the mixer separately from air-entraining admixtures in accordance with the manufacturer's printed instructions.

610-2.7 PREMOLDED JOINT MATERIAL. Premolded joint material for expansion joints shall meet the requirements of ASTM [D 1751]].

610-2.8 JOINT FILLER. The filler for joints shall meet the requirements of Item P-605, unless otherwise specified in the proposal.

610-2.9 STEEL REINFORCEMENT. Reinforcing shall consist of [Grade 60 deformed bars conforming to ASTM A 615] conforming to the requirements of [ASTM A 185].

610-2.10 COVER MATERIALS FOR CURING. Curing materials shall conform to one of the following specifications:

Waterproof paper for curing concrete	ASTM C 171
Polyethylene Sheeting for Curing Concrete	ASTM C 171
Liquid Membrane-Forming Compounds for Curing Concrete	ASTM C 309, Type 2

CONSTRUCTION METHODS

610-3.1 GENERAL. The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified herein. All machinery and equipment owned or controlled by the Contractor, which he proposes to use on the work, shall be of sufficient size to meet the requirements of the work, and shall be such as to produce satisfactory work; all work shall be subject to the inspection and approval of the Engineer.

610-3.2 CONCRETE COMPOSITION. The concrete shall develop a compressive strength of [4,000] psi in 28 days as determined by test cylinders made in accordance with ASTM C 31 and tested in accordance with ASTM C 39. The concrete shall contain not less than 470 pounds of cement per cubic yard (280 kg per cubic meter). The concrete shall contain 5 percent of entrained air, plus or minus 1 percent, as determined by ASTM C 231 and shall have a slump of not more than 4 inches (10 cm) as determined by ASTM C 143.

Concrete produced by a reputable local supplier of ready-mix or transit-mix concrete designed for a minimum compressive strength of 4,000 psi at 28 days, unless otherwise specified, may be used when approved by the Engineer. The Contractor shall submit the ready-mix or transit-mix design to the Engineer at least 30 days prior to startup of construction.

610-3.3 ACCEPTANCE SAMPLING AND TESTING. Concrete for each structure will be accepted on the basis of the compressive strength specified in paragraph 3.2. The concrete shall be sampled in accordance with ASTM C 172. Compressive strength specimens shall be made in accordance with ASTM C 31 and tested in accordance with ASTM C 39.

Concrete cylindrical test specimens shall be made in accordance with ASTM C 31 and tested in accordance with ASTM C 39. The Contractor shall cure and store the test specimens under such conditions as directed. The Engineer will make the actual tests on the specimens at no expense to the Contractor.

610-3.4 PROPORTIONING AND MEASURING DEVICES. When package cement is used, the quantity for each batch shall be equal to one or more whole sacks of cement. The aggregates shall be measured separately by weight. If aggregates are delivered to the mixer in batch trucks, the exact amount for each mixer charge shall be contained in each batch compartment. Weighing boxes or hoppers shall be approved by the Engineer and shall provide means of regulating the flow of aggregates into the batch box so that the required and exact weight of aggregates can be readily obtained.

610-3.5 CONSISTENCY. The consistency of the concrete shall be checked by the slump test specified in ASTM C 143.

610-3.6 MIXING. Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C 94.

610-3.7 MIXING CONDITIONS. The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F (4°C) without permission of the Engineer. If permission is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50°F (10°C) nor more than 100°F (38°C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his/her expense.

Retempering of concrete by adding water or any other material shall not be permitted.

The delivery of concrete to the job shall be in such a manner that batches of concrete will be deposited at uninterrupted intervals.

610-3.8 FORMS. Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the Engineer. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as designed on the plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports. The Contractor shall bear responsibility for their adequacy. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes.

The internal ties shall be arranged so that, when the forms are removed, no metal will show in the concrete surface or discolor the surface when exposed to weathering. All forms shall be wetted with water or with a non-staining mineral oil, which shall be applied shortly before the concrete is placed. Forms shall be constructed so that they can be removed without injuring the concrete or concrete surface. The forms shall not be removed before the expiration of at least 30 hours from vertical faces, walls, slender columns, and similar structures; forms supported by falsework under slabs, beams, girders, arches, and similar construction shall not be removed until tests indicate that at least 60% of the design strength of the concrete has developed.

610-3.9 PLACING REINFORCEMENT. All reinforcement shall be accurately placed, as shown on the plans, and shall be firmly held in position during concreting. Bars shall be fastened together at intersections. The reinforcement shall be supported by approved metal chairs. Shop drawings, lists, and bending details shall be supplied by the Contractor when required.

610-3.10 EMBEDDED ITEMS. Before placing concrete, any items that are to be embedded shall be firmly and securely fastened in place as indicated. All such items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The embedding of wood shall be avoided. The concrete shall be spaded and consolidated around and against embedded items.

610-3.11 PLACING CONCRETE. All concrete shall be placed during daylight, unless otherwise approved. The concrete shall not be placed until the depth and character of foundation, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved. Concrete shall be placed as soon as practical after mixing and in no case later than 1 hour after water has been added to the mix. The method and manner of placing shall be such to avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. Dropping the concrete a distance of more than 5 feet (1.5 m), or depositing a large quantity at one point, will not be permitted. Concrete shall be placed upon clean, damp surfaces, free from running water, or upon properly consolidated soil.

The concrete shall be compacted with suitable mechanical vibrators operating within the concrete. When necessary, vibrating shall be supplemented by hand spading with suitable tools to assure proper and adequate compaction. Vibrators shall be manipulated so as to work the concrete thoroughly around the reinforcement and embedded fixtures and into corners and angles of the forms. The vibration at any joint shall be of sufficient duration to accomplish compaction but shall not be prolonged to the point where segregation occurs. Concrete deposited under water shall be carefully placed in a compact mass in its final position by means of a tremie, a closed bottom dump bucket, or other approved method and shall not be disturbed after being deposited.

610-3.12 CONSTRUCTION JOINTS. When the placing of concrete is suspended, necessary provisions shall be made for joining future work before the placed concrete takes its initial set. For the proper bonding of old and new concrete, such provisions shall be made for grooves, steps, keys, dovetails, reinforcing bars or other devices as may be prescribed. The work shall be arranged so that a section begun on any day shall be finished during daylight of the same day. Before depositing new concrete on or against concrete that has hardened, the surface of the hardened concrete shall be cleaned by a heavy steel broom, roughened slightly, wetted, and covered with a neat coating of cement paste or grout.

610-3.13 EXPANSION JOINTS. Expansion joints shall be constructed at such points and of such dimensions as may be indicated on the drawings. The premolded filler shall be cut to the same shape as that of the surfaces being joined. The filler shall be fixed firmly against the surface of the concrete already in place in such manner that it will not be displaced when concrete is deposited against it.

610-3.14 DEFECTIVE WORK. Any defective work discovered after the forms have been removed shall be immediately removed and replaced. If any dimensions are deficient, or if the surface of the concrete is bulged, uneven, or shows honeycomb, which in the opinion of the Engineer cannot be repaired satisfactorily, the entire section shall be removed and replaced at the expense of the Contractor.

610-3.15 SURFACE FINISH. All exposed concrete surfaces shall be true, smooth, and free from open or rough spaces, depressions, or projections. The concrete in horizontal plane surfaces shall be brought flush with the finished top surface at the proper elevation and shall be struck-off with a straightedge and floated. Mortar finishing shall not be permitted, nor shall dry cement or sand-cement mortar be spread over the concrete during the finishing of horizontal plane surfaces.

When directed, the surface finish of exposed concrete shall be a rubbed finish. If forms can be removed while the concrete is still green, the surface shall be pointed and wetted and then rubbed with a wooden float until all irregularities are removed. If the concrete has hardened before being rubbed, a

carborundum stone shall be used to finish the surface. When approved, the finishing can be done with a rubbing machine.

610-3.16 CURING AND PROTECTION. All concrete shall be properly cured and protected by the Contractor. The work shall be protected from the elements, flowing water, and from defacement of any nature during the building operations. The concrete shall be cured as soon as it has sufficiently hardened by covering with an approved material. Water-absorptive coverings shall be thoroughly saturated when placed and kept saturated for a period of at least 3 days. All curing mats or blankets shall be sufficiently weighted or tied down to keep the concrete surface covered and to prevent the surface from being exposed to currents of air. Where wooden forms are used, they shall be kept wet at all times until removed to prevent the opening of joints and drying out of the concrete. Traffic shall not be allowed on concrete surfaces for 7 days after the concrete has been placed.

610-3.17 DRAINS OR DUCTS. Drainage pipes, conduits, and ducts that are to be encased in concrete shall be installed by the Contractor before the concrete is placed. The pipe shall be held rigidly so that it will not be displaced or moved during the placing of the concrete.

610-3.18 COLD WEATHER PROTECTION. When concrete is placed at temperatures below 40°F (4°C), the Contractor shall provide satisfactory methods and means to protect the mix from injury by freezing. The aggregates, or water, or both, shall be heated in order to place the concrete at temperatures between 50°F and 100°F (10°C and 38°C).

Calcium chloride may be incorporated in the mixing water when directed by the Engineer. Not more than 2 pounds (908 grams) of Type 1 nor more than 1.6 pounds (726 grams) of Type 2 shall be added per bag of cement. After the concrete has been placed, the Contractor shall provide sufficient protection such as cover, canvas, framework, heating apparatus, etc., to enclose and protect the structure and maintain the temperature of the mix at not less than 50°F (10°C) until at least 60% of the designed strength has been attained.

610-3.19 FILLING JOINTS. All joints that require filling shall be thoroughly cleaned, and any excess mortar or concrete shall be cut out with proper tools. Joint filling shall not be started until after final curing and shall be done only when the concrete is completely dry. The cleaning and filling shall be carefully done with proper equipment and in a manner to obtain a neat looking joint free from excess filler.

METHOD OF MEASUREMENT

~~**610-4.1** Portland cement concrete shall be measured by the number of cubic yards (cubic meters) of concrete complete in place and accepted. In computing the yardage of concrete for payment, the dimensions used shall be those shown on the plans or ordered by the Engineer. No measurements or other allowances shall be made for forms, falsework, cofferdams, pumping, bracing, expansion joints, or finishing of the concrete. No deductions in yardage shall be made for the volumes of reinforcing steel or embedded items.~~

~~**610-4.2** Reinforcing steel shall be measured by the calculated theoretical number of pounds (kg) placed, as shown on the plans, complete in place and accepted. The unit weight used for deformed bars shall be the weight of plain square or round bars of equal nominal size. If so indicated on the plans, the poundage to be paid for shall include the weight of metal pipes and drains, metal conduits and ducts, or similar materials indicated and included.~~

610-4.1 No measurement will be made for direct payment for any portland cement concrete and reinforcing steel, as the cost of the portland cement concrete and reinforcing steel shall be considered as subsidiary to the items requiring portland cement concrete and reinforcing steel.

BASIS OF PAYMENT

610-5.1 Payment shall be made at the contract unit price per cubic yard (cubic meter) for structural portland cement concrete and per pound (kg) for reinforcing steel. These prices shall be full compensation for furnishing all materials and for all preparation, delivering and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

~~**610-5.1** No payment shall be made for structural portland cement concrete and reinforcing steel. The cost of portland cement concrete and reinforcing steel shall be incidental to those items of work which require portland cement concrete and its payment shall be included in the cost of those items.~~

Payment will be made under:

Item P-610-5.1	Structural Portland Cement Concrete Concrete Curb and Gutter D424- Per-Linear Foot Cubic Yard (cubic meter)
Item P-610-5.2	Steel Reinforcement — Per Pound (kg) Concrete Curb and Gutter B624 — Per Linear Foot
Item P-610-5.3	6 Inch Concrete Slab w/ 6"x6" WWF — Per Square Yard

TESTING REQUIREMENTS

ASTM C 31	Making and Curing Test Specimens in the Field
ASTM C 39	Compressive Strength of Cylindrical Concrete Specimens
ASTM C 136	Sieve Analysis of Fine and Coarse Aggregates
ASTM C 138	Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C 143	Slump of Hydraulic Cement Concrete
ASTM C 231	Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 666	Resistance of Concrete to Rapid Freezing and Thawing
ASTM C 1077	Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C 1260	Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)

MATERIAL REQUIREMENTS

ASTM A 184	Specification for Fabricated Deformed Steel Bar or Rod Mats for Concrete Reinforcement
ASTM A 185	Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM A 497	Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement
ASTM A 615	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

ASTM A 704	Welded Steel Plain Bars or Rod Mats for Concrete Reinforcement
ASTM C 33	Concrete Aggregates
ASTM C 94	Ready-Mixed Concrete
ASTM C 150	Portland Cement
ASTM C 171	Sheet Materials for Curing Concrete
ASTM C 172	Sampling Freshly Mixed Concrete
ASTM C 260	Air-Entraining Admixtures for Concrete
ASTM C 309	Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	Chemical Admixtures for Concrete
ASTM C 595	Blended Hydraulic Cements
ASTM C 618	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM D 1751	Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
ASTM D 1752	Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
AASHTO T 26	Quality of Water to be Used in Concrete

END OF ITEM P-610

ITEM P-620 RUNWAY AND TAXIWAY PAINTING

DESCRIPTION

620-1.1 This item shall consist of the painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Engineer.

MATERIALS

620-2.1 MATERIALS ACCEPTANCE. The Contractor shall furnish manufacturer's certified test reports for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. The reports can be used for material acceptance or the Engineer may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the Engineer upon arrival of a shipment of materials to the site. The material quantities shall be verified "on-site" to match the square feet of markings. Quantities shall be calculated in accordance with the coverage rates outlined below for both paint and glass beads.

620-2.2 PAINT. Paint shall be [~~waterborne, epoxy, methacrylate, solvent-base, or preformed thermoplastic~~] in accordance with the requirements of paragraph 620-2.2 [a]. Paint shall be furnished in [White - 37925, Yellow - 33538 or 33655, Pink – 1 part Red – 31136 to 2 parts White – 37925, Red - 31136 and Black - 37038] in accordance with Federal Standard No. 595. In the event paved islands require painting to identify that they are not usable pavements, paint shall be furnished in Green - 34138 or 34230 or 34540 or an approved green color as specifically specified or required by the Owner. The Owner shall be responsible for defining which color of green paint is utilized. In the event the Owner wishes to utilize a different shade of green than specified herein, the contractor shall submit color samples of Federal Standard 595C or latest edition authorized paint colors for approval by the Owner and Engineer prior to ordering any green paint.

a. Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952E, [~~Type I, Type II, or Type III~~]. Waterborne black paint shall be used to outline a border at least 6-inches (150 mm) wide around markings on all light colored pavements.

b. Epoxy. ~~Paint shall be a two component, minimum 99 percent solids type system conforming to the following:~~

~~(1) Pigments. Component A. Percent by weight.~~

~~—— (a) White: Titanium Dioxide, ASTM D 476, type II shall be 18 percent minimum (16.5 percent minimum at 100 percent purity).~~

~~—— (b) Yellow and Colors: Titanium Dioxide, ASTM D 476, type II shall be 14 to 17 percent. Organic yellow, other colors, and tinting as required to meet color standard. Epoxy resin shall be 75 to 79 percent.~~

~~(2) Epoxy Content. Component A. The weight per epoxy equivalent, when tested in accordance with ASTM D 1652 shall be the manufacturer's target plus or minus 50.~~

~~(3) Amine Number. Component B. When tested in accordance with ASTM D 2074 shall be the manufacturer's target plus or minus 50.~~

(4) Prohibited Materials. The manufacturer shall certify that the product does not contain mercury, lead, hexavalent chromium, halogenated solvents, nor any carcinogen as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant Federal Regulations.

(5) Daylight Directional Reflectance.

—————**(a) White:** The daylight directional reflectance of the white paint shall not be less than 75 percent (relative to magnesium oxide), when tested in accordance with Federal Test Method Standard No. 141D/GEN, Method 6121.

—————**(b) Yellow:** The daylight directional reflectance of the yellow paint shall not be less than 38 percent (relative to magnesium oxide), when tested in accordance with Federal Test Method Standard No. 141D/GEN. The x and y values shall be consistent with the Federal Hegman yellow color standard chart for traffic yellow standard 33538, or shall be consistent with the tolerance listed below:

x .462	x .470	x .479	x .501
y .438	y .455	y .428	y .452

(6) Accelerated Weathering.

—————**(a) Sample Preparation.** Apply the paint at a wet film thickness of 0.013 in (0.33 mm) to four 3 by 6 in (8 by 15 cm) aluminum panels prepared as described in Federal Test Method Standard No. 141D/GEN, Method 2013. Air dry the sample 48 hours under standard conditions.

—————**(b) Testing Conditions.** Test in accordance with ASTM G 15453 using both Ultra Violet (UV-B) Light and condensate exposure, 72 hours total, alternating 4 hour UV exposure at 60 degree C, and 4 hours condensate exposure at 40 °C.

—————**(c) Evaluation.** Remove the samples and condition for 24 hours under standard conditions. Determine the directional reflectance and color match using the procedures in paragraph 620-2.2b(5) above. Evaluate for conformance with the color requirements.

(7) Volatile Organic Content. Determine the volatile organic content in accordance with 40 CFR Part 60 Appendix A, Method 24.

(8) Dry Opacity. Use Procedure B, Method B of Method 4121 of Federal Test Method Standard No. 141D/GEN. The wet film thickness shall be 0.015 in (0.12 mm). The minimum opacity for white and colors shall be 0.92.

(9) Abrasion Resistance. Subject the panels prepared in paragraph 620-2.2b(6) to the abrasion test in accordance with ASTM D 968, Method A, except that the inside diameter of the metal guide tube shall be from 0.747 to 0.750 in (18.97 to 19.05 mm). Five liters of unused sand shall be used for each test panel. The test shall be run on two test panels. [Note: five liters of sand weighs 17.5 lb. (7.94 kg).] Both baked and weathered paint films shall require not less than 150 liters of sand for the removal of the paint films.

(10) Hardness, Shore. Hardness shall be at least 80 when tested in accordance with ASTM D 2240.

c. Methacrylate. Paint shall be a two component, minimum 99 percent solids type system conforming to the following:

(1) Pigments. Component A. Percent by weight.

~~_____ (a) White: Titanium Dioxide, ASTM D 476, type II shall be 6 percent minimum. Methacrylate resin shall be 18 percent minimum.~~

~~_____ (b) Yellow and Colors:~~

~~Titanium Dioxide, ASTM D 476, type II shall be 6 percent minimum.
Organic yellow, other colors, and tinting as required to meet color standard.
Methacrylate resin shall be 18 percent minimum.~~

~~(2) Prohibited Materials. The manufacturer shall certify that the product does not contain mercury, lead, hexavalent chromium, halogenated solvents, nor any carcinogen as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant Federal Regulations.~~

~~(3) Daylight Directional Reflectance:~~

~~_____ (a) White: The daylight directional reflectance of the white paint shall not be less than 75 percent (relative to magnesium oxide), when tested in accordance with Federal Test Method Standard No. 141D/GEN, Method 6121.~~

~~_____ (b) Yellow: The daylight directional reflectance of the yellow paint shall not be less than 45 percent (relative to magnesium oxide), when tested in accordance with Federal Test Method Standard No. 141D/GEN. The x and y values shall be consistent with the Federal Hegman yellow color standard chart for traffic yellow standard 33538, or shall be consistent with the tolerance listed below:~~

x .462	x .470	x .479	x .501
y .438	y .455	y .428	y .452

~~(4) Accelerated Weathering.~~

~~_____ (a) Sample Preparation. Apply the paint at a wet film thickness of 0.013 in (0.33 mm) to four 3 by 6 in (8 by 15 cm) aluminum panels prepared as described in Method 2013 of Federal Test Method Standard No. 141D/GEN. Air dry the sample 48 hours under standard conditions.~~

~~_____ (b) Testing Conditions. Test in accordance with ASTM G 53-154 using both Ultra Violet (UV-B) Light and condensate exposure, 72 hours total, alternating 4 hour UV exposure at 60 degree C, and 4 hours condensate exposure at 40 °C.~~

~~_____ (c) Evaluation. Remove the samples and condition for 24 hours under standard conditions. Determine the directional reflectance and color match using the procedures in paragraph 620-2.2c(3) above. Evaluate for conformance with the color requirements.~~

~~(5) Volatile Organic Content. Determine the volatile organic content in accordance with 40 CFR Part 60 Appendix A, Method 24.~~

~~(6) Dry Opacity. Use Procedure B, Method B of Method 4121 of Federal Test Method Standard No. 141D/GEN. The wet film thickness shall be 0.015 in (0.12 mm). The minimum opacity for white and colors shall be 0.92.~~

~~(7) Abrasion Resistance. Subject the panels prepared in paragraph 620-2.2c(4) to the abrasion test in accordance with ASTM D 968, Method A, except that the inside diameter of the metal guide tube shall be from 0.747 to 0.750 in (18.97 to 19.05 mm). Five liters of unused sand shall be used for each test panel. The test shall be run on two test panels. [Note: 5 liters of sand weighs 17.5 lb. (7.94 kg).] Both~~

~~baked and weathered paint films shall require not less than 150 liters of sand for the removal of the paint films.~~

~~(8) Hardness, Shore.~~ Hardness shall be at least 80 when tested in accordance with ASTM D 2240.

~~d. Solvent Base.~~ Paint shall meet the requirements of Federal Specification ~~[A-A-2886A Type I or Type II].~~

e. Preformed Thermoplastic Airport Pavement Markings. Markings must be composed of ester modified resins in conjunction with aggregates, pigments, and binders that have been factory produced as a finished product. The material must be impervious to degradation by aviation fuels, motor fuels, and lubricants.

(1) The markings must be able to be applied in temperatures as low as 35 °F without any special storage, preheating, or treatment of the material before application.

(a) The markings must be supplied with an integral, non-reflectorized black border.

(2) Graded Glass Beads.

(a) The material must contain a minimum of thirty percent (30%) intermixed graded glass beads by weight. The intermixed beads shall conform to **[Federal Specification. TT-B-1325D, Type I, gradation A]** **[Federal Specification. TT-B-1325D, Type IV]**.

(b) The material must have factory applied coated surface beads in addition to the intermixed beads at a rate of 1 lb. (± 10%) per 10 sq. ft. These factory applied coated surface beads shall have a minimum of 90% true spheres, minimum refractive index of 1.50, and meet the following gradation.

Size Gradation		Retained, %	Passing, %
US Mesh	µm		
12	1700	0 - 2%	98 - 100%
14	1400	0 - 3.5%	96.5 - 100%
16	1180	2 - 25%	75 - 98%
18	1000	28 - 63%	37 - 72%
20	850	63 - 72%	28 - 37%
30	600	67 - 77%	23 - 33%
50	300	89 - 95%	5 - 11%
80	200	97 - 100%	0 - 3%

(3) Heating Indicators. The top surface of the material (same side as the factory applied surface beads) shall have regularly spaced indents. These indents shall act as a visual cue during application that the material has reached a molten state so satisfactory adhesion and proper bead embedment has been achieved and a post-application visual cue that the installation procedures have been followed.

(4) Pigments. Percent by weight.

(a) White: Titanium Dioxide, ASTM D 476, type II shall be 10 percent minimum.

(b) Yellow and Colors: Titanium Dioxide, ASTM D 476, type II shall be 1 percent minimum. Organic yellow, other colors, and tinting as required to meet color standard.

(5) Prohibited Materials. The manufacturer shall certify that the product does not contain mercury, lead, hexavalent chromium, halogenated solvents, nor any carcinogen as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant Federal Regulations.

(6) Daylight Directional Reflectance.

(a) White: The daylight directional reflectance of the white paint shall not be less than 75 percent (relative to magnesium oxide), when tested in accordance with Federal Test Method Standard No. 141D/GEN, Method 6121.

(b) Yellow: The daylight directional reflectance of the yellow paint shall not be less than 45 percent (relative to magnesium oxide), when tested in accordance with Federal Test Method Standard No. 141D/GEN. The x and y values shall be consistent with the Federal Hegman yellow color standard chart for traffic yellow standard 33538, or shall be consistent with the tolerance listed below:

x .462	x .470	x .479	x .501
y .438	y .455	y .428	y .452

(7) Skid Resistance. The surface, with properly applied and embedded surface beads, must provide a minimum resistance value of 45 BPN when tested according to ASTM E303.

(8) Thickness. The material must be supplied at a nominal thickness of 65 mil (1.7 mm).

(9) Environmental Resistance. The material must be resistant to deterioration due to exposure to sunlight, water, salt, or adverse weather conditions and impervious to aviation fuels, gasoline, and oil.

(10) Retroreflectivity. The material, when applied in accordance with manufacturer's guidelines, must demonstrate a uniform level of nighttime retroreflection when tested in accordance to ASTM E1710.

(11) Packaging. A protective film around the box must be applied in order to protect the material from rain or premature aging.

(12) Manufacturing Control and ISO Certification. The manufacturer must be ISO 9001:2000 certified and provide proof of current certification. The scope of the certification shall include manufacture of reflective markings.

a. The markings must be a resilient thermoplastic product with uniformly distributed glass beads throughout the entire cross-sectional area. The markings must be resistant to the detrimental effects of aviation fuels, motor fuels and lubricants, hydraulic fluids, de-icers, anti-icers, protective coatings, etc. Lines, legends, and symbols must be capable of being affixed to bituminous and/or Portland cement concrete pavements by the use of a large radiant heater. Colors shall be available as required.

b. The markings must be capable of conforming to pavement contours, breaks, and faults through the action of airport traffic at normal pavement temperatures. The markings must be capable of fully conforming to grooved pavements, including pavement grooving per FAA AC 150/5320-12, current version. The markings shall have resealing characteristics, such that it is capable of fusing with itself and previously applied thermoplastics when heated with a heat source per manufacturer's recommendation.

c. Multicolored markings must consist of interconnected individual pieces of preformed thermoplastic pavement marking material, which through a variety of colors and patterns, make up the

desired design. The individual pieces in each large marking segment (typically more than 20 ft. long) must be factory assembled with a compatible material and interconnected so that in the field it is not necessary to assemble the individual pieces within a marking segment. Obtaining multicolored effect by overlaying materials of different colors is not acceptable due to resulting inconsistent marking thickness and inconsistent application temperature in the marking/substrate interface.

e. The marking material must set up rapidly, permitting the access route to be re-opened to traffic a maximum of 15 minutes after application.

f. The marking material shall have an integral color throughout the thickness of the marking material.

620-2.3 REFLECTIVE MEDIA. Glass beads shall meet the requirements for [Federal Specification. TT-B-1325D, Type III]. Glass beads shall be treated with ~~all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.~~ adhesion promoting and/or flotation coatings. The Retroreflective readings at application should meet values ranging from 700 to 1100 millicandellas on the white markings and 400 to 900 millicandellas on yellow markings.

Paint Color	Glass Beads, Type I, Gradation A	Glass Beads, Type III	Glass Beads, Type IV
White	See Table 1.	See Table 1.	See Table 1.
Yellow	See Table 1.	See Table 1.	See Table 1.
Red	See Table 1 and Note.	Not used.	See Table 1 and Note.
Pink	See Table 1 and Note.	Not used.	See Table 1 and Note.
Black	Not used.	Not used.	See Table 1 and Note.

CONSTRUCTION METHODS

620-3.1 WEATHER LIMITATIONS. The painting shall be performed only when the surface is dry and when the surface temperature is at least 45 °F (7 °C) and rising and the pavement surface temperature is at least 5 °F (2.7 °C) above the dew point. **[Painting operations shall be discontinued when the surface temperature exceeds [120] degrees F** Markings shall not be applied when the pavement temperature is greater than 120 °F (49 °C).

620-3.2 EQUIPMENT. Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job. The equipment shall be able to paint from 6-inches to 36-inches in a single pass with the capability of applying two colors simultaneously.

The mechanical marker shall be an atomizing spray-type or airless-type marking machine suitable for application of traffic paint. It shall produce an even and uniform film thickness at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray.

620-3.3 PREPARATION OF SURFACE. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other foreign material that would reduce the bond between the paint and the pavement. The area to be painted shall be cleaned by high pressure water blasting to remove all loose and poorly bonded paint, mildew or other surface contaminants. A vacuum sweeper shall be provided to remove the majority of the water and debris as the cleaning proceeds. The Engineer shall be given 24-hours notice prior to the commencement of painting operations to insure adequate cleaning measures have been performed ~~sweeping and blowing or by other methods as required to~~

~~remove all dirt, laitance, and loose materials without damage to the pavement surface. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the Engineer.~~

[Paint shall not be applied to Portland cement concrete pavement until the areas to be painted are clean of curing material. Sandblasting or high-pressure water shall be used to remove curing materials.]

620-3.4 LAYOUT OF MARKINGS. The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the plans. ~~The locations of markings to receive glass beads shall be shown on the plans.~~ Markings to be repainted shall be verified for proper location and alignment in accordance with the tolerances shown under 620-3.5 below. All markings shall receive glass beads unless otherwise noted on the plans.

620-3.5 APPLICATION. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the Engineer. The edges of the markings shall not vary from a straight line more than 1/2 in (12 mm) in 50 ft (15 m) and marking dimensions and spacings shall be within the following tolerances:

Dimension and Spacing	Tolerance
36 in (910 mm) or less	±1/2 in (12 mm)
greater than 36 in to 6 ft (910 mm to 1.85 m)	± 1 in (25 mm)
greater than 6 ft to 60 ft (1.85 m to 18.3 m)	± 2 in (51 mm)
greater than 60 ft (18.3 m)	± 3 in (76 mm)

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted. A period of **[30 days]** shall elapse between placement of a bituminous surface course or seal coat and application of the paint. . If the runway must be placed in service before the 30-day cure time, markings shall be applied at 1/2 rate without glass beads. After the 30-day cure time, a full application of paint and beads shall be applied to all affected markings. If the airport requires beads be applied to the paint that was applied at 1/2 rate, the beads shall be applied at a rate that will produce Retroreflective readings at application that meet values ranging from [to] millicandellas on the white markings and [to] millicandellas on yellow markings. Once the asphalt pavements have cured and the pavement is ready for final full application of markings, all existing glass beads (if present) shall be swept clear of the temporary paint and the temporary paint prepared in accordance with these specifications to receive the full and final painting.

Paint installation shall be monitored for correct application rates (film thickness). Wet film thickness gauges shall be used in wet paint to ascertain the "wet film thickness" of the paint. The proper paint thickness is necessary to properly anchor the glass beads and verify the paint coverage matches the application rates below. Wet film thickness should be 15 mils wet.

Green paint shall be applied to paved islands only as designated on the plans and in the specific areas shown on the plans. If the contractor has concerns or questions about the location and/or layout of the areas to receive green paint, the contractor shall notify the Engineer for a clarification prior to performing any painting. Green paint shall only be applied to paved islands when specifically authorized or required by the Owner.

**Table 1 Application Rates For Paint And Glass Beads
(See Note regarding Red and Pink Paint)**

Paint Type	Paint Sq ft per gallon, ft²/gal. (Sq ms per liter, m²/l)	Glass Beads, Type I, Gradation A Pounds per gallon of paint-lb./gal. (Km per liter of paint- kg/l)	Glass Beads, Type III Pounds per gallon of paint-lb./gal. (Km per liter of paint- kg/l)	Glass Beads, Type IV Pounds per gallon of paint-lb./gal. (Km per liter of paint- kg/l)
*	*	*	*	*
Note: The glass bead application rate for Red and Pink paint shall be reduced by 2 lb./gal. (0.24 kg/l) for Type I and Type IV beads. Type III beads shall not be applied to Red or Pink paint.				

Application Rates For Paint And Glass Beads For Table 1

Paint Type	Paint Sq ft per gallon, ft²/gal. (Sq m per liter, m²/l)	Glass Beads, Type I, Gradation A Pounds per gallon of paint-lb./gal. (Km per liter of paint- kg/l)	Glass Beads, Type III Pounds per gallon of paint-lb./gal. (Km per liter of paint-kg/l)	Glass Beads, Type IV Pounds per gallon of paint-lb./gal. (Km per liter of paint-kg/l)
Waterborne	115 ft ² /gal. max (2.8 m ² /l)	7 lb./gal. min (0.85 kg/l)	10 lb./gal. min (1.2 kg/l)	--
Waterborne	90 ft ² /gal. max (2.2 m ² /l)	--	--	8 lb./gal. min (1.0 kg/l)
Solvent Base	115 ft ² /gal. max (2.8 m ² /l)	7 lb./gal. min (0.85 kg/l)	10 lb./gal. min (1.2 kg/l)	--
Solvent Base	90 ft ² /gal. max (2.2 m ² /l)	--	--	8 lb./gal. min (1.0 kg/l)
Epoxy	90 ft ² /gal. max (2.2 m ² /l)	10 lb./gal. min (1.2 kg/l)	15 lb./gal. min (1.8 kg/l)	10 lb./gal. min (1.2 kg/l)
Methacrylate	45 ft ² /gal. max (1.1 m ² /l)	14 lb./gal. min (1.7 kg/l)	20 lb./gal. min (2.4 kg/l)	15 lb./gal. min (1.8 kg/l)

Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads as the paint is applied. Each bead dispenser shall be calibrated in the presence of the inspector or their designated representative in accordance with the manufacturer's recommendations. A calibration kit consisting of a scaled beaker and a stopwatch is available from the glass bead manufacturer. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made.

Retro-Reflectivity readings measure the effective light return for glass beads and are correlated to low light or nighttime visibility. Retro-Reflective readings shall measure a minimum of 700 millicandellas per square meter per lux for white paint and a minimum of 400 for yellow paint. Readings shall be taken within three (3) days of application using an approved 30 meter retro-reflectometer (Miralux or LTL 2000).

All emptied containers shall be returned to the paint storage area for checking by the Engineer. The containers shall not be removed from the airport or destroyed until authorized by the Engineer.

620-3.6 APPLICATION--PREFORMED AIRPORT PAVEMENT MARKINGS.

a. Asphalt and Portland cement To ensure minimum single-pass application time and optimum bond in the marking/substrate interface, the materials must be applied using a variable speed self-propelled mobile heater with an effective heating width of no less than 16 ft (4.88 m) and a free span between supporting wheels of no less than 18 ft (5.49 m). The heater must emit thermal radiation to the marking material in such a manner that the difference in temperature of 2 in (5.08 cm) wide linear segments in the direction of heater travel must be within 5 percent of the overall average temperature of the heated thermoplastic material as it exits the heater. The material must be able to be applied at ambient and pavement temperatures down to 35 °F (2 °C) without any preheating of the pavement to a specific temperature. The material must be able to be applied without the use of a thermometer. The pavement shall be clean, dry, and free of debris. A non-VOC sealer with a maximum applied viscosity of 250 centiPoise (ASTM D 2393) must be applied to the pavement shortly before the markings are applied. The supplier must enclose application instructions with each box/package.

620-3.7 PROTECTION AND CLEANUP. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose or unadhered reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the Engineer. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and Federal environmental statutes and regulations.

METHOD OF MEASUREMENT

620-4.1 The quantity of runway and taxiway markings and associated surface preparation to be paid for shall be ~~[the number of square feet (square meters) of painting and the number of pounds (km) of reflective media] [the number of square feet (square meters) of preformed markings] [one complete item in place]~~ performed in accordance with the specifications and accepted by the Engineer.

BASIS OF PAYMENT

620-5.1 Payment shall be made at the respective contract ~~[price per square foot (square meter)] [lump sum price]~~ for runway and taxiway painting and associated surface preparation ~~[, and [price per pound (km)] [lump sum price] [price per square foot (square meter)] [lump sum price] for preformed markings]~~ for reflective media. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

~~Item P-620-5.1-1 Runway and Taxiway Painting [per square foot (square meter)] [lump sum]~~

~~Item P-620-5.1-2 Reflective Media [per pound (km)] [lump sum]~~

Item P-620-5.1 Pavement Marking (Yellow) with Reflective Beads Including Surface Preparation -- Per Square Foot (square meter)

Item P-620-5.2	Pavement Marking (Black) without Reflective Beads Including Surface Preparation -- Per Square Foot (square meter)
Item P-620-5.3	Pavement Marking (White) with Reflective Beads Including Surface Preparation -- Per Square Foot (square meter)
Item P-620-5.4	Painted Parking Position Marking with Reflective Beads -- Per Each.
Item P-620-5.5	Handicap Symbol Pavment Marking with Reflective Beads -- Per Each.
Item P-620-5.6	Pavement Marking – Turn Arrow -- Per Each.

TESTING REQUIREMENTS

ASTM C 136	Sieve Analysis of Fine and Coarse Aggregates
ASTM C 146	Chemical Analysis of Glass Sand
ASTM C 371	Wire-Cloth Sieve Analysis of Nonplastic Ceramic Powders
ASTM D 92	Test Method for Flash and Fire Points by Cleveland Open Cup
ASTM D 711	No-Pick-Up Time of Traffic Paint
ASTM D 968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D 1213-54 (1975)	Test Method for Crushing Resistance of Glass Spheres
ASTM D 1652	Test Method for Epoxy Content of Epoxy Resins
ASTM D 2074	Test Method for Total Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D 2240	Test Method for Rubber Products-Durometer Hardness
ASTM G 15453	Operating Light and Water-Exposure Apparatus (Fluorescent Light Apparatus UV-Condensation Type) for Exposure of Nonmetallic Materials.
Federal Test Method Standard No. 141D/GEN	Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling and Testing

MATERIAL REQUIREMENTS

ASTM D 476	Specifications for Dry Pigmentary Titanium Dioxide Pigments Products
Code of Federal Regulations	40 CFR Part 60, Appendix A – Definition of Traverse Point Number and Location

Code of Federal Regulations	29 CFR Part 1910.1200 – Hazard Communications
FED SPEC TT-B-1325D	Beads (Glass Spheres) Retroreflective
AASHTO M 247	Glass Beads Used in Traffic Paints
FED SPEC TT-P-1952E	Paint, Traffic and Airfield Marking, Waterborne
Commercial Item Description (CID) A-A-2886B	Paint, Traffic, Solvent Based
FED STD 595	Colors used in Government Procurement

END OF ITEM P-620

ITEM D-701 PIPE FOR STORM DRAINS AND CULVERTS

DESCRIPTION

701-1.1 This item shall consist of the construction of pipe culverts and storm drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

MATERIALS

701-2.1 Materials shall meet the requirements shown on the plans and specified below.

701-2.2 PIPE. The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements.

ASTM A 760	Metallic Coated Corrugated Steel Pipe (Type I, IR or II)
ASTM A 761	Galvanized Steel Corrugated Structural Plates and Fasteners for Pipe, Pipe-Arches, and Arches
ASTM A 762	Polymer Precoated Corrugated Steel Pipe for Sewers and Drains
ASTM A 849	Post-Coated and Lined (Bituminous or Concrete) Corrugated Steel Sewer and Drainage Pipe
A885/A885M-96	Steel Sheet, Zinc and Aramid Fiber Composite Coated for Corrugated Steel Sewer, Culvert, and Underdrain Pipe
ASTM B 745	Corrugated Aluminum Alloy Culvert Pipe
ASTM C 14	Non-Reinforced Concrete Pipe
ASTM C 76	Reinforced Concrete Pipe
ASTM C 655	Reinforced Concrete D-Load Pipe
ASTM C 506	Reinforced Concrete Arch Pipe
ASTM C 507	Reinforced Concrete Elliptical Pipe
ASTM C 789 and C 850	Precast Reinforced Concrete Box Sections
ASTM F 667	Large Diameter Corrugated Polyethylene Pipe and Fittings
ASTM F 714	Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
ASTM F 794	Poly (Vinyl Chloride) Ribbed Drain Pipe & Fittings
ASTM F 894	Based on Controlled Inside Diameter Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe

ASTM F 949	Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings
ASTM F 2435	Steel Reinforced Polyethylene (PE) Corrugated Pipe
ASTM F 2562	Steel Reinforced Thermoplastic (HDPE) Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
AASHTO M 190	Bituminous-Coated Corrugated Metal Pipe and Pipe Arches
AASHTO M 190 and M 196	Bituminous-Coated Corrugated Aluminum Alloy Culvert Pipe
AASHTO M 167 and M 243	Bituminous-Coated Structural Plate Pipe, Pipe Arch, and Arches
AASHTO M 219	Aluminum Alloy Structural Plate for Pipe, Pipe Arch, and Arches
ASTM D 3034	Polyvinyl Chloride (PVC) Pipe
AASHTO M 252	Corrugated Polyethylene Drainage Tubing (all types)
AASHTO M 294M	Corrugated Polyethylene Pipe 300 to 1200 mm Diameter (all types)
AASHTO M 304	Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP-20	Steel Reinforced Polyethylene (PE) Ribbed Pipe

Pipe identified for use with jack and bore operations and its associated cost shall be included with the jack and bore specification and bid item. The basic definition of pipe type, class, and accessories required for the project can be defined herein. However, if there are any specialty items such as cushioning materials, special seals, special pipe end conditions, etc. required because of the jack and bore operations, those special items shall be specified and bid with the separate jack and bore bid items.

701-2.3 CONCRETE. Concrete for pipe cradles shall have a minimum compressive strength of 2000 psi (13.8 MPa) at 28 days and conform to the requirements of ASTM C 94.

701-2.4 RUBBER GASKETS. Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C 443. Rubber gaskets for PVC pipe and polyethylene pipe shall conform to the requirements of ASTM F 477. Rubber gaskets for zinc-coated steel pipe and precoated galvanized pipe shall conform to the requirements of ASTM D 1056, for the "RE" closed cell grades. Rubber gaskets for steel reinforced thermoplastic (HDPE) ribbed pipe shall conform to the requirements of ASTM F 477.

701-2.5 JOINT MORTAR. Pipe joint mortar shall consist of one part Portland cement and two parts sand. The Portland cement shall conform to the requirements of ASTM C 150, Type I. The sand shall conform to the requirements of ASTM C 144.

701-2.6 JOINT FILLERS. Poured filler for joints shall conform to the requirements of ASTM D 1190.

701-2.7 PLASTIC GASKETS. Plastic gaskets shall conform to the requirements of AASHTO M 198 (Type B).

[701-2.8. CONTROLLED LOW STRENGTH MATERIAL (CLSM). Controlled low strength material shall conform to the requirements of Item P-153. When CLSM is used all joints shall have gaskets.

CONSTRUCTION METHODS

701-3.1 EXCAVATION. The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but it shall not be less than the external diameter of the pipe plus 6 in (150 mm) on each side. The trench walls shall be approximately vertical.

Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 12 in (300 mm) or $\frac{1}{2}$ in (12 mm) for each foot of fill over the top of the pipe (whichever is greater) but for no more than three-quarters of the nominal diameter of the pipe. The width of the excavation shall be at least 1 ft (30 cm) greater than the horizontal outside diameter of the pipe. The excavation below grade shall be backfilled with selected fine compressible material, such as silty clay or loam, and lightly compacted in layers not over 6 in (150 mm) in uncompacted depth to form a uniform but yielding foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The Engineer shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

The excavation for pipes that are placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the pipe as shown on the plans.

701-3.2 BEDDING. The pipe bedding shall conform to the class specified on the plans. When no bedding class is specified or detailed on the plans, the requirements for Class C bedding shall apply.

a. Rigid Pipe. Class A bedding shall consist of a continuous concrete cradle conforming to the plan details.

Class B bedding shall consist of a bed of granular material having a thickness of at least 6 in (150 mm) below the bottom of the pipe and extending up around the pipe for a depth of not less than 30 percent of the pipe's vertical outside diameter. The layer of bedding material shall be shaped to fit the pipe for at least 10 percent of the pipe's vertical diameter and shall have recesses shaped to receive the bell of bell and spigot pipe. The bedding material shall be sand or selected sandy soil, all of which passes a $\frac{3}{8}$ in (9 mm) sieve and not more than 10 percent of which passes a No. 200 (0.075 mm) sieve.

Class C bedding shall consist of bedding the pipe in its natural foundation to a depth of not less than 10 percent of the pipe's vertical outside diameter. The bed shall be shaped to fit the pipe and shall have recesses shaped to receive the bell of bell and spigot pipe.

b. Flexible Pipe. For flexible pipe, the bed shall be roughly shaped to fit the pipe, and a bedding blanket of sand or fine granular material shall be provided as follows:

Pipe Corrugation Depth		Minimum Bedding Depth	
in.	mm	in.	mm
1/2	12.5	1	25.0
1	25.0	2	50.0
2	50.0	3	75.0
2 1/2	62.5	3 1/2	87.5

c. PVC and Polyethylene Pipe. For PVC and polyethylene pipe, the bedding material shall consist of coarse sands and gravels with a maximum particle size of 3/4 in (13 mm). For pipes installed under paved areas, no more than 12 percent of the material shall pass the No. 200 (0.075 mm) sieve. For all other areas, no more than 50 percent of the material shall pass the No. 200 (0.075 mm) sieve. The bedding shall have a thickness of at least 6 in (150 mm) below the bottom of the pipe and extend up around the pipe for a depth of not less than 50 percent of the pipe's vertical outside diameter.

701-3.3 LAYING PIPE. The pipe laying shall begin at the lowest point of the trench and proceed upgrade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing upgrade. **Pipe shall be placed using a laser.**

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

Elliptical and elliptically reinforced pipes shall be placed with the manufacturer's top of pipe mark within five degrees of a vertical plane through the longitudinal axis of the pipe.

701-3.4 JOINING PIPE. Joints shall be made with (1) Portland cement mortar, (2) Portland cement grout, (3) rubber gaskets, (4) plastic gaskets, or (5) coupling bands.

Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Molds or runners shall be used for grouted joints in order to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible watertight seal.

a. Concrete Pipe. Concrete pipe may be either bell and spigot or tongue and groove. The method of joining pipe sections shall be such that the ends are fully entered and the inner surfaces are reasonably flush and even. Joints shall be thoroughly wetted before mortar or grout is applied.

b. Metal Pipe. Metal pipe shall be firmly joined by form fitting bands conforming to the requirements of ASTM A 760 for steel pipe and AASHTO M 196 for aluminum pipe.

c. PVC and Polyethylene Pipe. Joints for PVC and Polyethylene pipe shall conform to the requirements of ASTM D 3212 when water tight joints are required. Joints for PVC and Polyethylene pipe shall conform to the requirements of AASHTO M 304 when soil tight joints are required. Fittings for polyethylene pipe shall conform to the requirements of AASHTO M 252 or M 294M.

701-3.5 BACKFILLING. Pipes shall be inspected before any backfill is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and relaid or replaced at the Contractor's expense.

Material for backfill shall be fine, readily compatible soil, granular material selected from the excavation or a source of the Contractor's choosing, ~~or shall meet the requirements of Item P-153].~~ It shall not contain frozen lumps, stones that would be retained on a 2 in (50.0 mm) sieve, chunks of highly plastic clay, or other objectionable material. No less than 95 percent of a granular backfill material shall pass

through a 1/2 in (12 mm) sieve, and no less than 95 percent of it shall be retained on a No. 4 (4.75 mm) sieve.

When the top of the pipe is even with or below the top of the trench, the backfill shall be compacted in layers not exceeding 6 in (150 mm) on both sides of the pipe and shall be brought up 1 ft (30 cm) above the top of the pipe or to natural ground level, whichever is greater. Care shall be exercised to thoroughly compact the backfill material under the haunches of the pipe. Material shall be brought up evenly on both sides of the pipe.

When the top of the pipe is above the top of the trench, the backfill shall be compacted in layers not exceeding 6 in (150 mm) and shall be brought up evenly on both sides of the pipe to 1 ft (30 cm) above the top of the pipe. The width of backfill on each side of the pipe for the portion above the top of the trench shall be equal to twice the pipe's diameter or 12 ft (3.5 m), whichever is less.

For PVC and polyethylene pipe, the backfill shall be placed in two stages; first to the top of the pipe and then at least 12 in (300 mm) over the top of the pipe. The backfill material shall meet the requirements of paragraph 701-3.2c.

All backfill shall be compacted to the density required under Item P-152 **Excavation and Embankment**.

METHOD OF MEASUREMENT

701-4.1 The length of pipe shall be measured in linear feet (meters) of pipe in place, completed, and approved. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. The several classes, types and size shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipe being measured.

~~**701-4.2** The volume of concrete for pipe cradles to be paid for shall be the number of cubic yards (cubic meters) of concrete that is completed in place and accepted.~~

~~**701-4.3** The volume of rock to be paid for shall be the number of cubic yards (cubic meters) of rock excavated. No payment shall be made for the cushion material placed for the bed of the pipe.~~

BASIS OF PAYMENT

701-5.1 Payment will be made at the contract unit price per linear foot (meter) for each kind of pipe of the type and size designated; at the contract unit price per cubic yard (cubic meter) of concrete for pipe cradles; and at the contract unit price per cubic yard (cubic meter) for rock excavation.

These prices shall fully compensate the Contractor for furnishing all materials and for all preparation, excavation, and installation of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item 701-5.1	[] inch [] per linear foot (meter)
Item 701-5.2	Concrete for pipe cradles — per cubic yard (cubic meter)
Item 701-5.3	Rock excavation — per cubic yard (cubic meter)
Item 701-5.1	Storm Sewer Pipe, 12" CL V, C76 – Per Linear Foot

Item 701-5.2	Storm Sewer Pipe, 18" CL V, C76 – Per Linear Foot
Item 701-5.3	Storm Sewer Pipe, 24" CL V, C76 – Per Linear Foot
Item 701-5.4	Storm Sewer Pipe, 30" CL V, C76 – Per Linear Foot
Item 701-5.5	Storm Sewer Pipe, 36" CL V, C76 – Per Linear Foot
Item 701-5.6	Storm Sewer Pipe, 42" CL V, C77 – Per Linear Foot
Item 701-5.7	Storm Sewer Pipe, 4" SDR 35 – Per Linear Foot

MATERIAL REQUIREMENTS

ASTM A 760	Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
ASTM A 761	Corrugated Steel Structural Plate, Zinc Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
ASTM A 762	Corrugated Steel-Pipe, Polymer Precoated for Sewers and Drains
ASTM A 849	Post-Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe
ASTM A 885/A 885M-96	Steel Sheet, Zinc and Aramid Fiber Composite Coated for Corrugated Steel Sewer, Culvert, and Underdrain Pipe
ASTM B 745	Corrugated Aluminum Alloy Culvert Pipe
ASTM C 14	Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C 76	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 94	Ready Mixed Concrete
ASTM C 144	Aggregate for Masonry Mortar
ASTM C 150	Portland Cement
ASTM C 443	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 506	Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
ASTM C 507	Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
ASTM C 655	Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe
ASTM C 1433	Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers
ASTM D 1056	Flexible Cellular Materials-Sponge or Expanded Rubber

ASTM D 3034	Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D 3212	Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D 6690	Joint and Crack Sealants, Hot-Applied, for Concrete and Asphalt Pavements
ASTM F 477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F 667	Large Diameter Corrugated Polyethylene Pipe and Fittings
ASTM F 714	Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
ASTM F 794	Poly (Vinyl Chloride) Ribbed Drain Pipe & Fittings Based on Controlled Inside Diameter
ASTM F 894	Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
ASTM F 2435	Steel Reinforced Polyethylene (PE) Corrugated Pipe
ASTM F 2562	Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage.
ASTM F 949	Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings
AASHTO M 190	Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M 196	Corrugated Aluminum Alloy Culverts and Underdrains
AASHTO M 198	Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets
AASHTO M 219	Aluminum Alloy Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M 243	Field Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M 252	Corrugated Polyethylene Drainage Tubing
AASHTO M 294M	Corrugated Polyethylene Pipe, 300 to 1200 mm Diameter
AASHTO M 304	Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP-20	Steel Reinforced Polyethylene (PE) Ribbed Pipe

END ITEM D-701

ITEM D-705 PIPE UNDERDRAINS FOR AIRPORTS

DESCRIPTION

705-1.1 This item shall consist of the construction of pipe drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

MATERIALS

705-2.1 GENERAL. Materials shall meet the requirements shown on the plans and specified below.

705-2.2 PIPE. The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements.

ASTM C 444	Perforated Concrete Pipe
ASTM C 654	Porous Concrete Pipe
ASTM A 762	Polymer Precoated Perforated Corrugated Steel Pipe
AASHTO M 196	Perforated Corrugated Aluminum Alloy Pipe
ASTM F 758	Smooth-Wall Perforated PVC Pipe
ASTM F 794	Poly (Vinyl Chloride) Ribbed Drain Pipe & Fittings Based on Controlled Inside Diameter
ASTM F 949	Poly (Vinyl Chloride)(PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings
ASTM F 2562	Steel Reinforced Thermoplastic (HDPE) Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
ASTM A 760	Perforated Corrugated Steel Pipe
AASHTO M 196	Bituminous-Coated Perforated Corrugated
AASHTO M 252	Aluminum Alloy Pipe and M 190 Corrugated Polyethylene Drainage Tubing (all types)
AASHTO M 294M	Corrugated Polyethylene Pipe, 300 to 1200 mm Diameter (all types)
AASHTO M 304	Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP-20	Steel Reinforced Polyethylene (PE) Ribbed Pipe

705-2.4 ELASTOMERIC SEALS. Elastomeric seals shall conform to the requirements of ASTM F 477.

705-2.5 POROUS BACKFILL. Porous backfill shall be free of clay, humus, or other objectionable matter, and shall conform to the gradation in Table 1 when tested in accordance with ASTM C 136.

Table 1. Gradation Of Porous Backfill

Sieve Designation (square openings)	Percentage by Weight Passing Sieves	
	Porous Material No. 1	Porous Material No. 2
1-1/2 in (38 mm)		100
1 in (25 mm)		90 - 100
3/8 in (9.5 mm)	100	25 - 60
No. 4 (4.75 mm)	95 - 100	5 - 40
No. 8 (2.36 mm)		0 - 20
No. 16 (1.18 mm)	45 - 80	
No. 50 (0.30 mm)	10 - 30	
No. 100 (0.15 mm)	0 - 10	

When two courses of porous backfill are specified in the plans, the finer of the materials shall conform to particle size tabulated herein for porous material No. 1. The coarser granular material shall meet the gradation given in the tabulation for porous material No. 2.

705-2.6. GRANULAR MATERIAL. Granular material used for backfilling shall conform to the requirements of ASTM D 2321 for Class IA, IB, or II materials, or shall meet the requirements of AASHTO Standard Specification for Highway Bridges Section 30.

705-2.7. FILTER FABRIC. The filter fabric shall conform to the requirements of AASHTO M 288-99, Class 2.

Table 2

Fabric Property	Test Method	Test Requirement
Grab Tensile Strength, lbs	ASTM D 4632	125 min
Grab Tensile Elongation %	ASTM D 4632	50 min
Burst Strength, psi	ASTM D 3785	125 min
Trapezoid Tear Strength, lbs	ASTM D 4533	55 min
Puncture Strength, lbs	ASTM D 4833	40 min
Abrasion, lbs	ASTM D 4886	15 max loss
Equivalent Opening Size	ASTM D 4751	70-100
Permittivity sec⁻¹	ASTM D 4491	0.80
Accelerated Weathering (UV Stability) (Strength Retained - %)	ASTM D 4355 *(500 hrs exposure)	70

705-2.8. CONTROLLED LOW STRENGTH MATERIAL (CLSM). Controlled low strength material shall conform to the requirements of Item P-153. When CLSM is used all joints shall have elastomeric seals.

CONSTRUCTION METHODS

705-3.1 EQUIPMENT. All equipment necessary and required for the proper construction of pipe underdrains shall be on the project, in first-class working condition, and approved by the Engineer before construction is permitted to start.

705-3.2 EXCAVATION. The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but shall not be less

than the external diameter of the pipe plus 6 in (150 mm) on each side. The trench walls shall be approximately vertical.

Where rock, hardpan, or other unyielding material is encountered, it shall be removed below the foundation grade for a depth of at least 4 in (100 mm). The excavation below grade shall be backfilled with selected fine compressible material, such as silty clay or loam, and lightly compacted in layers not over 6 in (150 mm) in uncompacted depth to form a uniform but yielding foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The Engineer shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

Excavated material not required or acceptable for backfill shall be disposed of by the Contractor as directed by the Engineer. The excavation shall not be carried below the required depth; when this is done, the trench shall be backfilled at the Contractor's expense with material approved by the Engineer and compacted to the density of the surrounding earth material.

The bed for the pipe shall be so shaped that at least the lower quarter of the pipe shall be in continuous contact with the bottom of the trench. Spaces for the pipe bell shall be excavated accurately to size to clear the bell so that the barrel supports the entire weight of the pipe.

The Contractor shall do such trench bracing, sheathing, or shoring necessary to perform and protect the excavation as required for safety and conformance to governing laws. Unless otherwise provided, the bracing, sheathing, or shoring shall be removed by the Contractor after the completion of the backfill to at least 12 in (300 mm) over the top of the pipe. The sheathing or shoring shall be pulled as the granular backfill is placed and compacted to avoid any unfilled spaces between the trench wall and the backfill material. The cost of bracing, sheathing, or shoring, and the removal of same, shall be included in the unit price bid per foot (meter) for the pipe.

705-3.3 LAYING AND INSTALLING PIPE.

a. Concrete Pipe. The laying of the pipe in the finished trench shall be started at the lowest point and laid upgrade. When bell and spigot pipe is used, the bells shall be laid upgrade. If tongue and groove pipe is used, the groove end shall be laid upgrade. Holes in perforated pipe shall be placed down, unless otherwise shown on the plans. The pipe shall be firmly and accurately set to line and grade so that the invert will be smooth and uniform. Pipe shall not be laid on frozen ground.

Pipe which is not true in alignment, or which shows any settlement after laying, shall be taken up and relaid without extra compensation.

b. Metal Pipe. The metal pipe shall be laid with the separate sections joined firmly together with bands, with outside laps of circumferential joints pointing upgrade, and with longitudinal laps on the sides. Any metal in the pipe or bands that is not protected thoroughly by galvanizing shall be coated with a suitable asphaltum paint.

During installation, the asphalt-protected pipe shall be handled without damaging the asphalt coating. Any breaks in the bitumen or treatment of the pipe shall be refilled with the type and kind of bitumen used in coating the pipe originally.

c. PVC or Polyethylene Pipe. PVC or polyethylene pipe shall be installed in accordance with the requirements of ASTM D 2321 or AASHTO Standard Specification for Highway Bridges Section 30.

Perforations shall meet the requirements of AASHTO M 252 or M 294 Class 2, unless otherwise indicated on the plans. The pipe shall be laid accurately to line and grade.

d. All Types of Pipe. The upgrade end of pipelines, not terminating in a structure, shall be plugged or capped as approved by the Engineer.

Unless otherwise shown on the plans, a 4 in (100 mm) bed of granular backfill material shall be spread in the bottom of the trench throughout the entire length under all perforated pipe underdrains.

Pipe outlets for the underdrains shall be constructed when required or shown on the plans. The pipe shall be laid with tight-fitting joints. Porous backfill is not required around or over pipe outlets for underdrains. All connections to other drainage pipes or structures shall be made as required and in a satisfactory manner. If connections are not made to other pipes or structures, the outlets shall be protected and constructed as shown on the plans.

e. Filter Fabric. The filter fabric shall be installed in accordance with the manufacturer's recommendations, or in accordance with AASHTO M 288-99 APPENDIX, unless otherwise shown on the plans.

705-3.4 MORTAR. The mortar shall be of the desired consistency for caulking and filling the joints of the pipe and for making connections to other pipes or to structures. Mortar that is not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted.

705-3.5 JOINTS IN CONCRETE PIPE. When open or partly open joints are required or specified, they shall be constructed as indicated on the plans. The pipe shall be laid with the ends fitted together as designed. If bell and spigot pipe is used, mortar shall be placed along the inside bottom quarter of the bell to center the following section of pipe.

The open or partly open joints shall be surrounded with granular material meeting requirements of porous backfill No. 2 or as indicated on the plans. This backfill shall be placed so its thickness will be not less than 3 in (75 mm) nor more than 6 in (150 mm), unless otherwise shown on the plans.

When the original material excavated from the trench is impervious, commercial concrete sand or granular material meeting requirements of porous backfill No. 1 shall surround porous backfill No. 2, as shown on the plans or as directed by the Engineer.

When the original material excavated from the trench is pervious and suitable, it may be used as backfill in lieu of porous backfill No. 1, when indicated on the plans or as directed by the Engineer.

705-3.6 BACKFILLING.

a. Earth. All trenches and excavations shall be backfilled within a reasonable time after the pipes are installed, unless other protection of the pipe is directed. The backfill material shall be selected material from excavation or borrow; material which is placed within a nominal pipe diameter distance at the sides of the pipe and 1 ft (30 cm) over the top shall be material that can be readily compacted. It shall not contain stones retained on a 3 in (75 mm) sieve, frozen lumps, chunks of highly plastic clay, or any other material that is objectionable to the Engineer. The material shall be moistened or dried, if necessary to be compacted by the method in use. Backfill material shall be approved by the Engineer. Special care shall be taken in placing the backfill. Great care shall be used to obtain thorough compaction under the haunches and along the sides to the top of the pipe.

The backfill shall be placed in loose layers not exceeding 6 in (150 mm) in depth under and around the pipe, and not exceeding 8 in (200 mm) over the pipe. Successive layers shall be added and

thoroughly compacted by hand and pneumatic tampers, approved by the Engineer, until the trench is completely filled and brought to the proper elevation. Backfilling shall be done in a manner to avoid injurious top or side pressures on the pipe.

In embankments and for other areas outside of pavements, the backfill shall be compacted to the density required for embankments in unpaved areas under Item P-152 Excavation and Embankment. Under paved areas, the subgrade and any backfill shall be compacted to the density required for embankments for paved areas under Item P-152.

b. Granular Material. When granular backfill is required, its placement in the trench and about the pipe shall be as shown on the plans. Special care shall be taken in placing the backfill. The granular backfill shall not contain a damaging amount of foreign matter, nor shall earth from the sides of the trench or from the windrow be allowed to filter into the backfill. When required by the Engineer, a template shall be used to properly place and keep separate the two sizes of backfill. The backfill shall be placed in loose layers not exceeding 6 in (150 mm) in depth and compacted by hand and pneumatic tampers to the requirements as given for earth backfill. Backfilling shall be done in a manner to avoid injurious top or side pressure on the pipe. The granular backfill shall be made to the elevation of the trench, as shown on the plans.

When perforated pipe is specified, granular backfill material shall be placed along the full length of the pipe. The position of the granular material shall be as shown on the plans. If the original material excavated from the trench is pervious and suitable, it shall be used in lieu of porous backfill No. 1.

When porous backfill is to be placed in paved or adjacent areas prior to the completion of grading or subgrade operations, the backfill material shall be placed immediately after laying the pipe. The depth of this granular backfill shall be not less than 12 in (300 mm), measured from the top of the underdrain. During subsequent construction operations, this minimum backfill of 12 in (300 mm) of depth shall not be disturbed until such time as the underdrains are to be completed. When the underdrains are to be completed, the unsuitable material shall be removed until the porous backfill is exposed. That part of the porous backfill that contains objectionable material shall be removed and replaced with suitable material. The cost of removing and replacing any such unsuitable material shall be borne by the Contractor.

Whenever a granular subbase blanket course is to be used under pavements which extends several ft beyond the edge of paving to the outside edge of the underdrain trench, the granular backfill material over the underdrains shall be placed in the trench up to an elevation of 2 in (50 mm) above the bottom surface of the granular subbase blanket course. Immediately prior to the placing of the granular subbase blanket course, the Contractor shall blade this excess trench backfill from the top of the trench onto the adjacent subgrade where it can be incorporated into the granular subbase blanket course. Any unsuitable material that remains over the underdrain trench shall be removed and replaced. The subbase material shall be placed to provide clean contact between the subbase material and the underdrain granular backfill material for the full width of the underdrain trench.

c. Controlled Low Strength Material (CLSM). Controlled low strength material shall conform to the requirements of Item P-153 Controlled Low-Strength Material (CLSM).

d. Deflection Testing. The Engineer may at any time, notwithstanding previous material acceptance, reject or require re-installation of pipe that exceeds 5 percent deflection when measured in accordance with ASTM D 2321, including Appendices.

705-3.7 CONNECTIONS. When the plans call for connections to existing or proposed pipe or structures, these connections shall be watertight and made so that a smooth uniform flow line will be obtained throughout the drainage system.

705-3.8 CLEANING AND RESTORATION OF SITE. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as ordered by the Engineer. Except for paved areas of the airport, the Contractor shall restore all disturbed areas to their original condition.

METHOD OF MEASUREMENT

705-4.1 The length of pipe to be paid for shall be the number of linear feet (meters) of pipe underdrains in place, completed, and approved; measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. The several classes, types, and sizes shall be measured separately. All fittings, porous backfill and filter fabric shall be included in the footage as typical pipe sections in the pipeline being measured.

~~**705-4.2** The quantity of porous backfill to be paid for shall be the number of cubic yards (cubic meters) of porous backfill No. 1 and No. 2, complete in place and accepted, and shall be determined from the dimensions given on the plans by typical trench sections indicating the placement of porous backfill or dimensions ordered by the Engineer.~~

~~**705-4.3** The quantity of filter fabric to be paid for shall be the number of square yards (square meters) of filter fabric in place, completed, and approved; and shall be determined from the dimensions given on the plans by typical trench sections indicating the placement of filter fabric or dimensions ordered by the Engineer.~~

BASIS OF PAYMENT

705-5.1 Payment will be made at the contract unit price per linear foot (meter) for pipe underdrains of the type, class, and size designated; at the contract unit price ~~[per cubic yard (cubic meter)] [per ton (metric ton)]~~ for porous backfill No. 1; the contract unit price ~~[per cubic yard (cubic meter)] [per ton (metric ton)]~~ for porous backfill No. 2, and at the contract unit price per square yard (square meter) for filter fabric. ~~[per linear foot (meter)]~~ **COMPLETE (including porous backfill and filter fabric.)** These prices shall be full compensation for furnishing all materials and for all preparation, excavation, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item D-705-5.1	Install 6" Underdrain with Fabric Pipe Wrap and Porous Backfill – Per Linear Foot
Item D-705-5.3	Remove Sewer Pipe (Storm), 12"-18" Dia. – Per Linear Foot
Item D-705-5.4	Remove Sewer Pipe (Storm), 19" and Greater – Per Linear Foot
Item D 705 5.5	[] inch pipe (mm pipe) [] per linear foot (meter) COMPLETE (including porous backfill and filter fabric)

MATERIAL REQUIREMENTS

ASTM A 760	Corrugated Steel Pipe, Metallic Coated for Sewers and Drains
ASTM A 762	Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains

ASTM C 136	Sieve Analysis of Fine and Coarse Aggregates
ASTM C 144	Aggregate for Masonry Mortar
ASTM C 150	Portland Cement
ASTM C 444	Perforated Concrete Pipe
ASTM C 654	Porous Concrete Pipe
ASTM D 2321	Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D 3034	Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM F 477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F 758	Smooth Wall Poly(Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage
ASTM F 794	Poly (Vinyl Chloride) Ribbed Drain Pipe & Fittings Based on Controlled Inside Diameter
ASTM F 949	Poly (Vinyl Chloride)(PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F 2562	Steel Reinforced Thermoplastic (HDPE) Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
AASHTO M 190	Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M 196	Corrugated Aluminum Alloy Culverts and Underdrains
AASHTO M 252	Corrugated Polyethylene Drainage Tubing
AASHTO M 288-99	Geotextile Specification for Highway Applications
AASHTO M 294M	Corrugated Polyethylene Pipe, 300 to 1200 mm Diameter
AASHTO M 304	Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP-20	Steel Reinforced Polyethylene (PE) Ribbed Pipe
AASHTO	Standard Specifications for Highway Bridges

END OF ITEM D-705

ITEM F-162 CHAIN-LINK FENCE

DESCRIPTION

162-1.1 This item shall consist of furnishing and erecting a chain-link fence in accordance with these specifications and the details shown on the plans and in conformity with the lines and grades shown on the plans or established by the Engineer.

MATERIALS

162-2.1 FABRIC. [The fabric shall be woven with a 9-gauge [galvanized steel wire] ~~polyvinyl chloride (PVC) coated steel~~ [aluminum alloy] [zinc 5% aluminum mischmetal] wire in a 2 in (50 mm) mesh and shall meet the requirements of [ASTM A 121].] ~~[The fabric shall be woven from a [] gauge aluminum-coated steel wire in a 2 in (50 mm) mesh and shall conform to the requirements of ASTM A 491.]~~

162-2.2 BARBED WIRE. Barbed wire shall be 2-strand 12-1/2 gauge [zinc-coated] ~~[aluminum-coated]~~ wire with 4-point barbs and shall conform to the requirements of [ASTM A 121, CLASS 3, CHAIN LINK FENCE GRADE].

162-2.3 POSTS, RAILS AND BRACES. Line posts, rails, and braces shall conform to the requirements of ASTM F-1043 or ASTM F 1083 as follows.

Galvanized tubular steel pipe shall conform to the requirements of Group IA, (Schedule 40) coatings conforming to Type A, or Group IC (High Strength Pipe), External coating Type B, and internal coating Type B or D.

Roll Formed Steel Shapes (C-Sections) shall conform to the requirements of Group IIA, and be galvanized in accordance with the requirements of ASTM F 1043, Type A.

Hot-Rolled Shapes (H Beams) shall meet the requirements of Group III, and be galvanized in accordance with the requirements of ASTM F 1043, Type A.

Aluminum Pipe shall conform to the requirements of Group IB.

Aluminum Shapes shall conform to the requirements of Group IIB.

Vinyl or polyester coated steel shall conform to the requirements of ASTM F 1043, Paragraph 7.3 Optional Supplemental Color Coating.

Composite posts shall conform to the strength requirements of ASTM F 1043 or ASTM F 1083. The strength loss of composite posts shall not exceed 10 percent when subjected to 3,600 hours of exposure to light and water in accordance with ASTM G 23, ASTM G 26, and ASTM G-53.

Posts, rails, and braces furnished for use in conjunction with aluminum alloy fabric shall be aluminum alloy or composite.

Posts, rails, and braces, with the exception of galvanized steel conforming to F 1043 or ASTM F 1083, Group 1A, Type A, or aluminum alloy, shall demonstrate the ability to withstand testing in salt spray in accordance with ASTM B 117 as follows:

External: 1,000 hours with a maximum of 5% red rust.

Internal: 650 hours with a maximum of 5% red rust.

The dimensions of the posts, rails, and braces shall be in accordance with Tables I through VI of Fed. Spec. RR-F-191/3.

162-2.4 GATES. Gate frames shall consist of ~~[galvanized steel pipe] [polymer-coated steel pipe] [aluminum alloy pipe] [composite posts]~~ and shall conform to the specifications for the same material under paragraph 162-2.3. The fabric shall be of the same type material as used in the fence.

162-2.5 WIRE TIES AND TENSION WIRES. Wire ties for use in conjunction with a given type of fabric shall be of the same material and coating weight identified with the fabric type. Tension wire shall be 7-gauge marcelled steel wire with the same coating as the fabric type and shall conform to ASTM A 824.

All material shall conform to Fed. Spec. RR-F-191/4.

162-6 MISCELLANEOUS FITTINGS AND HARDWARE. Miscellaneous steel fittings and hardware for use with ~~[zinc-coated] [aluminum-coated] [polymer-coated] [zinc 5% aluminum mischmetal alloy-coated]~~ steel fabric shall be of commercial grade steel or better quality, wrought or cast as appropriate to the article, and sufficient in strength to provide a balanced design when used in conjunction with fabric posts, and wires of the quality specified herein. ~~[All steel fittings and hardware shall be protected with a zinc coating applied in conformance with ASTM A 153.] [Miscellaneous aluminum fittings for use with aluminum alloy fabric shall be wrought or cast aluminum alloy.]~~ Barbed wire support arms shall withstand a load of 250 pounds (113 kg) applied vertically to the outermost end of the arm.

162-2.7 CONCRETE. Concrete shall be of a commercial grade with a minimum 28-day compressive strength of 2500 psi (17 240 kPa) meeting the requirements of P-610 Structural Portland Cement Concrete.

162-2.8 MARKING. Each roll of fabric shall carry a tag showing the kind of base metal (steel, aluminum, or aluminum alloy number), kind of coating, the gauge of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal (steel, aluminum, or aluminum alloy number), and kind of coating.

162-2.9 POST CAPS. All posts shall have post caps installed on top to prevent moisture from entering through the top of the post. The post caps shall meet the requirements of paragraph 162-2.6 and shall be of the size such that when the post cap is installed over the top of the fence top, it will fit securely and not be loose. The post caps shall have at least the industry standard side depth.

CONSTRUCTION METHODS

162-3.1 CLEARING FENCE LINE. All trees, brush, stumps, logs, and other debris which would interfere with the proper construction of the fence in the required location shall be removed a minimum width of 2 ft (61 cm) on each side of the fence centerline before starting fencing operations. The cost of removing and disposing of the material shall not constitute a pay item and shall be considered incidental to fence construction.

162-3.2 INSTALLING POSTS. All posts shall be set in concrete at the required dimension and depth and at the spacing shown on the plans.

The concrete shall be thoroughly compacted around the posts by tamping or vibrating and shall have a smooth finish slightly higher than the ground and sloped to drain away from the posts. All posts shall be set plumb and to the required grade and alignment. No materials shall be installed on the posts, nor shall the posts be disturbed in any manner within 7 days after the individual post footing is completed.

Should rock be encountered at a depth less than the planned footing depth, a hole 2 in (50 mm) larger than the greatest dimension of the posts shall be drilled to a depth of 12 in (300 mm). After the posts are set, the remainder of the drilled hole shall be filled with grout, composed of one part Portland cement and two parts mortar sand. Any remaining space above the rock shall be filled with concrete in the manner described above.

In lieu of drilling, the rock may be excavated to the required footing depth. No extra compensation shall be made for rock excavation.

162-3.3 INSTALLING TOP RAILS. The top rail shall be continuous and shall pass through the post tops. The coupling used to join the top rail lengths shall allow for expansion.

162-3.4 INSTALLING BRACES. Horizontal brace rails, with diagonal truss rods and turnbuckles, shall be installed at all terminal posts.

162-3.5 INSTALLING FABRIC. The wire fabric shall be firmly attached to the posts and braced in the manner shown on the plans. All wire shall be stretched taut and shall be installed to the required elevations. The fence shall generally follow the contour of the ground, with the bottom of the fence fabric no less than 1 in (25 mm) or more than 4 in (100 mm) from the ground surface. Grading shall be performed where necessary to provide a neat appearance.

At locations of small natural swales or drainage ditches and where it is not practical to have the fence conform to the general contour of the ground surface, longer posts may be used and multiple strands of barbed wire stretched thereon to span the opening below the fence. The vertical clearance between strands of barbed wire shall be 6 in (150 mm) or less.

162-3.6 ELECTRICAL GROUNDS. ~~Electrical grounds shall be constructed [where a power line passes over the fence] [at 500 ft (150 m) intervals]. [The ground shall be installed directly below the point of crossing.]~~ The ground shall be accomplished with a copper clad rod 8 ft (240 cm) long and a minimum of 5/8 in (15 mm) in diameter driven vertically until the top is 6 in (150 mm) below the ground surface. A No. 6 solid copper conductor shall be clamped to the rod and to the fence in such a manner that each element of the fence is grounded. Installation of ground rods shall not constitute a pay item and shall be considered incidental to fence construction.

METHOD OF MEASUREMENT

162-4.1 Chain-link fence will be measured for payment by the linear foot (meter). Measurement will be along the top of the fence from center to center of end posts, excluding the length occupied by gate openings.

Gates will be measured as complete units.

BASIS OF PAYMENT

162-5.1 Payment for chain-link fence will be made at the contract unit price per linear foot (meter).

Payment for driveway or walkway gates will be made at the contract unit price for each gate.

The price shall be full compensation for furnishing all materials, and for all preparation, erection, and installation of these materials, and for all labor equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item F-162-5.1	Remove Fence -- Per Linear Foot (meter)
Item F-162-5.2	Remove Gates -- Per Each
Item F-162-5.3	6' Chain Link Fence w/ 3 Strands Barbed Wire -- Per Linear Foot
Item F-162-5.4	Temporary Fence 6' Chain Link Fence, No Concrete Pull Posts, No Top Rail or Barbed Wire -- Per Linear Foot
Item F-162-5.5	Reinforced Fence Section -- Per Each

MATERIAL REQUIREMENTS

ASTM A 121	Zinc-Coated (Galvanized) Steel Barbed Wire
ASTM A 123	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 392	Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A 491	Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM A 572	High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Steel Quality
ASTM A 653	Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 824	Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link Fence
ASTM A 1011	Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
ASTM B 117	Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM B 221	Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire Shapes and Tubes
ASTM B 429	Aluminum-Alloy Extruded Structural Pipe and Tube
ASTM F 668	Poly(vinyl Chloride)(PVC) and other Organic Polymer-Coated Steel Chain-Link Fence Fabric
ASTM F 1043	Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework

ASTM F 1083	Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
ASTM F 1183	Aluminum Alloy Chain Link Fence Fabric
ASTM F 1345	Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Chain Link Fence Fabric
ASTM G 152	Operating Open Flame (Carbon-Arc) Light Apparatus for Exposure of Nonmetallic Materials
ASTM G 153	Operating Enclosed Carbon-Arc Light Apparatus for Exposure of Nonmetallic Materials
ASTM G 154	Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials
ASTM G 155	Operating (Xenon-Arc) Light Apparatus for Exposure of Nonmetallic Materials
FED SPEC RR-F-191/3	Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces)
FED SPEC RR-F-191/4	Fencing, Wire and Post, Metal (Chain-Link Fence Accessories)

END OF ITEM F-162

ITEM T-901 SEEDING

DESCRIPTION

901-1.1 This item shall consist of soil preparation, seeding [and fertilizing] the areas shown on the plans or as directed by the Engineer in accordance with these specifications.

MATERIALS

901-2.1 SEED The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Fed. Spec. A-A-2671. Fertilizing, seeding and/or mulching operations will not be permitted when wind velocities are in excess of 15 miles per hour. All seed shall meet the requirements of the (State) Department of Agriculture and Consumer Services and all applicable state laws.

Seed shall be furnished separately or in mixtures in standard containers with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the Engineer duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within 6 months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed.

Seeds shall be applied as follows:

Seed Purity	Minimum Seed Purity (Percent)	Minimum Germination (Percent)	Rate of Application lb./acre (or lb./1,000 S.F.)
<u>Permanent Seeding</u>			
Common Bermuda	95%	85%	150 lbs per acre
Pensacola Bahia	95%	80%	80 lbs per acre
<u>Temporary Seeding</u>			
Annual Rye or Winter Quick Growing Type	95%	90%	80 lbs per acre

~~Seeding shall be performed during the period between [] and [] inclusive, unless otherwise approved by the Engineer. The germination rate shall not include the hard seed percentage.~~

Millet seed is expressly prohibited from being applied anywhere on the project. Should the Contractor apply Millet knowingly or unknowingly to the project, an initial fine of \$1,000.00 will be levied. An additional \$1,000.00 per day fine shall be levied on the Contractor for each day the Millet seed is not removed from the project. The fines levied shall be recorded daily and shall be deducted from the Contractor's earnings at the end of the project. The Contractor shall submit a certification of the seed provided for this project stating no millet is present in the seed.

901-2.2 LIME. Lime shall be ground limestone containing not less than 85% of total carbonates, and shall be ground to such fineness that 90% will pass through a No. 20 mesh sieve and 50% will pass through a No. 100 mesh sieve. Coarser material will be acceptable, providing the rates of application are increased to provide not less than the minimum quantities and depth specified in the special provisions on the basis of the two sieve requirements above. Dolomitic lime or a high magnesium lime shall contain at least 10% of magnesium oxide. Lime shall be applied at the rate of [Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water.]. All liming materials shall conform to the requirements of ASTM C 602.

901-2.3 FERTILIZER. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified herein, and shall meet the requirements of Fed. Spec. A-A-1909 and applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

- a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or
- c. A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be [**10-10-10 (n-p-k)**] commercial fertilizer and shall be spread at the rate of [**400**].

901-2.4 SOIL FOR REPAIRS. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the Engineer before being placed.

901-2.5 SUBMITTALS AND CERTIFICATES. Shop drawings of each seeding related component shall be submitted to the Engineer for review and approval and shall be approved prior to ordering any materials associated with this item. The submittals shall include the following:

- a. Catalogue data and certification showing that the seed mixture percent by weight, percent purity, percent germination and date of manufacture meet the requirements specified.
- b. Catalogue data and certification showing that the guaranteed analysis of the fertilizer meets the requirements specified.

The data shall be sufficient, in the opinion of the Engineer, to determine compliance with the contract documents. The Contractor shall submit the submittals to the Engineer 30 days prior to start up of construction.

901-2.6 INSPECTION OF SEED. Prior to startup of any seeding operations, the Engineer shall inspect all bags containing seed to ensure the proper seed specified is being utilized and that no unauthorized seed will be incorporated into the work.

CONSTRUCTION METHODS

901-3.1 ADVANCE PREPARATION AND CLEANUP. After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2-inches (50 mm) in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage. This may include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5-inches (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3-inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

However, when the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5-inches (125 mm). Clods shall be broken and the top 3-inches (75 mm) of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

901-3.2 DRY APPLICATION METHOD.

a. Liming. Lime shall be applied separately and prior to the application of any fertilizer or seed and only on seedbeds that have previously been prepared as described above. The lime shall then be worked into the top 3 inches (75 mm) of soil after which the seedbed shall again be properly graded and dressed to a smooth finish.

b. Fertilizing. Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate that will provide not less than the minimum quantity stated in paragraph 901-2.3.

c. Seeding. Grass seed shall be sown at the rate specified in paragraph 901-2.1 immediately after fertilizing, and the fertilizer and seed shall be raked within the depth range stated in the special provisions. Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plans or in the special provisions, a cover crop shall be sown by the same methods required for grass and legume seeding.

d. Rolling. After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawnroller, weighing 40 to 65 pounds per foot (60 to 97 kg per meter) of width for clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot (223 to 298 kg per meter) of width for sandy or light soils.

The Contractor shall utilize the dry application method only when expressly authorized by the Engineer and only on a limited basis when authorized by the Engineer.

901-3.3 WET APPLICATION METHOD.

a. General. The Contractor may elect to apply seed and fertilizer ~~(and lime, if required)~~ by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

b. Spraying Equipment. The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (190 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 pounds per square inch (690 kPa). The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8-inch (15 mm) solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20- to 100-feet (6 to 30 m). One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50-feet (15 m) in length shall be provided to which the nozzles may be connected.

c. Mixtures. Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. Brackish water shall not be used at any time. The Contractor shall identify to the Engineer all sources of water at least 2 weeks prior to use. The Engineer may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the Engineer following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within 2 hours from the time they were mixed or they shall be wasted and disposed of at locations acceptable to the Engineer.

d. Spraying. Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3-inches (8 cm), after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds ~~on which the lime, if required, shall~~ already have been worked in. The mixtures shall be applied by means of a high-pressure spray that shall always be directed upward into the air so that the mixtures will fall to the

ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to insure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area. Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the Engineer, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

901-3.4 MAINTENANCE OF SEEDED AREAS. The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the Engineer. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work. The Contractor will be required to water seeded areas three days per week until the proper stand of grass is established and approved by the Engineer. The Contractor shall water every other day such that the grass is watered at least three times per week. If the Contractor does not water the required three days per week, the days missed shall have the payment for seeding per acre reduced at a pro-rata share based upon the number of total days calculated for watering (less any rain days) times the number of days missed. It is imperative that the Contractor water consistently to ensure proper grass growth.

When either the dry or wet application method outlined above is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the Engineer. A grass stand shall be considered adequate when bare spots are one square foot or less, randomly dispersed, and do not exceed 3% of the area seeded. If at the time when the contract has been otherwise completed it is not possible to make an adequate determination of the color, density, and uniformity of such stand of grass, payment for the unaccepted portions of the areas seeded out of season will be withheld until such time as these requirements have been met.

901-3.5 ACCEPTABLE STAND OF GRASS. At the time of final inspection, a healthy, uniform, close stand of grass shall be established, free of weeds and surface irregularities, with coverage exceeding 90% over any 10 square feet and bare spots not exceeding 5-inches x 5-inches.

METHOD OF MEASUREMENT

901-4.1 The quantity of seeding to be paid for shall be the number of units ~~[1,000 square feet (square meters)]~~ **[acres (square meters)]** measured on the ground surface, outside the limits of pavement, but within the areas disturbed by construction or as shown on the plans completed and accepted.

BASIS OF PAYMENT

901-5.1 Payment shall be made at the contract unit price per ~~[1,000 square feet (square meters)]~~ **[acre (square meters)]** or fraction thereof, which price and payment shall be full compensation for tilling the soil, for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item 901-5.1 Hydroseeding and Wood Fiber Mulch with Fertilizer -- Per **Acre**
(square meters)

MATERIAL REQUIREMENTS

ASTM C 602	Agricultural Liming Materials
ASTM D 977	Emulsified Asphalt
FED SPEC A-A-1909	Fertilizer
FED SPEC A-A-2671	Seeds, Agriculture

END OF ITEM T-901

ITEM T-905 TOPSOILING

DESCRIPTION

905-1.1 This item shall consist of preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the Engineer.

MATERIALS

905-2.1 TOPSOIL. Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches or more in diameter), and clay lumps or similar objects. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sods and herbaceous growth such as grass and weeds are not to be removed but shall be thoroughly broken up and intermixed with the soil during handling operations. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the association of official agricultural chemists in effect on the date of invitation of bids. The organic content shall be not less than 3% nor more than 20% as determined by the wet-combustion method (chromic acid reduction). There shall be not less than 20% nor more than 80% of the material passing the 200 mesh (0.075 mm) sieve as determined by the wash test in accordance with ASTM C 117.

Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.

905-2.2 INSPECTION AND TESTS. Within 10 days following acceptance of the bid, the Engineer shall be notified of the source of topsoil to be furnished by the Contractor. The topsoil shall be inspected to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the Contractor may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths, for testing purposes as specified in 905-2.1.

CONSTRUCTION METHODS

905-3.1 GENERAL. Areas to be topsoiled shall be shown on the plans. If topsoil is available on the site, the location of the stockpiles or areas to be stripped of topsoil and the stripping depths shall be shown on the plans.

Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the Engineer before the various operations are started.

905-3.2 PREPARING THE GROUND SURFACE. Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the Engineer, to a minimum depth of 2-inches (50 mm) to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2-inches (50 mm) in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

Grades on the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be smooth-graded and the surface left at the prescribed grades in an even and properly compacted condition to prevent, insofar as practical, the formation of low places or pockets where water will stand.

905-3.3 OBTAINING TOPSOIL. Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, rubbish or stones found on such areas, which may interfere with subsequent operations, shall be removed using methods approved by the Engineer. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means shall be removed.

When suitable topsoil is available on the site, the Contractor shall remove this material from the designated areas and to the depth as directed by the Engineer. The topsoil shall be spread on areas already tilled and smooth-graded, or stockpiled in areas approved by the Engineer. Any topsoil stockpiled by the Contractor shall be rehandled and placed without additional compensation. Any topsoil that has been stockpiled on the site by others, and is required for topsoiling purposes, shall be removed and placed by the Contractor. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding.

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the Engineer. The Contractor shall notify the Engineer sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

905-3.4 PLACING TOPSOIL. The topsoil shall be evenly spread on the prepared areas to a uniform depth of 2-inches (50 mm) after compaction, unless otherwise shown on the plans or stated in the special provisions. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turving operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2-inches (50 mm) or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the Contractor. After spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the Engineer. The compacted topsoil surface shall conform to the required lines, grades, and cross sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

METHOD OF MEASUREMENT

~~**905-4.1** Topsoil obtained on the site shall be measured by the number of cubic yards (cubic meters) of topsoil measured in its original position and stripped or excavated. Topsoil stockpiled by others and removed for topsoiling by the Contractor shall be measured by the number of cubic yards (cubic meters) of topsoil measured in the stockpile. Topsoil shall be measured by volume in cubic yards (cubic meters) computed by the method of end areas.~~

905-4.1 Topsoil shall be measured by the number of cubic yards of topsoil measured in its final position, complete in place.

~~905-4.2 Topsoil obtained off the site shall be measured by the number of cubic yards (cubic meters) of topsoil measured in its original position and stripped or excavated. Topsoil shall be measured by volume in cubic yards (meters) computed by the method of end areas.~~

BASIS OF PAYMENT

905-5.1 Payment will be made at the contract unit price per cubic yard (cubic meter) for topsoiling removed from stockpile and placed in its final position ~~(obtained on the site)~~. This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

~~905-5.2 Payment will be made at the contract unit price per cubic yard (cubic meter) for topsoiling (obtained off the site). This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.~~

Payment will be made under:

Item T 905-5.1	Topsoiling (Obtained on Site) -- Per Cubic Yard (cubic meter)
Item T 905-5.2	Topsoiling (Removed from Stockpile) -- Per Cubic Yard (cubic meter)
Item T-905-5.1	Topsoiling (Furnished from Off the Site) -- Per Cubic Yard (cubic meter)

TESTING MATERIALS

ASTM C 117	Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
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END OF ITEM T-905

ITEM L-110 AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS

DESCRIPTION

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete) installed in accordance with this specification at the locations and in accordance with the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; counterpoise wire, concrete encasement, mandreling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables in accordance with the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 GENERAL.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the Engineer.

b. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals. The Contractor's submittals shall be in accordance with Item L-106, Submittals, Record Documents and Maintenance Manuals.

d. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the plans and specifications. [The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section.] The Contractor's submittals shall be submitted to the Engineer within fifteen (15) days of the notice to proceed. Submittals shall comply with Item L-106. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least [twelve (12) months] from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

110-2.2 STEEL CONDUIT. Rigid galvanized steel conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standard 6, 514B, and 1242.

110-2.3 PLASTIC CONDUIT. Plastic conduit and fittings shall conform to the requirements of Fed. Spec. W-C-1094, Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

- a. Type I—Schedule 40 PVC suitable for underground use either direct-buried or encased in concrete.
- b. Type II—Schedule 40 PVC suitable for either above ground or underground use.

The type of adhesive shall be as recommended by the conduit/fitting manufacturer.

110-2.4 SPLIT CONDUIT. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

110-2.5 CONDUIT SPACERS. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 CONCRETE. Concrete shall conform to Item P-610, Structural Portland Cement Concrete, using [1] inch maximum size coarse aggregate with a minimum 28 day compressive strength of [4,000] psi. Where reinforced duct banks are specified, reinforcing steel shall conform to ASTM A 615 Grade 60. Concrete and reinforcing steel are incidental to the respective pay item of which they are a component part.

110-2.7 FLOWABLE BACKFILL. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153 "Controlled Low Strength Material".

110-2.8 DETECTABLE WARNING TAPE Plastic, detectable, color as noted magnetic tape shall be polyethylene film with a metallized foil core and shall be 4 - 6 in (75 - 150 mm) wide. Detectable tape is incidental to the respective bid item.

110-2.9 COUNTERPOISE WIRE. Counterpoise wire shall be as specified in Item L-110 Airport Underground Electrical Duct Banks and Conduits.

CONSTRUCTION METHODS

110-3.1 GENERAL. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The Engineer shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 in (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 in (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps

where moisture may accumulate shall be avoided. No duct bank or underground conduit shall be less than 18 in below finished grade. Where under pavement, the top of the duct bank shall not be less than 18 in below the subgrade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. ~~A flexible~~ ~~An iron-shod~~ mandrel, not more than ¼ in (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc. interiors IMMEDIATELY prior to pulling cable. Once cleaned and swabbed the base cans, manhole, pull boxes, etc. and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc. is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the Engineer of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200 pound test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminate from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet. Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads.

~~Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.~~

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 in below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4 in sieve. Flowable backfill may alternatively be used. The Contractor shall ascertain the type of soil or rock to be excavated before bidding. All such rock removal shall be performed and paid for under Item P-152 Excavation and Embankment.

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the Engineer. If not shown on the plans, the warning tape shall be located six in above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared in accordance with the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly.

Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet.

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the Engineer, the unsuitable material shall be removed in accordance with Item P-152 and replaced with suitable material. Alternatively, additional duct bank supports that are adequate and stable shall be installed, as approved by the Engineer.

All excavation shall be unclassified and shall be considered incidental to the respective L-110 pay item of which it is a component part. Dewatering necessary for duct installation, erosion and turbidity control, in accordance with Federal, State, and Local requirements is incidental to its respective pay item as a part of Item L-110. The cost of all excavation regardless of type of material encountered, shall be included in the unit price bid for the L-110 Item.

Unless otherwise specified, excavated materials that are deemed by the Engineer to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the Engineer and compacted in accordance with item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall insure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

(1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

(2) Trenching, etc., in cable areas shall then proceed with approval of the Engineer, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable. In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

110-3.2 DUCT BANKS. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 in (45 cm) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 in (45 cm) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (90 cm) beyond the edges of the pavement or 3 feet (90 cm) beyond any underdrains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, proper provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 in (75 mm) thick prior to its initial set. Where two or more conduits in the duct bank are intended to carry conductors of equivalent voltage insulation rating, the Contractor shall space the conduits not less than 1-1/2 in (37 mm) apart (measured from outside wall to outside wall). Where two or more conduits in the duct bank are intended to carry conductors of differing voltage insulation rating, the Contractor shall space the conduits not less than 3 in apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 in (75 mm) thick unless

otherwise shown on the plans. End bells or couplings shall be installed flush with the concrete encasement at access points.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 in to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5 ft intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the Engineer for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5 ft (150 cm) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract unit with price for the duct.

Install a plastic, detectable, color as noted, 4 - 6 in (75 – 150 mm) wide tape 8 in (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the Engineer shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the Engineer.

110-3.3 CONDUITS WITHOUT CONCRETE ENCASEMENT. Trenches for single-conduit lines shall be not less than 6 in (150 mm) nor more than 12 in (300 mm) wide, and the trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 4 in (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4 in (6 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits are at least 18 in (45 cm) below the finished grade.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 2 in (50 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 in (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall spaced not less than 3 in (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 in (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 in to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5 ft intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the Engineer for review prior to use.

110-3.4 MARKERS. The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 in (100 - 150 mm) thick extending approximately 1 in (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the Engineer. The letters shall be 4 in (100 mm) high and 3 in (75 mm) wide with width of stroke $\frac{1}{2}$ in (12 mm) and $\frac{1}{4}$ in (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

110-3.5 BACKFILLING FOR CONDUITS. For conduits, 8 in (200 cm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted in accordance with Item P-152 "Excavation and Embankment" except that material used for back fill shall be select material not larger than 4 in in diameter.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during back, filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface: except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of in accordance with instructions issued by the Engineer.

110-3.6 BACKFILLING FOR DUCT BANKS. After the concrete has cured, the remaining trench shall be backfilled and compacted in accordance with Item P-152 "Excavation and Embankment" except that the material used for backfill shall be select material not larger than 4 in in diameter. In addition to the requirements of P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet of duct bank or one work period's construction, whichever is less.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface: except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of in accordance with instructions issued by the Engineer.

110-3.7 RESTORATION. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The

restoration shall include **[sodding]**, **[topsoiling]**, **[fertilizing]**, **[liming]**, **[seeding]**, **[sprigging]** and **[mulching]** as shown on the plans. Refer to specifications T-901 Seeding, T-904 Sodding and T-908 Mulching. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item.

METHOD OF MEASUREMENT

110-4.1 Underground conduits and duct banks shall be measured by the linear feet (meter) of conduits and duct banks installed, including encasement, counterpoise wire, locator tape, trenching and backfill with designated, resolution, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

110-5.1 Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, including trench and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with the provisions and intent of the plans and specifications.

Payment will be made under:

~~Item L-110-5.1 Electrical Duct Bank, [# and Size] per linear foot (meter)~~

~~Item L-110-5.2 Electrical Conduit [# and size] per linear foot (meter)~~

Item L-110-5.1 1-Way, 2", Schedule 40 PVC, **direct buried**-- Per Linear Foot

Item L-110-5.2 1-Way, 2", Schedule 40 **PVC, in paved areas** -- Per Linear Foot

~~Item L-110-5.3 4-Way, 4" Concrete encased Ductbank, -- Per Linear Foot~~

~~Item L-110-5.4 Concrete Encase 1-Way, 2" PVC Conduit, Schedule 40, Direct Buried -- Per Linear Foot~~

MATERIAL REQUIREMENTS

Fed. Spec. W-C-1094 Conduit and Conduit Fittings; Plastic, Rigid (cancelled; replaced by UL 514 Boxes, Nonmetallic Outlet, Flush Device Boxes, & Covers, and UL 651 Standard for Conduit & Rigid PVC)

Underwriters Laboratories Standard 6 Rigid Metal Conduit

Underwriters Laboratories Standard 514B Fittings for Cable and Conduit

Underwriters Laboratories
Standard 1242

Intermediate Metal Conduit

Underwriters Laboratories
Standard 651

Schedule 40 and 80 Rigid PVC Conduit (for Direct Burial)

Underwriters Laboratories
Standard 651A

Type EB and A Rigid PVC Conduit and HDPE Conduit (for
concrete encasement)

END OF ITEM L-110

ITEM L-125 INSTALLATION OF AIRPORT LIGHTING SYSTEMS

DESCRIPTION

125-1.1 GENERAL. This item shall consist of airport lighting systems furnished and installed in accordance with this specification, any referenced specifications, and the applicable Federal Aviation Administration Advisory Circulars. The systems shall be installed at the location and in accordance with the dimensions, layout, design, and details shown in the plans. This item shall include furnishing and installing all lights, signs, transformers, base cans, mounting assemblies, base plates, adapter rings, concrete work, taxiway ending markers, cable connections, all lamps, testing of the installation and all incidentals and appurtenances necessary to place the systems in operation as completed units to the satisfaction of the Engineer.

125-1.2 REFERENCED MATERIALS. Additional details pertaining to specific systems covered in this section are contained in the Federal Aviation Administration (FAA) Advisory Circulars (AC's), latest edition, listed below:

150/5340-1	Standards for Airport Markings
150/5340-18	Standards for Airport Sign Systems
150/5340-26	Maintenance of Airport Visual Aid Facilities
150/5340-30	Design And Installation Details For Airport Visual Aids
150/5345-1	Approved Airport Equipment
150/5345-3	Specification for L-821 Panels for Control of Airport Lighting
150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
150/5345-26	FAA Specification for L-823 Plug and Receptacle, Cable Connectors
150/5345-39	FAA Specification L-853, Runway and Taxiway Centerline Retroreflective Markers
150/5345-42	Specification for Airport Light Bases, Transformer Houses, Junction Boxes and Accessories
150/5345-44	Specification for Runway and Taxiway Signs
150/5345-46	Specification for Runway and Taxiway Light Fixtures
150/5345-47	Isolation Transformers for Airport Lighting Systems
150/5345-49	Specification L-854, Radio Control Equipment
150/5345-53	Airport Lighting Equipment Certification Program
150/5370-2	Operational Safety on Airports During Construction
150/5370-10	Standards for Specifying Construction of Airports

150/5345-28D	Precision Approach Path Indicator (PAPI) Systems
150/5345-51	Specification for Discharge-Type Flashing Light Equipment
FAA Order 6850.2A Chg 4	Visual Guidance Lighting Systems (Installed under the Facilities and Equipment (F & E) Program – VASI & PAPI)

The Contractor is responsible for obtaining and using the latest edition of the referenced FAA Advisory Circulars. This is not all inclusive but is offered as a convenience to the Contractor.

125-1.3 SUBMITTALS. Shop drawings of each airfield lighting component, indicating FAA approval, shall be submitted to the Engineer for review and approval and be approved prior to ordering any materials for this item. This submittal shall include the proposed method of installation for all airfield lighting components. The submittal shall include data on all component parts of the item or system, and shall include the manufacturers list of recommended spare parts for one years use. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the contract documents. The Contractor's submittals shall be in accordance with Item L-106, Submittals, Record Documents and Maintenance Manuals.

125-1.4 QUALIFICATIONS. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.

125-1.5 SPARE PARTS. The Manufacturer/Contractor by submitting a bid assures the Owner that it will sell to the Owner or any of the Owner's designated representatives any and all parts for materials furnished under this contract at the lowest price the Contractor or its subcontractors, or suppliers furnish them to any second party. This pricing requirement shall apply for five (5) years from the date of final acceptance of the contract. In furnishing parts at this price, the Contractor shall provide the parts within one week of an approved purchase agreement. The Owner shall have the right to verify that the prices the Owner pays for the parts are the lowest and if they are determined not to be, then the Owner shall receive a payment from the Manufacturer/Contractor in the amount of one and one-half (1.5) times the difference. The Contractor is responsible to coordinate and obtain this agreement, in writing, from the manufacturer.

125-1.6 SPECIAL PROVISIONS FOR PROTECTION OF CABLES, CONTROLS, NAVAIDS AND WEATHER BUREAU FACILITIES. This provision for the protection of cables, controls, NAVAIDS and weather bureau facilities has been taken from Appendix 3 of FAA Advisory Circular 150/5370-4. Although the Advisory Circular has been cancelled, the requirements of Appendix 3 are included herein and made a part of this specification.

The Contractor is hereby informed that there are installed on the Airport FAA NAVAIDS; including, without limitation, ASR, UHF and VHF Receivers and Transmitters; U.S. Weather Bureau facilities; electric cables and controls relating to such NAVAIDS and facilities, and other electric power cables serving other facilities. Such NAVAIDS, Weather Bureau and other facilities, and electric cables must be fully protected during the entire construction time. Work under this contract can be accomplished in the vicinity of these facilities and cables only at approved periods of time. Approval is subject to withdrawal at any time because of changes in the weather, emergency conditions on the existing airfield areas, anticipation of emergency conditions, and for any other reason determined by the Engineer acting under the orders and instructions of the airport management and/or the designated FAA representatives. Any instructions to the Contractor to clear any given area, at any time, by the Engineer, the Owner or the FAA control tower (by radio or other means) shall be immediately executed. Construction work will be commenced in the cleared area only when additional instructions are issued by the proper authorities.

Power and control cables leading to and from any FAA NAVAIDS, Weather Bureau and other facilities, will be marked in the field by the authority having jurisdiction or the utility locating authority for the information of the Contractor, before any work in their general vicinity is started. Thereafter, through the entire time of this construction they shall be protected from any possible damage, including crossing with unauthorized equipment, etc.

These provisions intend to make perfectly clear the need for protection of FAA NAVAIDS, Weather Bureau and other facilities, and cables by the Contractor at all times.

The Contractor shall immediately repair, with identical or higher quality material by skilled workmen, any underground cables serving FAA NAVAIDS, Weather Bureau and other airport facilities, which are damaged by the Contractor's workmen, equipment or work. Prior approval of the FAA must be obtained for the materials, workmen, time of day or night, method of repairs, and for any temporary or permanent repairs the Contractor proposes to make to any FAA NAVAIDS and facilities damaged by the Contractor. Prior approval of the Engineer or the Owner must be obtained for the materials, workmen, time of day or night, and for the method of repairs for any temporary or permanent repairs the Contractor proposes to make to any other airport facilities and cables damaged by the Contractor.

It is recognized that the Owner will incur costs for employees' salaries, engineering fees, and otherwise in connection with the damage and inspection and repair of any such damage, caused by the Contractor; and consequently that the Owner may incur loss of income by reason of the diversion of aircraft traffic from the airport resulting from interruption of the use of airport facilities; and that such expenses and loss of income are not measurable now and may not be reasonably ascertainable at the time of any incident caused by the Contractor. The Owner and the Contractor hereby agree to the assessment of liquidated damages in lieu of such expenses of other damages incurred by the Owner. In addition to the obligation of the Contractor to immediately repair any cables or facilities damaged by the Contractor, the sum of \$1,000.00 shall be deducted daily from the money due the Contractor, or if no money is due the Contractor, the Owner shall have the right to recover said sum or sums from the Contractor, from the surety, or from both. The amount of these deductions are to cover liquidated damages to the Owner incurred by additional and other expenses and damages arising from the incident or incidents caused by the Contractor, and such deductions are not considered penalties.

MATERIALS

125-2.1 GENERAL.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified and listed under Advisory Circular (AC) 150/5345-53, Airport Lighting Equipment Certification Program, latest edition.

All other equipment and materials covered by other referenced specification shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification. The Contractor shall submit the manufacturer's certificate of compliance and the applicable specification sections to the Engineer for approval before the equipment and material are ordered.

Manufacturers certifications shall not relieve the Contractor of his responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

All items required per this section are for use on a 6.6 amp primary series circuit unless specifically noted otherwise.

125-2.2 GUARANTEES.

a. Except as modified below, all equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of twelve (12) months or the manufacturer's standard guarantee period which ever is greater, from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

b. The lamp life, as rated by the manufacturer (not the supplier), shall be warranted for the specified number of hours. Should ten percent (10%) of the lamps fail prior to the rated life of the lamp, then the entire system using the failing lamp type shall be relamped, at the Contractor's expense, and the warranty time shall start over. At the Owner's option, with written permission of the Engineer, the Contractor may elect to supply 100% spare lamps at the time of Owner's acceptance of the lighting system.

c. The lamp prices shall be furnished to the Owner in the bid and the prices shall be guaranteed for a period of five (5) years.

125-2.3 BASIS OF DESIGN. The airfield lighting systems are designed using the below listed maximum fixture wattages. Approved airfield lighting fixtures with higher wattages are permissible provided the Contractor assumes all costs for the redesign of the airfield lighting and necessary power distribution systems and all costs incurred furnishing and installing any additional equipment. In no case shall the Contractor be allowed to reduce the size of the constant current regulators or the power distribution systems.

L-804	Taxi-Holding Position Light (WIG-WAG)	100 W
L-850A	Runway Centerline Light	100 W
L-850B	Touchdown Zone Light	50 W
L-850C	Runway Edge Light (Semi-flush)	230 W
L-852C	Taxiway Centerline Light (Narrow Beam)	65W
L-852D	Taxiway Centerline Light (Wide Beam)	65W
L-858B	Distance Remaining Sign	170 VA
L-858Y R, L	Location, Information, 1 Module	125 VA
	Boundary, Destination	
	Mandatory Sign	
	2 Module	225 VA
	3 Module	315 VA
	4 Module	385 VA
L-861T	Taxiway Edge Light (Elevated)	30 W
L-862	Runway Edge Light (Elevated)	120 W
L-862E	Runway Threshold Light (Elevated)	200 W

125-2.4 TAXI-HOLDING POSITION LIGHTS. The holding position edge lights shall be L-804 (Wig-Wag).

125-2.5 RUNWAY EDGE LIGHTS. The elevated runway edge lights shall be L-862 incandescent non-quartz type. The semi-flush edge lights shall be L-850C incandescent non-quartz type. Contractor shall provide to the Owner an elevated light level. Contractor may use the level to install the new fixtures. Level shall be in like new condition, as determined by the Engineer when turned over to the Owner. Cost of level is incidental to the fixture pay item.

125-2.6 TAXIWAY CENTERLINE LIGHTS. The Taxiway centerline lights shall be L-852C and L-852D as indicated in the Contract Documents.

125-2.7 RUNWAY THRESHOLD. The runway threshold lights shall be L-862E quartz type.

125-2.8 L-858 SIGNS. The signs shall be Low VA Type L-858Y, R, L and B and shall be internally lighted as indicated on the plans. The size of the units shall be size 3 for the L-858Y, L and R and size 4 for the L-858B. The signs shall be furnished with T-10 incandescent lamps installed. The L-858B, Y, R, L units shall be Style 2 or 3 or 5 as required by the circuit the respective sign is connected to. All units shall be Class 1. All signs shall be furnished with tethers on a minimum of two legs per module. The tethers shall be fabricated from 3/16-inch stainless steel aircraft cable with a formed eye on both ends and shall be of ample length to attach the sign (min. of 6-inch of slack) to the flange plate and allow the frangible coupling and disconnect plug to function properly. The bolting pattern, method of anchoring, etc., shall be per the sign manufacturer's recommendation. The sign manufacturer shall submit to the Engineer calculations showing the sign and anchoring methods will withstand a 200 MPH jet blast in accordance with Paragraph 4.1.2 of AC 150/5345-44G, latest edition. The signs shall be supplied with the messages as shown on the sign schedule.

Each sign shall be furnished with an on-off toggle switch with weatherproof cover. The switch shall be used by maintenance personnel to de-energize the sign so maintenance work can be performed. The switch shall be located immediately adjacent to the load side of the L-823 disconnect plug. The weatherproof cover shall provide protection from driving rain and shall have a spring operated closing device. The weatherproof cover shall also provide physical protection for the switch handle.

The nameplate required by 150/5345-44G shall be made of metal with the data stamped into the metal nameplate.

Provide 3-M Scotch-Lite or approved equivalent 6-inch high, die cut labels for each sign, labels shall be reflective film, with pressure-sensitive adhesive backing, suitable for exterior applications. Labels shall be UV resistant. Labels shall be yellow for installation on black surface, black for installation on other surfaces. Text shall be: number and letter style; Helvetica medium, upper case, 6-inch in height.

The quantity of sign modules is based on two (2) characters per module. Payment shall be made on the basis of a module consisting of two characters, regardless of the manufacturing methods or techniques.

Sign conversion kits and printed instructions for the conversion shall be provided by the original sign manufacturer. Sign modifications shall be completed in accordance with the manufacturer's instructions.

Each sign shall be furnished with an on-off toggle switch with weatherproof cover. The switch shall be used by maintenance personnel to de-energize the sign so maintenance work can be performed. The weatherproof cover shall provide protection from driving rain and shall have a spring operated closing device. The weatherproof cover shall also provide physical protection for the switch handle.

125-2.9 TAXIWAY EDGE LIGHTS. The taxiway edge lights shall be L-861T with T-10 incandescent non-quartz type lamps.

125-2.10 LIGHT BASES. All light bases (base cans) shall meet the requirements of FAA AC 150/5345-42C, latest edition. The light bases shall be L-867 type for the non-load bearing units and L-868 for the load bearing units. The sizes of the units shall be as shown in the Plans and in this specification. Telescoping base cans may be used for the L-867 non-load bearing base cans. Two piece base cans may be used where paving interferences require their use. All light bases, transformer houses and junction boxes shall be Class 1, galvanized steel.

125-2.11 REFLECTORS. The reflectors shall be L-853 runway and taxiway retroreflective semi-flush markers as shown in the Plans. The adhesive used shall be compatible with the pavement design.

125-2.12 CABLES. Cables shall comply with specification L-108, Installation of Underground Cable for Airports and L-111 Section 16120, Wire and Cables.

125-2.13 L-823 CONNECTORS. Connectors shall comply with specification L-108, Installation of Underground Cable for Airports.

125-2.14 ISOLATION TRANSFORMER. The isolation transformers shall be L-830, 6.6 amp primary to 6.6 amp secondary, sized per the fixture manufacturer's recommendations and conforming to AC 150/5345-47A, latest edition.

125-2.15 PLUG CUTOUTS. The S1 plug cutouts shall be a polymer based type unit. Porcelain is not acceptable.

125-2.16 FRANGIBLE COUPLINGS. All elevated items shall be installed on frangible couplings in accordance with the respective Federal Aviation Administration Advisory Circular. Frangible couplings shall be metallic and provide an electrical grounding path between the fixture/sign and the base can.

125-2.17 LAMPS. Airfield lighting fixture lamps shall be incandescent or quartz of size and type to provide distribution and minimum output requirements of isocandela curves shown for each size in AC 150/5345-46B, (latest edition). All airfield lighting fixtures shall be installed with lamps.

Airfield sign lamps and taxiway edge light lamps shall be quartz or high pressure sodium or incandescent T-10 lamps of size and type to provide distribution and minimum output requirements as detailed in FAA AC 150/5345-44G, latest edition. All airfield signs shall be installed with lamps.

Lamps shall be a generic, standard design manufactured by at least two of the following manufacturers:

- a. G.E. Lighting.
- b. Sylvania.
- c. Phillips.

Proprietary lamps, that is lamps intended to be used only for one manufacturer's product(s) and that are manufactured for this sole purpose, are not acceptable.

Lamps shall be readily available from local commercial electrical supply dealers for assured availability and supply to the airport.

125-2.18 COLORED FILTERS. Colored filters, or colored lenses, to be used for Airfield Lighting Fixtures

shall conform to the requirements of Military Specification SAE-AS25050 type I and FAA Advisory Circulars.

125-2.19 TAPE. Plastic electrical tapes shall be Scotch Electrical Tape number 88 as manufactured by the Minnesota Mining and Manufacturing Company, or an approved equivalent. Electrical coating shall be Scotchkote as manufactured by the Minnesota Mining and Manufacturing Company, or approved equivalent.

125-2.20 CONCRETE. Concrete for backfill shall comply with Specification P-610, Structural Portland Cement Concrete and have a maximum size coarse aggregate of 1-inch and shall have a 28-day comprehensive strength of not less than 4,000 psi and increasing with age.

125-2.21 CONDUIT. Conduit shall comply with specification L-110, Installation of Airport Underground Electrical Duct and L-111-Section 16111, Conduit Systems.

125-2.22 HEAT SHRINK KIT. Heat shrinkable tubing with integral sealant for waterproofing L-823 connectors shall be Sigmaform Corporation Type APL, or Raychem Corporation Type ADL, or Crouse Hinds Type HSK or approved equivalent.

125-2.23 IDENTIFICATION/NUMBER PLATES. The identification/number plates shall be 2-inch diameter brass tags/monuments as shown in the plans and details. The identification shall be permanently stamped. Text height shall be 3/8-inch.

125-2.24 REINFORCING STEEL. All reinforcing steel shall be ASTM A 615, Grade 60.

125-2.25 BOLTING HARDWARE. All airfield bolting hardware shall be stainless steel and shall meet FAA requirements. All bolts 1/4-inch and larger shall be hex head type. All bolts smaller than 1/4-inch trade size shall be recessed allen type. All bolted connections shall utilize an anti-rotational locking type device. The base can cover and fixture mounting bolts shall extend through the base can mounting flange into the base can a minimum of 0.5-inches. The bolts shall have enough thread length so they do not shoulder out before the fixture is securely tightened.

125-2.26 ANTI-SEIZE COMPOUND. The anti-seize compound shall be Ideal "Noalox" or approved equivalent. Use GE-RTV-118 non-curing sealant to seal between sections of base cans, spacer rings, adaptor rings or fixtures.

125-2.27 FILLERS AND ADHESIVES. Joint sealing filler shall comply with Specification P-605, Joint Sealing Filler and adhesive compounds shall comply with Specification P-606, Adhesive Compounds, Two-Component, For Sealing Wire and Lights and Pavement. The P-605 and P-606 compounds shall be formulated so they are compatible with the pavement type with which they are to be used.

125-2.28 STRAIN RELIEF CONNECTORS. Strain relief connectors shall be Liquid Tight Thomas & Betts 2500 series with WMG-PG wire mesh cable grip or approved equivalent.

125-2.29 IDENTIFICATION MARKERS. Fixture, manhole and sign identification markers shall be brass bench markers by Surv-Kap of Tucson, Arizona model number M/M-B2 with flat top or approved equivalent.

125-2.30 L-854 RADIO CONTROLLER. The L-854 radio controller shall comply with AC 150/5340-27A, "Air to Ground Radio Control of Airport Lighting Systems" and AC 150/5345-49A, "Specification L-854, Radio Control Equipment".

The pay item shall include all materials, labor, supervision transportation and services required to furnish

and install a new L-854 Radio Control System in the existing airfield lighting vault. This item includes all incidentals required to provide a complete and operational system to the satisfaction of the Engineer.

The Radio controls will be integrated into the existing ADB Airfield Lighting Control System (ALCS). The system shall operate as follows: 3-clicks will turn on all runways and taxiways to step1; 5-clicks will turn on all runways to step 3 and all taxiways to step 2; 7-clicks will turn on all runways to step 5 and all taxiways to step 3. The system will turn off 15 minutes after the last on command. The radio control will be "locked-out" during tower control periods. The radio control shall be provided with a photocell to lockout nuisance activation during daylight hours. The frequency will be the UNICOM frequency, 119.9 CTAF or other FAA approved frequency as designated prior to construction. This pay item shall include the deactivation and removal of the existing ADB control system in the flight service station only (the balance of the ALCS shall remain operational as currently configured), installation/rework of the existing fiber optic loop to "dead-end" the unused fibers and "blanking off" of the console/equipment where the flight service station equipment is removed. The "blanking off" shall aesthetically match the console/equipment in finish and appearance as determined by the FAA and Engineer. The Contractor shall schedule at least one site visit by the equipment manufacturer(s) to deactivate the flight service station ALCS and for the L-854 Radio Controller commissioning. Also included in this pay item is all raceway, conductors, overcurrent protection, cable terminations, interface devices, antenna, antenna mast/tower, grounding and all appurtenances required. The Contractor shall provide all coordination, support materials, labor, etc required to place the L-854 at the optimal location in accordance with the manufacturer's instructions, including any towers, masts, etc. The entire antenna assembly shall be rated for 120 mph wind with a 30% gust factor.

The Contractor shall provide all necessary forms and data for the Owner to comply with the requirements of Paragraph 8 of AC 150/5340-27A.

125-2.31 FAA OWNED REIL. The existing FAA owned Runway 35 End Runway End Identifier Light (REIL) system must be removed due to the Runway 17-35 being completely reconstructed. The removed REIL units will be reinstalled at the appropriate time after completion of the Runway 17-35 reconstruction. The contractor shall coordinate all work with the Airport Owner and FAA. All work shall be performed in strict accordance with FAA F&E requirements and all associated REIL work is subject to FAA inspection and acceptance. The work includes reinstallation of the REIL units, furnishing and installing new concrete bases, and new power and control circuits. The Contractor shall verify proper operation of the existing REILs on Runway 35 prior to starting construction. The FAA shall be responsible for removing and storing the existing REIL units during construction. The FAA will turn over the existing REIL units to the Contractor just prior to reinstallation. The Contractor shall reinstall the FAA REIL units and shall protect the Runway 35 REILs after installation until such time as the runway reconstruction project is accepted by the Owner and the FAA accepts the REIL installation. The Contractor shall furnish and install all materials, labor, transportation and supervision required to complete any necessary rework and reinstallation to the Runway 35 REILs as a result of this project. The Contractor shall demonstrate proper operation of the Runway 35 REILs to the Owner, Engineer and FAA at the end of the project. **Remote Maintenance Monitoring for the REILs system is expressly deleted from this project.**

The Contractor shall inspect the existing REIL equipment, note any deficiencies or obvious damage to the equipment prior to FAA removal and prior to accepting the equipment for reinstallation. Once the Contractor has accepted the FAA furnished materials, the Contractor shall be solely responsible for their protection from damage.

125-2.32 FAA OWNED VASI. The Federal Aviation Administration owns the existing Visual Approach Slope Indicator (VASI) systems located at the Runway [] and [] ends. The FAA will be responsible for removal of the existing VASI units and disconnecting the power to the units. The new Precision Approach Path Indicator (PAPI) contractor shall be responsible for removal of the old abandoned VASI foundations and miscellaneous electrical items associated with the old VASI systems. The FAA shall remove the

VASI units and the demolition of all other existing VASI components will be a part of the L-105-7.2 demolition pay item.

125-2.33 FAA OWNED PAPI. The existing VASI system on the Runway [] end is being removed and replaced with new PAPI systems meeting the requirements of the FAA Facilities and Equipment (F & E) Program, Southern Region, Atlanta, Georgia. All aspects of the PAPI equipment and installation are required to conform strictly to the requirements established by the FAA F&E Program whether defined herein or not. All work shall be performed in strict accordance with FAA F&E requirements and all associated PAPI work is subject to FAA inspection and acceptance. Once all the construction is complete and the final inspection has occurred and the FAA approves the system, the new PAPI systems will be turned over to the FAA for maintenance and operation. The FAA will furnish the one set of PAPI equipment scheduled for Runway []. The equipment furnished will consist of the following for PAPI Installation:

- a. 4 Each Lamp Housing Assemblies
- b. 1 Each RMS Cabinet
- c. 1 Each Power and Control Unit
- d. 1 Each Aiming Device
- e. 1 Each RMS Antenna
- f. Ground-Ground Receiver
- g. Ground-Ground Decoder
- h. Receiver Antenna

Only the items shown above shall be FAA furnished. The Contractor shall furnish all other items. The above items of FAA furnished material will be provided to the Contractor from storage at the Airport. Transportation of the materials from the storage area to the project site will be at the Contractor's expense. The Contractor shall thoroughly inspect all materials supplied by the FAA and officially accept all materials. Once the Contractor has accepted the FAA furnished materials, the Contractor shall be solely responsible for their protection from damage.

All reference to Remote Maintenance Monitoring of the PAPI system is expressly deleted from this contract.

The following are the general requirements to be adhered to during the purchase and installation of the new PAPI facilities.

a. PAPI Lamp Housing Assemblies

(1) General. Each lamp housing assembly is mounted on three legs in a triangular configuration. A fourth leg is provided to accommodate the power and control wiring (two conductors for power and six pair shielded cable for control and monitoring with a #12 green insulated ground).

(2) Wiring to Lamp Housing Assembly (LHA). Underground wiring from the power and control assembly is routed through a 2-inch rigid galvanized steel conduit and frangible coupling followed by a rigid steel elbow conduit fitting a rigid steel coupling. From the coupling 2-inch rigid galvanized steel conduit is used to feed wiring into a 2-inch rigid galvanized steel conduit elbow, which feeds into a 2-inch LB conduit

and then through flexible-liquid-tight conduit to the LHA through appropriate fittings. Allow at least 18 inches of wire to protrude into the LHA.

(3) LHA Installation. Install the LHA on its three legs in accordance with procedures described in the manufacturer's instruction book.

(4) LHA Elevation Angle Adjustment. The elevation angle of each LHA in the PAPI is inclined at a different angle as follows for a 3 degree glide path for height group 3 aircraft:

LHA-1 (closest to runway)	3°30' or 3.50°
LHA-2	3°10' or 3.17°
LHA-3	2°50' or 2.83°
LHA-4	2°30' or 2.50°

(5) LHA Tilt Switch Adjustment. Each LHA is provided with a tilt switch, which requires precise adjustment for proper system operation. The Contractor shall provide these adjustments as prescribed in the manufacturer's instruction book.

(6) LHA Installation Dimensions and Tolerances. Lamp housing assemblies are intended to be set to the runway centerline elevation, not to the tolerance value, thus, leaving the tolerance to overcome possible minor construction errors.

b. PAPI Power and Control Assembly

(1) General. The power and control assembly (PCA) shall be mounted as specified on the construction drawings. Insert each rigid galvanized steel conduit into the bottom of the PCA cabinets and fasten with threaded lock nuts.

(2) Power and Control Assembly Input Power. The 120/240 volt, 3 wire, single phase, 60 hertz power input is supplied through the disconnect switch mounted beside the PCA cabinet. The wire size shall be specified on the installation drawings.

(3) Power and Control Assembly Output. Install the output cables to the lamp housing assembly as described in Section 1.2. The output cables from the power and control assembly are installed in the power and control wiring leg as detailed on construction drawings.

c. Remote Radio Control Installation

(1) General. The ground-to-ground radio control equipment shall be mounted as shown on the construction drawings. All conduit openings shall be secured with threaded locknuts and shall be made watertight by applying silicone sealant.

(2) Ground-to-Ground Receiver and Decoder. The ground-to-ground receiver and decoder shall be mounted beside the PCA as shown on the construction drawings.

(3) ATCT Radio Control Equipment. The transmitter and encoder interface is existing in the rack in the Electronic Equipment Room. The visual NAVAID switch assembly cabinet is existing in the console in the ATCT cab. The transmitter antenna is existing on the roof of the ATCT cab.

d. PAPI Operational Test

(1) General. The Contractor shall provide the necessary labor, materials, and equipment to perform an operational test of the complete PAPI installation.

(2) Requirements. Test results of all cable tests performed under Section 15-3.2 shall be approved by the Resident Engineer prior to proceeding with the operational test of the system. The Contractor shall read and thoroughly familiarize himself with the PAPI instruction book before proceeding.

(3) Energizing the System. - The Contractor, in the presence of the Resident Engineer, shall perform basic general steps outlined in the equipment instruction book to energize the system. The Contractor shall take and record voltage measurements to verify that the system is properly energized. If the system malfunctions, deactivate it until the problem is corrected.

(4) Operational Test. An operational test shall be performed in the presence of the Resident Engineer to demonstrate operation in accordance with the PAPI instruction book. During the test, low brightness/high brightness and proper on/off cycling shall be demonstrated a minimum of 16 times. The PAPI systems shall be operated each for four continuous hours at high brightness and four continuous hours at low brightness.

(5) Test Results. The Contractor shall submit to the Resident Engineer an original and two copies of all test results and voltage measurements obtained in Sections 4.3 and 4.4.

e. Grounding

(1) General. The grounding system for the facility shall be as indicated on the contract drawings and as specified herein. The National Electrical Code, except where otherwise indicated hereinafter, shall govern, but in no case shall the Code be violated.

(2) Grounding Electrode Conductor. The grounding electrode conductor shall be bare copper unless otherwise indicated and shall be sized as shown on the contract drawings, or where not shown, shall be sized in accordance with the applicable part of the National Electrical Code (NFPA 70) except that it shall not be sized smaller than No 6 AWG. This conductor shall be connected to the grounding terminal in the service disconnecting means and shall extend to the grounding electrode directly, in one continuous run. Where installed in metal conduit that is not electrically continuous to the grounding electrode, the grounding electrode conductor shall be bonded to the open ends of the conduit by using a grounding bushing.

(3) Grounding Electrodes. Grounding electrodes shall be installed as shown on the contract drawings. The rods shall be 3/4-inch by 10-foot copper-clad steel and shall be the sectional type. The top of the ground rod shall be a minimum of 12-inches below grade. Grounding electrodes shall be placed at 300-foot intervals in the cable duct trench.

(4) Grounding Systems. All underground conductor to connections and conductor to ground rod connections shall be made by the exothermic weld process.

f. Equipment Grounding Conductor

(1) All metallic non-current carrying parts of electrical equipment shall be grounded with an equipment-grounding conductor whether or not shown on the drawings. The equipment-grounding conductor shall be a green insulated copper conductor unless otherwise indicated. When this conductor is not sized, or shown on the drawings, it shall be sized in accordance with the applicable sections of the National Electrical Code and in no case shall it be smaller than #10 AWG.

(2) The equipment grounding conductor shall be connected to the grounded conductor (neutral) only at the main service disconnect means. The equipment-grounding conductor shall be installed in the same conduit as its related branch and feeder conductors and shall be connected to the ground bus in

the branch or distribution panelboard.

(3) Where there are parallel feeders installed in more than one raceway, a full sized equipment-grounding conductor shall be installed in each raceway. The metallic conduit housing the equipment-grounding conductor shall also be electrically continuous forming a parallel path to the equipment-grounding conductor. Under no circumstances shall this conductor be omitted from the electrical system, nor shall any separate grounding system such as the signal ground, be used for an alternate grounding system or an alternate path to the grounding electrode. All connections to the equipment to be grounded shall be made with a ground connector specifically intended for that purpose. Connecting screws or mounting bolts and screws are not suitable for use as grounding connections. All ground lugs shall be of a non-corrosive material suitable for use as a grounding connection, and must be compatible with the type of metal being grounded.

(4) A minimum size #12 AWG equipment-grounding conductor shall be run in raceways enclosing control wiring.

g. Grounding Bushings. Terminate each end of all exterior steel conduits and ducts containing a #6 BSDC grounding conductor and/or entering electrical panels, boxes, etc., with grounding bushings and #6 BSDC wire. Connections shall be made to the grounding conductor which, in turn, shall be connected to a ground rod and the appropriate electrical panel box, etc.

h. Other Grounding System. Any additional grounding system used for electronic equipment shall be connected directly to the exterior earth electrode system unless otherwise indicated on the drawings. Other grounding systems shall not be used in place of the equipment grounding conductor system. The conductors used for other grounding systems shall be color-coded green with a yellow stripe.

i. Lightning Protection

(1) General. Lightning protection system, where shown on the contract drawings, shall be in accordance with the applicable parts of NFPA No. 780, Lightning Protection Code and shall be installed in a manner so that they will be eligible for the Master Label by meeting the installation requirements of UL 96A, Master Labeled Lightning Protection Systems. Conductors used in lightning protection systems shall be copper and of a type specifically manufactured for such use.

j. Wiring Methods

(1) General. Unless otherwise indicated, wiring shall consist of insulated copper conductors installed in heavy-wall zinc coated rigid galvanized steel conduit. All neutral conductors shall extend from the neutral bus in the device where the active conductors originate. Device terminals for connection of more than one conductor shall be specifically designed for that purpose.

(2) Raceway System. Minimum conduit or size shall be 3/4-inch. Each run shall be complete, and shall be finished and swabbed before conductors are installed. Ends of conduit systems not terminated in boxes or cabinets shall be capped. Existing conduits shall be cleaned and swabbed before cables are pulled.

(a) Field Cutting. Where conduit has to be cut in the field, it shall be cut square using a hand or power hacksaw or approved pipe cutter using cutting knives. The cut ends of the field-cut conduit shall be reamed to remove burrs and sharp edges. Where threads have to be cut on conduit, the threads shall have the same effective length and shall have the same thread dimensions and taper as specified for factory cut threads on conduit. If field threaded conduits are to be installed underground, oil shall be cleaned from threads before applying a cold galvanizing compound as required in Section 5-1.5. Conduits installed with threads not complying with these requirements shall be removed and replaced with conduits

that comply.

(b) Conduit Installation. Conduit shall be installed parallel to or at right angles with the lines of the structures unless shown otherwise on the drawings. Field bends shall be avoided where possible, but, where necessary, shall be made with approved hickey or conduit-bending device. Radius of field bends shall be not less than 10 times the inside diameter of the conduit. Underground conduits, except where otherwise indicated, and shall terminate a minimum of 2-feet below finished grade with RGS sweep conduit elbows.

Conduit shall be plugged during construction to prevent entrance of foreign material. Both ends of all conduits entering a junction box from below grade shall be sealed with 3M "Ductseal" or approved equivalent. All connections of conduits to boxes shall be made with weatherproof hub fittings. When two or more conduits are installed in the same trench, they shall have a minimum separation of 2-inches.

(c) Heavywall Zinc Coated Rigid Steel Conduit. Heavy zinc coated rigid galvanized steel conduit shall be used in all locations. All fittings for use with rigid galvanized steel conduit shall be of the threaded type of the same material as the conduit. Where conduits enter boxes or cabinets without threaded hubs, double locknuts shall be used plus an insulated metallic bushing on the open end. In exterior locations, exposed threads of metal conduit shall be cleaned and then painted (see Section 5-1.4). Rigid conduit taping or coating is required for underground installations. The conduit shall be field wrapped with 0.010-inch pipe wrapping plastic tape applied with 50 percent overlap, or shall have a factory-applied coating with minimum thickness as follows:

Low-Density or Medium Density Plastic	0.020-inch
Epoxy Resin	0.008-inch
Coal-Tar Enamel	0.063-inch

(d) Flexible Steel Conduit. Flexible steel conduit may be used in short lengths for applications as permitted by the NEC. Liquid tight flexible conduit shall be used outdoors or in wet locations. A separate ground conductor shall be provided across all flexible connections in addition to the green wire ground.

(3) Preparation. Trench excavation and bedding material used in preparation for placing PVC or rigid conduit shall be in accordance with Item L-110, Installation of Airport Underground Electrical Duct. Trenches shall be free of debris and water prior to cable laying operations.

(4) Cable and Conduit Depths. Cables in conduits for underground installation shall be placed at the depths specified herein. All cable ducts on airport property shall be a minimum of 36-inches below the finished grade or as required to comply with local authority requirements.

(5) Direct Earth Burial Cable. Cables for the PAPIs shall only be installed in the cable duct system with handhole cans as specified on the drawings. The counterpoise shall be #6 AWG bare copper (solid) wire running about 12-inches above and parallel to the cable duct system with handhole cans, as applicable.

(a) Splices. Whenever possible, cable shall be continuous run between connections. Splices on multiple cables in a trench shall be staggered. Taped or cast splice kits designed for the cable are also acceptable. Connections of cable conductors shall be made using crimp connectors utilizing a crimping tool designed to make a complete crimp before the tool can be removed. Cable ends to be spliced shall be kept free from moisture by using tape or caps. All cable runs shall be given continuity and insulation resistance tests per Section 16-5 at the completion of each splice. Splices are not permitted inside of rigid or PVC conduit, but only in the handhole cans. Metallic armored or shielded cables shall be bonded across the splice by cleaning and soldering to provide a continuous electrical path. Armor and shielding shall

be completely insulated from each other except as ground connection at each end of the cable runs.

(b) Loops. A cable loop shall be made at all splices, and cable entrances into underground conduits. The cable loop shall be installed at the time of the cable run. The loop shall be approximately 3-feet with bends whose inner radius is not less than 12 times the outside diameter of the cable.

k. Conductors

(1) Uninsulated Conductors. Uninsulated conductors shall be copper.

(2) Insulated Conductors. Unless otherwise indicated, insulated conductors shall be copper with thermoplastic or thermosetting insulation, type THW, THWN, and XHHW for general use, or type THHN for use in dry locations only, all insulated for 600 V. Conductors #10 AWG and smaller shall be solid, and conductors #8 AWG and larger shall be stranded. Minimum branch circuit conductor size shall be #12 AWG.

(3) Underground Feeders. Conductors in contact with the earth shall be type UF, XHHW-USE, RHW-USE, XLP-USE, or of a multiconductor armored construction with equivalent outer insulation.

(4) Color-Coding. All branch circuit and feeder conductors shall be color coded as specified hereinafter. The color-coding shall be continuous throughout the facility on each phase conductor to its point of utilization so that the conductor phase connection is readily identifiable in any part of the installation. The equipment-grounding conductor shall be covered with green insulation or shall be bare copper as specified herein. Neutral conductors shall be continuous white unless more than one system is run in the same raceway, box, or other type enclosure. Where color-coding is not available in the larger size conductors (larger than #6 AWG), the conductors shall be color-coded by use of color-coded tape, half lapped for a minimum length of 3-inches. Where conductors are color-coded in this manner, they shall be color-coded in all junction boxes, outlets, and switches, as well as at all terminations.

Phase conductors shall be color-coded as follows:

Single Phase
120/240 Volts
Line A - Black
Line B - Red

(5) Conductor Identification. In addition to color coding, all line, phase, and neutral conductors shall be identified by plastic-coated, self-sticking printed markers, permanently attached stamped metal foil markers, or equivalent means as approved by the Resident Engineer. Panel and circuit numbers shall be identified. Conductor identification shall be provided at all terminations, and in all junction boxes through which these conductors pass. In addition to color-coding, control circuit conductor identification shall be made by plastic-coated self-sticking printed markers, permanently attached stamped metal foil markers, or equivalent means as approved by the Resident Engineer. Conductor identification shall be provided within each enclosure where a tap, splice, or termination is made. Control circuit terminals of equipment shall be properly identified. Terminal and conductor identification shall match that shown on approved shop drawings. Hand lettering or marking is not acceptable.

I. Service Equipment

(1) Power. Service entrance equipment for power shall be in accordance with the regulations of the local utility providing service and the NEC.

(a) Service Entrance Conduits. Service entrance conduits shall be installed as indicated on the drawings and shall be heavywall zinc-coated rigid steel unless otherwise indicated.

(b) Underground Service. Underground service entrance conduits shall be installed a minimum of 3 feet below finished grade.

(c) Main Service Disconnect Means. All switches and circuit breakers used for service entrance connecting means must be U.L. approved for use as service equipment, and shall meet the requirements specified hereinafter.

(d) AC Power Surge Protection. An AC power surge arrester shall be installed adjacent to and on the load side of the main service disconnect as shown on the drawings. The arrester shall be compatible with the voltage for the service, and shall be wired in such a manner that sharp bends are avoided and all bends are kept to a minimum. The arrester shall be connected in a manner recommended by the manufacturer of the arrester.

(e) Safety Switches. Safety switches shall be type "HD," heavy duty. Switches installed outdoors, or in damp or wet locations shall be mounted in NEMA 3R enclosures. Switches shall be of the quick-make, quick-break type, and all parts shall be mounted on insulating bases to permit replacement of any part from the front of the switch. All current-carrying parts shall be of high-conductivity copper, designed to carry rated load without excessive heating. Switch contacts shall be silver-tungsten type or plated to prevent corrosion, pitting, and oxidation and to assure suitable conductivity. The Contractor shall ensure the safety switch is lockable in both the "on" and "off" positions.

(f) Identification. Each switch shall be identified with a name plate, which shows the functional name of the unit, voltage utilized, one or three phase as applicable, and any other pertinent information.

Additional units of equipment shall also be identified if called for in the plans. Nameplates shall be nonferrous metal or rigid plastics, stamped, embossed or engraved with 3/8-inch minimum height lettering or numerals. The plates shall be secured to the equipment with a minimum of two screws.

(g) Fuses. A complete set of fuses shall be installed and two sets of spares shall be furnished for each fusible device. Time/current tripping characteristics of fuses shall be coordinated for the proper operation. Fuses shall have a voltage rating not less than the circuit voltage. Cartridge fuses shall have an interrupting rating as indicated, but if not indicated shall be not less than 100,000 amps when used in branch and distribution circuits, and not less than 200,000 amps when used in a service entrance switch.

(h) Repair Existing Work. Electrical work shall be carefully laid out in advance. Where cutting, channeling, chasing, or drilling of floors, wall partitions, ceilings, or other surfaces is necessary for the proper installation, support, or anchorage of the conduit, raceways, or other electrical work, it shall be carefully done. Damage to the building, piping, or equipment shall be repaired by skilled mechanics of the trades involved at no additional cost to the Government.

m. Cable Duct Markers. Locations of cable duct runs shall be indicated with a 2-foot square by 6-inch thick concrete marker at 200-foot spacing, at each change of direction of the cable, at each end of conduits under roadways and/or taxiways, and beside each cable splice at the handhole cans. Markers shall not be poured in place. The markers shall be installed flat in the ground immediately above the cable and with approximately 1-inch projecting above the surface. Existing cable markers displaced or new markers shall be placed within 24 hours of the trench backfill operation. Cable markers shall be painted "Alert Orange" with paint specifically intended for use on uncured concrete. Exterior house paint is not acceptable.

(1) Letters and Identification. All lettering on cable duct markers shall be made with

stencils approved by the Engineer. No "hand lettering" or similar shall be used. Letters identifying the cable shall be impressed or cast into the concrete. The letters shall be 4-inches high, 3-inches wide, and 1/2-inch deep. The top line shall read "PAPI" or "MALSR" to identify the facility served. The second line shall be marked with "DUCT". The next line shall be an arrow indicating the direction of the cable duct run. This line is not necessary if there will be a splice. The arrow point shall be about 3 inches on a side and the shaft about 1-1/2-inches wide by 12-inches long. The bottom line of the marker shall be marked, for example, "1 W 2" (one-way 2-inch) or "SPLICE".

n. Quality Control Provisions

(1) Cable Tests. All cable testing shall be done by the Contractor in the presence of the FAA Resident Engineer and the Airport Owner's Representative. The Contractor shall provide all test equipment and power. Equipment shall have been calibrated within 2 years. Cables shall be tested in the following order: upon delivery to the site; again prior to installation; after each splice during installation; and again upon completion of backfill operations. The Contractor shall immediately report any physical defects detected by cable testing to the FAA Resident Engineer and the Airport Owner's Representative. The control cabinet and PAPI units shall be disconnected during cable testing.

(a) 600-Volt Cable Test. Conductors, splices, and insulation shall be tested at not less than 500 volts. The minimum resistive value shall be 30 megohms between conductors and between conductors and ground.

(b) Control Cable Tests. Control cables shall be tested at not less than 500 volts. The minimum resistive value between conductors and from each conductor to grounded shield shall be 50 megohms. All conductors in cable with 11 pair or less shall meet test requirements. With the approval of the Engineer, all but two conductors are required to pass tests for cable with between 12 pair and 25 pair.

(2) Failure of Cable Under Test. Cable failing tests prior to installation shall not be installed. The Engineer will take action to replace government-furnished cable, if applicable, that failed the upon-delivery testing. GFM cables which pass the initial, upon delivery testing, but, which fail after Contractor takes possession shall be repaired or replaced by the Contractor at no additional cost to the Government.

(3) Ground Resistance Test. Ground resistance of the ground rod system shall not exceed 10 ohms. Ground resistance measurements shall be made in normally dry weather and not less than 72 hours after rainfall. If the desired resistance value is not obtained, additional rods shall be driven at least 10-feet apart until resistance values are obtained. Testing shall be by "fall of potential" method using Biddle Earth Tester, or approved equivalent.

(4) Quality Assurance. All electrical equipment and materials provided by the Contractor shall be in accordance with this specification and be approved by Underwriters' Laboratories (UL), Inc. Original and two copies of tabulated results of all cable tests and ground resistance test performed under this section shall be forwarded to the Engineer for approval.

125-2.34 DELIVERY, STORAGE AND HANDLING. Ship materials and equipment disassembled only to the extent necessary for reasons of shipping limitations, handling facilities, and to avoid damage during shipment. Maintain materials and equipment in new condition. This shall include the use of heat lamps, suitable coverings, indoor storage, etc. to properly protect the equipment and materials. Any equipment or materials, in the opinion of the Owner or Engineer, damaged during construction or storage periods shall be replaced by and at the expense of the Contractor.

125-2.35 SPARE PARTS. The following table lists the electrical spare parts required to be furnished by the Contractor. All spare parts shall be identical to the same parts approved and installed in the project. The cost of all defined spare parts to be furnished to the Owner shall be included in the various unit bid

items for which the spare parts are provided.

SPARE PARTS LIST

Category	Description	Quantity
Fixtures:	L-850A runway inset edge light clear/clear	4
	L-850A runway inset edge light clear/red	4
	L-850B runway inset edge light clear/clear	4
	L-850C runway inset edge light clear/clear	4
	L-850C runway inset edge light amber/clear	2
	L-861T taxiway edge light	4
	L-862 runway edge light clear/clear	4
	L-862 runway edge light clear/amber	4
	L-862E runway threshold light red/green	2
Miscellaneous:	Set of recommended spare parts for each size CCR	1
Lamps:	Provide 2 spare lamps for each 10 fixtures or signs or part thereof installed as a part of this contract, additionally provide:	4
	Spare lamps for L-850A runway edge lights	20
	Spare lamps for L-850B runway edge lights	20
	Spare lamps for L-850C runway edge lights	10
	Spare lamps for L-862 runway edge lights	20
	Spare lamps for L-862E runway threshold lights	4

125-2.36 SIGN LEGENDS. Furnish sign legends to be installed on existing airfield signs. Legends shall be compatible with existing sign. ~~Manufacturer model number and size of existing signs are scheduled in the Plans along with a revised legend text.~~ The new legends are scheduled in the plans. The Contractor shall be responsible to determine the manufacturer, model, size, etc. of each sign requiring a new sign panel and to order the sign panel/legend from the original sign manufacturer.

The new legends shall not affect the lumen output of the existing sign. New legends shall secure to existing signs in the same manner as the original legends. Legend text size and style shall be in accordance with FAA Advisory Circular 150/5345-44G, latest edition.

Legends provided for existing signs that are to remain shall be by original manufacturer of those signs. Provide letter of certification from the manufacturer that the legend replacement does not change any of the performance parameters under which the sign was FAA certified.

Sign legend panels shall include all incidentals required for a complete and operational unit to the satisfaction of the Engineer. Each replacement sign panel shall be one or two characters in length.

125-2.37 RUNWAY SURFACE CONDITION SENSOR SYSTEM. This item shall consist of furnishing and installing an airport pavement surface condition sensor system in accordance with these specifications and in accordance with the dimensions, design and details shown in the Plans as well as the recommendations of the equipment manufacturer. This item shall include the furnishing of all equipment, materials, services and incidentals necessary to place the system in operation as completed units to the satisfaction of the Engineer.

System supplier is responsible for coordinating installation requirements with the Contractor. Shop drawings shall show any deviation made necessary during the installation.

Submit customized wiring diagrams and installation instructions. Wiring diagrams shall show color coding of connections and mounting dimensions of equipment. A complete equipment list shall be supplied with the submittal.

The system radio license will be furnished and renewed by the Owner and applied for through the Federal Communication Commission by the system supplier and/or the Contractor on behalf of the Owner.

All new sensor equipment, sensor heads, RPU's, etc., shall be fully compatible and interchangeable with the current existing system.

The runway surface condition sensor system, as shown in the Plans, shall conform to the requirements of AC 150/5220-13B and specifically designed for monitoring and displaying pavement surface and conditions including dry, wet, frost, snow or ice and relative amount of de-icing chemical present, as well as atmospheric conditions including air temperature, relative humidity, precipitation, dew point and wind speed/direction. The system shall also include all hardware and software licenses. The surface condition sensor system shall include, but not limited to, the following components:

a. Surface Sensors: The surface sensor shall be solid state, with a temperature range of -22°F to 176°F and be constructed of materials which have thermal characteristics similar to common pavement materials. The sensor shall be supplied with 150-feet of attached cable that is waterproofed and sealed as an integral part of the assembly. The sensor shall electronically sample the following pavement surface conditions:

- (1) Pavement surface temperature at the sensor head.
- (2) Dry pavement condition.
- (3) Wet pavement condition above 32 deg F.
- (4) Wet but not frozen pavement condition at or below 32 deg F.
- (5) Snowy or icy pavement condition at or below 32 deg F.
- (6) Dew pavement condition.
- (7) Frost pavement condition.
- (8) Relative amount of de-icing chemical present on pavement.

b. Air Temperature/Relative Humidity Sensor. The air temperature sensing element shall be accurate to +3 degrees F over the temperature range of -22 degrees F to 122 degrees F. The relative humidity sensing element shall have a measuring range of 10 percent to 100 percent relative humidity with an accuracy at 70 degrees F of -5 percent relative humidity in the same range. Operating temperature range shall be -22 degrees F to 122 degrees F. The system dew point temperature is calculated from the air temperature and relative humidity. The displayed accuracy of the dew point temperature shall be +1.8 degrees F or -2.7 degrees F in the range of 50 to 100 percent relative humidity.

c. Precipitation Sensor. The precipitation sensor shall have an operating temperature range of -22 degrees F to 140 degrees F and shall sense the onset and termination of any type of precipitation by detecting interruption in its infrared optical beam.

d. Wind Speed/Direction Sensor. The wind speed/direction sensor shall have an operating

range of 0 to 100 mph and 180 mph maximum with an operating azimuth of 360 degrees mechanical and 360 degrees electrical. The temperature operating range shall be -40 degrees F to 140 degrees F with less than 1 percent error.

e. Remote Processing Unit (RPU). The RPU shall gather data from all connected sensors and transmit this data to the central processing unit at intervals not exceeding 3 minutes when requested. The RPU shall operate from a 100-130 VAC power source at 60 Hz requiring approximately 100 watts continuous power system designed for unattended operation of pavement surface monitoring systems and shall have lightning protection. The RPU shall be mounted in a NEMA 4 aluminum enclosure and be capable of operating over a temperature range of -22 degrees F to 150 degrees F and 0 to 90 percent relative humidity noncondensing.

f. Communication. Communication between the new RPU and the existing pavement sensor system shall match the existing system parameters.

Installation of the runway surface condition sensor system shall be as shown in the Plans or approved shop drawings and in accordance with the applicable FAA Advisory Circulars. Tolerances given in the FAA Advisory Circulars, these specifications, and the Plans shall not be exceeded unless authorized by the Engineer.

The Contractor shall furnish all labor and materials and shall make complete electrical connections in accordance with the information furnished with the project drawings. The Contractor shall supply lightning arrestors as required by the equipment manufacturer.

The Contractor shall furnish and install ground rods, grounding cable, and ground clamps for grounding the frame of the assembly near the base.

The Contractor shall fully test the installation by continuous operation for a period of not less than 4 hours as a completed unit prior to acceptance by the Owner.

125-2.38 RUNWAY CENTERLINE LIGHTS. The runway centerline lights shall be L-850A.

125-2.39 RUNWAY TOUCHDOWN ZONE LIGHTS. The runway touchdown zone lights shall be L-850B with center toe-in. The base cans for the fixtures shall be toed-in 4 degrees toward the runway centerline.

125-2.40 FIXTURES-GENERAL. All in pavement fixtures shall be style 3. The total height of the fixture above the finished grade (x) shall be $x \leq 0.25$ -inch. All in pavement fixtures shall be Class 2. All fixtures shall be Mode 1, 6.6A. The fixture pay items shall include, as applicable, a deep base can, top can section, base plate, properly sized spacer ring (w/concrete ring), properly sized L-830 transformer, L-823 connectors, and all incidentals and appurtenances required to provide a fully functional and operating lighting system to the satisfaction of the Engineer. All alignment, leveling, aiming, etc. is included as a component part of the fixture pay item.

125-2.41 FIELD LIGHTNING ARRESTOR ASSEMBLY. The field lightning arrestor assembly shall be installed within the L-867/L-868 base cans and shall be able to be submerged in water during normal operation. The units shall be designed to operate on a 6.6 ampere primary series circuit, rated for 25,000 ampere, 8/20 microsecond discharge. Field lightning arrestor assembly shall be grounded to an internal ground lug in the base can with a #4 AWG copper conductor. An approved lug shall be utilized for each connection. Stranded conductors shall not be wrapped under a screw head.

125-2.42 SIGN CONVERSION KIT. Contractor shall provide all supervision, materials, tools, transportation and appurtenances required to convert the designated signs styles as noted in the contract documents.

CONSTRUCTION METHODS

125-3.1 INSTALLATION

a. Fixtures, Signs, Base Cans. All fixtures, signs, base cans, etc. shall be installed as shown in the plans or approved shop drawings and in accordance with the applicable FAA Advisory Circulars and manufacturers' recommendations. Survey instruments shall be used to position all items to insure precise orientation. Tolerances given in the FAA Advisory Circulars, these specifications, and the plans shall not be exceeded. Where no tolerance is given, no deviation is permitted. Items not installed in accordance with the FAA Advisory Circulars, these specifications and plans shall be removed and replaced by and at the expense of the Contractor.

Signs shall be oriented at 90 degrees to the direction of the taxing path from which it is viewed unless noted otherwise.

For all signs, the concrete pad shall extend to not less than 18-inches out from the edge of the sign all around. The concrete pad shall be a minimum of 6-inches thick. The concrete pad shall be poured in place and rest on undisturbed soil. The pad shall be reinforced with steel bars formed and placed as indicated in the Plans. Exposed concrete surface shall be finished smooth with a steel trowel or rubbed to a smooth finish. All horizontal edges to be chamfered one 1-inch at 45 degrees.

During construction of the pad, the transformer base shall be adjusted and firmly held in place so that machined upper surface of base flange will be level within -2 degrees and not more than 1/4-inch above the surface of pad. All other bearing areas for additional flange supports shall be in the same horizontal plane as the transformer base flange.

The Contractor shall completely survey and stake out each areas lighting and signage layout prior to starting any installation. Should any irregularities occur in the layout, the Engineer shall be notified immediately. The bid item price shall include the necessary surveyed layout for each item and the cost for any additional adjustment or resurvey of the location of the items due to the existing geometric conditions. The new lighting and signage installation shall be coordinated with and blend into the existing lighting and signage installation.

All loose material shall be removed from all excavations for electrical equipment, raceways, manholes, pads, etc. The bottom of the excavation shall be compacted to 95% compaction in accordance with ASTM D 1557 prior to the installation of the electrical item and backfill.

Install new legends on existing signs at locations and with designations as indicated in the Plans. Installation of new sign legends on existing signs shall be done in accordance with construction sequencing as indicated in the Plans.

The Contractor shall be responsible for final calibration and adjustments of the signs.

In new or existing pavement all conduits, duct banks, counterpoise, base cans, etc. shall be installed prior to the placement of the final lift of pavement.

Before paving may proceed, the Contractor shall demonstrate to the Engineer that the base cans are at the correct elevation, azimuth and rotation and that the proper clearance exists between the base can and the paving train.

The finished pavement surface shall be protected from foreign substances which could cause staining, i.e., oil, P-605, Joint Sealing Filler etc. The Contractor shall immediately clean all spills and correct/clean

any stained surfaces at the Contractor's expense.

Assemble units and connect to the system in accordance with the manufacturer's recommendations and instructions. Light fixtures shall not be installed closer than or within 2-feet of a paving joint without written permission of the Engineer.

An identification tag shall be installed with each fixture, sign, etc. as shown in the plans. Brass circuit identification tags identifying each circuit shall be attached to each circuit as shown in the plans.

Provide 6-feet of slack in each end of each cable in each base can. All connections shall be able to be made above ground.

Painted and galvanized surfaces that are damaged shall be repaired according to the manufacturer's recommendations, to the satisfaction of the Owner and Engineer. Use LPS-1G cold galvanizing compound or approved equivalent to repair galvanized surfaces. Obtain paint and primer, of same batch number, from the equipment manufacturer to repair painted surfaces.

GE RTV-118 non-curing sealant or approved equivalent shall be used to seal between sections of base cans, spacer rings, adapter rings or fixtures.

Where three (3) or more conduits enter a L-867-B Base Can a L-867D Base Can shall be used. Drain connections are excluded from the conduit count. When more than three conduits enter a L-868 base can conduit entry shall be through factory provided threaded hubs.

All threaded portions of frangible couplings, etc., shall be coated with Ideal "Noalox" compound or approved equivalent before being assembled.

Changes to the concrete joint layout or the location of the light base cans shall be submitted to the Engineer for approval. Conflicts that may occur due to changes in the joint layout or the location of the lights, shall be the full responsibility of the Contractor.

If a light can is installed incorrectly or the duct/conduit is plugged/broken or the concrete joints are installed incorrectly or the light base can is sawed by the concrete saw, the concrete slabs on both sides of the light base can and the light shall be removed and replaced at the Contractor's expense.

Dewatering necessary to construct L-125 Items and related erosion and turbidity control shall be in accordance with federal, state, and local requirements and is incidental to its respective pay item as a part of L-125. The cost of all excavation regardless of type of material encountered shall be included in the unit price bid for the L-125 Item.

125-3.2 TESTING. This section describes the testing and demonstrations furnished by the Contractor. All items furnished and/or installed by the Contractor shall be tested and demonstrated in accordance with these specifications. All equipment and labor required for testing and demonstrations shall be furnished by the Contractor.

a. Fully test the installation by continuous operation for a period of not less than seventy-two (72) hours as a completed unit, prior to acceptance by the Owner.

b. Up to two (2) walk-throughs may be initiated by the Owner or the Engineer during which the airfield lighting units would be required to be in operation. Additional walk-throughs may be necessary depending upon the number of discrepancies found on the previous walk-throughs.

c. The Contractor is responsible for lamp replacements and necessary maintenance of airfield

items during the testing, construction and walk-through periods.

d. Test cabling per specification L-108, Installation of Underground Cable for Airports.

e. Demonstrate all features and functions of all systems and instruct the Owner's personnel in the proper and safe operation of the systems.

f. The Contractor shall perform the necessary inspection and tests for some items concurrently with the installation because of subsequent inaccessibility of some components. The Engineer shall be notified by the Contractor forty-eight (48) hours in advance of any testing.

There are no approved "repair" procedures for items that have failed testing other than complete replacement. Any other corrective measures shall be approved in writing by the Engineer.

125-3.3 OPERATION AND MAINTENANCE MANUALS. The Contractor shall provide data for all equipment, material and components supplied or furnished under this section in the Operation and Maintenance Manuals. This data shall include cut sheets from the manufacturer and the manufacturer's installation, operation and maintenance manuals, recommended spare parts lists, any required test results, and other data as required by Section L-106, Submittals, Record Documents and Maintenance Manuals. The manuals shall be in accordance with Section L-106. Final payment for any contract amounts shall not be processed without proper submittal of these manuals and review and approval by the Engineer.

125-3.4 CONTRACT DRAWINGS. Where the electrical drawings indicate (diagrammatically or otherwise) the work intended and the functions to be performed, even though some minor details are not shown, the Contractor shall furnish all equipment, material, and labor to complete the installation work, and accomplish all the indicated functions of the electrical installation. Further, the Contractor shall be responsible for taking the necessary actions to ensure that all electrical work is coordinated and compatible with the civil plans.

125-3.5 MINOR DEPARTURES. Minor departures from exact dimensions shown in the electrical plans may be permitted where required to avoid conflict or unnecessary difficulty in placement of a dimensional item, provided contract requirements are met. The Contractor shall promptly obtain approval from the Owner and/or the FAA Resident Engineer prior to undertaking any such proposed departure.

125-3.6 SIGN NUMBERS. The runway and taxiway signage requires re-numbering and identification of electrical circuits installed on all signs throughout the airfield. The Contractor shall be required to provide to the Owner sign numbers 1 – 300 and the associated circuit number label materials for each existing sign of the size, style, material, etc. as specified in the plans. The Contractor shall provide the Owner all new number and circuit number materials per the contract documents so that the Owner can, at the Owner's convenience, install said numbers and circuit number signs. The Contractor shall not be required to install any of the number or circuit number label materials on signs not listed in the sign schedules. New number and circuit number materials, per the contract documents, shall be installed by the Contractor on all signs listed in the sign schedules. The cost for all number and circuit number signs shall be subsidiary to other items of work.

METHOD OF MEASUREMENT

125-4.1 GENERAL. The quantity of airfield lighting units to be paid for under this item shall be the number of each type installed, complete and in place, ready for operation, and accepted by the Engineer. Each airfield lighting unit shall include the installation of an identification plate or tag as detailed in the plans.

BASIS OF PAYMENT

125-5.1 GENERAL. Payment will be made at the contract unit price for each item completed in accordance with the plans and specifications that is installed by the Contractor and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation, assembly and installation of these materials, and for all labor, equipment, tools, incidentals, and appurtenances necessary to complete these items.

Payment will be made under:

If any of the following bid items are not included in the bid, the quantity is hereby specified as zero.

NOTE: THE QUANTITY OF SIGN MODULES IS BASED ON TWO (2) CHARACTERS PER MODULE. PAYMENT SHALL BE MADE ON THE BASIS OF A MODULE CONSISTING OF TWO CHARACTERS, REGARDLESS OF THE MANUFACTURING METHODS OR TECHNIQUES.

Item L-125-5.1 L-858 Guidance Sign, Size 1, Style 2, Mode 2, 2 Module

L-858, Y,R,L sign, size 1, style 3, mode 2 with T-10 Incandescent lamps installed on a concrete base with a L-867B 24" deep base can, with 1/2" thick galvanized steel cover plate and gasket, properly sized L-830 transformer(s), L-823 connectors, and all incidentals. Align and level as required -- per Each.

Item L-125-5.2 Medium Intensity Taxiway Edge Light, L861, 30" HEIGHT, 6.6A, Base Mount, 360 Blue Lens, LED Lamp

L-861T LED, Omni-directional, blue, LED lamp, MITL T/W edge light, column mounted on a L-867B/D deep base can with a "corten" or approved equivalent base plate with gasket and properly sized L-830 transformer, L-823 connectors, and all incidentals. Align and level as required. The overall height shall be 30" -- per Each.

Item L-125-5.3 Junction Box, L-867, Class 1, Size B, 24" Deep, 12" Wide

L-867B 12" diameter 24" deep base can with 1/2" galvanized steel blank cover with recessed bolts and gasket secured with stainless steel bolts installed in turf or pavement, with concrete encasement and all incidentals. Align and level as required -- per Each.

Item L-125-5.4 Temporary Taxiway Edge Lighting

This item includes all materials, labor, transportation and services required to perform the tasks required to provide temporary taxiway edge lighting during construction of the new taxiway circuit as shown on the plan sheets. The contractor shall be responsible for maintaining the temporary circuit throughout the duration of the construction. The temporary lights shall be mounted to prevent damage from jet blast. The contractor shall be responsible for providing a 24 hour contact to be available for any outage. -- per Lump Sum.

END OF ITEM L-125

ITEM S-101 GEOSYNTHETIC CLAY LINER (GCL) AND CUSHION GEOTEXTILE

DESCRIPTION

- A. This Section specifies geosynthetic clay liners, including requirements for fabrication, installation, and quality assurance.
- B. This Section specifies geotextile cushion fabric including requirements for installation and use.
- C. Related sections include:
 - 1. Item P-154 – Subbase Course
 - 2. Item P-152 – Excavation and Embankment
 - 3. Item D-751 – Manholes, Catch Basin, Inlets and Inspection Holes

DESCRIPTION

101-1.1 DEFINITIONS

- A. Geosynthetic Clay Liner (GCL): A manufactured hydraulic barrier consisting of a granular sodium bentonite clay liner between two geotextiles, held together by needlepunching.
- B. Geotextile Component: A nonwoven or woven fabric used to contain and support the bentonite layer in a GCL.
- C. Sodium Bentonite: The high swelling clay component of a GCL consisting primarily of the mineral Montmorillonite.
- D. Needlepunching: A GCL manufacturing process whereby boards of barbed needles incorporate the staple fibers from a nonwoven geotextile, through a sodium bentonite clay layer, into the matrix of a second geotextile layer.
- E. Cushion Geotextile: A nonwoven fabric used to cushion or separate the GCL from subgrade or cover materials.
- F. Minimum Average Roll Value (MARV): The minimum average value of the material in a particular lot calculated as the mean of the tested values minus two standard deviations.

101-1.2 SUBMITTALS

- A. Product data for each manufactured product proposal for use on this Project.
- B. Shop Drawings: GCL panel and cushion geotextile layout plans.
- C. Samples for each product proposed for use on this project.
- D. Quality Assurance/Control Submittals:
 - 1. GCL and cushion geotextile Manufacturer's Quality Control Certifications.

2. Certifications of subgrade acceptance for each area covered by GCL, signed by the earthwork Contractor for approval of the Engineer.
3. Reference list supplied by GCL Manufacturer indicating the appropriate experience level as required by the specification.
4. Reference list supplied by the GCL installer indicating the appropriate experience level as required by the specification.
5. Additional requirements specified in the CQA Plan.

101-1.3 QUALITY ASSURANCE

- A. Manufacturing Quality Control: The GCL shall be tested for compliance with this specification by the test methods and frequencies indicated on the material specification in X-100-A as appropriate. GCL materials may be tested and pre-approved at the manufacturing location.
1. Manufacturer Quality Control Certification: Quality Control certificates shall be issued by the GCL manufacturer to the Engineer. The certifications shall be signed by the quality control manager of the GCL manufacturer or other responsible party and shall include the following information:
 - a. Shipment Packing List: A list indicating rolls shipped on the particular truckload.
 - b. Bill of Lading: Shipping documents for the truck used for the shipment.
 - c. Letter of Certification: The letter indicating the material is in conformance with the physical properties specified.
 - d. Physical Properties Sheet: The material specification for the GCL supplied in accordance with this specification.
 2. Manufacturer Quality Control Submittal: Quality Control submittals shall be issued by the GCL manufacturer to the Engineer for each lot of material if necessary. The submittal shall include the following information:
 - a. Bentonite Manufacturer Certification: Bentonite manufacturer quality documentation for the particular lot of clay used in the production of the rolls delivered.
 - b. Geotextile Manufacturer Certification: Geotextile manufacturer quality control documentation for the particular lots of geotextiles used in the production of the rolls delivered.
 - c. GCL Manufacturer Tracking List: Cross referencing list delineating the corresponding geotextile and bentonite lots for the materials used in the production of the rolls delivered.
 - d. Manufacturing Quality Control Data: The manufacturing quality control test data including actual test values obtained when tested at the appropriate frequencies for the properties specified in Table X-100-A.
 3. Any GCL sample that does not comply with these specifications shall result in rejection of the roll from which the sample was taken. If a GCL sample fails to meet the quality control requirements of this specification, the GCL Manufacturer shall sample and test each roll manufactured in the same lot or batch, or at the same time as the failing roll. Sampling and testing of rolls shall continue until a pattern of acceptable test results is established.
 4. Additional sample testing may be performed, at the GCL Manufacturer's discretion, to more closely identify any non-complying rolls and/or to qualify individual rolls.
 5. Uncertified material shall be removed and replaced with new material.
 6. Cushion geotextile suppliers shall furnish materials whose Minimum Average Roll Values meet or exceed the criteria specified in Table X-100-B. The manufacturer shall provide test results for these procedures, as well as a certification that the material properties

meet or exceed the specified values. Tests shall be performed at least as frequently as shown on Table X-100-C. The geotextiles provided by the supplier shall be stock products. The supplier shall not furnish products specifically manufactured to meet the specifications of this project unless authorized by the Engineer.

101-1.4 DELIVERY, STORAGE, AND HANDLING

- A. Test Pad: Please refer to the Construction Quality Assurance plan for test pad requirements.
- B. GCL Packing, Shipping, Handling, and Unloading:
 - 1. The following procedures are as specific as possible while recognizing that the specific requirements of the project may necessitate minor modifications. Significant deviations from these procedures shall be pre-approved by the Engineer.
 - a. Packaging: All GCL rolls produced shall be bagged in moisture resistant plastic sleeves. Cardboard cores used shall be sufficiently strong to resist collapse during transit, but are not required to support the weight of the entire roll.
 - b. Roll Identification and Labeling: Prior to shipment, the manufacturer shall label each roll, both on the GCL roll and on the surface of the plastic protective sleeve. Labels shall be resistant to fading and moisture degradation to ensure legibility at the time of the installation. At a minimum the roll labels shall identify the following:
 - 1) Manufacturer's name.
 - 2) Product identification.
 - 3) Lot or batch number.
 - 4) Roll number, roll dimensions, roll weight.
 - 5) Any special handling requirements (e.g., "this side up") shall be marked on the GCL itself.
 - c. The Contractor shall contact the GCL manufacturer prior to shipment to determine the correct unloading methods and equipment if different from the pre-approved and specified methods.
 - d. Geosynthetic Clay Liner (GCL) must be supported during handling to ensure worker safety and prevent damage to the liner. Under no circumstances should the rolls be dragged, lifted from one end, lifted with only the forks of a lift truck or pushed to the ground from the delivery vehicle.
 - e. The manufacturer's representative and Contractor shall verify that proper handling equipment exists which does not pose any danger to installation personnel or risk damage or deformation to the liner material itself.
 - f. Suitable handling equipment is described below:
 - g. Spreader Bar Assembly: A spreader bar assembly shall include both a core pipe or bar and a spreader bar beam.
 - 1) The core pipe shall be used to uniformly support the roll when inserted through the GCL core while the spreader bar beam will prevent chains or straps from chafing the roll edges.
 - h. Stinger: A stinger is a ridged pipe or rod with one end directly connected to a forklift or other handling equipment.
 - 1) If a stinger is used, it should be fully inserted to its full length into the roll to prevent excessive bending of the roll when lifted.
 - i. Roller Cradles: Roller cradles consist of two large diameter rollers spaced approximately three inches apart which both support the GCL roll and allow it to be freely unrolled.

- 1) The use of roller cradles shall be permitted if the rollers support the entire width of the GCL roll.
 - j. Straps: Straps may be used to support the ends of spreader bars *but shall not be used as the primary support mechanism*.
 - 1) As straps may damage the GCL where wrapped around the roll and generally do not provide sufficient uniform support in preventing roll bending or deformation, great care must be exercised when using straps for roll support.
 2. GCL Acceptance at Site:
 - a. Each roll shall be visually inspected when unloaded to determine if any packaging and/or material has been significantly damaged during transit. Repairs to damaged GCL shall be performed in accordance with Section 100-3.7.
 - b. Rolls exhibiting damage shall be marked and set aside for closer examination during deployment.
 - c. Minor rips or tears in the plastic packaging shall be repaired with moisture resistant tape prior to being placed in storage to prevent moisture damage.
 - d. GCL rolls delivered to the project site shall be only those indicated on GCL manufacturing quality control certificates.
 3. GCL Storage and Protection:
 - a. The GCL shall be protected from moisture, excessive heat or cold, puncture, or other damaging or deleterious conditions. The GCL shall be stored off the ground, out of direct sunlight, and protected from precipitation.
 - b. Storage of the GCL rolls shall be the responsibility of the Installer or other designated party. All GCL rolls shall be stockpiled and maintained dry in a flat dedicated area away from high-traffic areas but sufficiently close to the active work area to minimize handling.
 - c. GCL shall be stored no higher than three to four rolls high or as may be safely handled by installation personnel. Stacks or tiers of rolls should be situated in a manner that prevents sliding or rolling by "chocking" the bottom layer of rolls.
 - d. Rolls shall not be stacked on pallets or other non-uniform, flat surfaces as this may cause deformation of the rolls and damage to the GCL or cause difficulty inserting the core pipe.
 - e. An additional tarpaulin or plastic sheet shall be used to provide extra shelter for GCL material stored in excess of 30 days.
 - f. Bagged bentonite material shall be stored and tarped next to GCL rolls unless other more protective measures are available. Bags shall be stored on pallets or other suitably dry surface which will prevent prehydration.
 4. Waste Management and Disposal: All waste materials, packaging, roll cores, and unsalvageable GCL pieces shall be disposed of off-site by the Contractor.
- C. Cushion Geotextile Packing, Shipping, Handling, and Unloading:
1. The following procedures are as specific as possible while recognizing that the specific requirements of the project may necessitate minor modifications. Significant deviations from these procedures shall be pre-approved by the Engineer.
 - a. Geotextiles shall be supplied in rolls wrapped in relatively impermeable and opaque protective covers.
 - b. Geotextile rolls shall be marked or tagged with the following information:
 - 1) manufacturers name;
 - 2) product identification;

- 3) lot or batch number;
 - 4) roll number; and
 - 5) roll dimensions.
- c. If any special handling is required, it shall be so marked on the geotextile itself; e.g., This Side Up or This Side Against Soil to be Retained.
- d. Transportation of the geotextiles is the responsibility of the Installer. The Installer shall be liable for all damages to the materials incurred prior to and during transportation to the site.
- e. Handling, storage, and care of the geotextiles prior to and following installation at the site, is the responsibility of the Installer. The Installer shall be liable for all damages to the materials incurred prior to final acceptance of the installation by the Owner and Engineer.
- f. The Installer shall be responsible for storage of the geotextile material at the site.
 - 1) The geotextiles shall be protected from sunlight, moisture, excessive heat or cold, puncture, or other damaging or deleterious conditions. The geotextile shall not be exposed to sunlight for more than 15 days. The geotextile shall be protected from mud, dirt and dust. Any additional storage procedures required by the manufacturer shall be the Installers responsibility.
- 2. Cushion Geotextile Acceptance at Site:
 - a. Each roll shall be visually inspected when unloaded to determine if any packaging and/or material has been significantly damaged during transit. Repairs to damaged cushion geotextile shall be performed in accordance with Section 100-3.8.
 - b. Rolls exhibiting damage shall be marked and set aside for closer examination during deployment.
 - c. Minor rips or tears in the plastic packaging shall be repaired with moisture resistant tape prior to being placed in storage to prevent moisture damage.
 - d. Cushion Geotextile rolls delivered to the project site shall be only those indicated on Cushion Geotextile manufacturing quality control certificates.
- 3. Cushion Geotextile Storage and Protection:
 - a. The Cushion Geotextile shall be protected from moisture, excessive heat or cold, puncture, or other damaging or deleterious conditions. The Cushion Geotextile shall be stored off the ground, out of direct sunlight, and protected from precipitation.
 - b. Storage of the GCL rolls shall be the responsibility of the Installer or other designated party. All GCL rolls shall be stockpiled and maintained dry in a flat dedicated area away from high-traffic areas but sufficiently close to the active work area to minimize handling.
 - c. An additional tarpaulin or plastic sheet shall be used to provide extra shelter for Cushion Geotextile material stored in excess of 30 days.
- 4. Waste Management and Disposal: All waste materials, packaging, roll cores, and unsalvageable cushion geotextile pieces shall be disposed of off-site by the Contractor.

101-1.5 WARRANTY

- A. Material: A five-year pro-rated material and workmanship warranty shall be provided by the manufacturer of the GCL and Cushion Geotextile, stating that the GCL or geotextile product supplied to the project was manufactured in accordance with industry practices and meets the manufacturer's certified properties.

- B. Installation: The installer of the GCL and Cushion Geotextile material shall provide a one year installation workmanship warranty and shall repair or replace any material not installed in full compliance with the requirements of the specification.
- C. GCL and Cushion Geotextile materials as well as installation warranties provided by the manufacturer and installer shall be incorporated into the final submittal documents.

MATERIALS

101-2.1 GEOSYNTHETIC CLAY LINER (GCL)

- A. The GCL shall be manufactured from new, first quality materials.
- B. The GCL shall retain its integrity during handling, placement, and long-term service; be capable of withstanding outdoor exposure prior to deployment for a minimum of 30 days with no measurable deterioration.
- C. General: The GCL product supplied to the project shall be in full accordance with the requirements of this section.
 - 1. The GCL shall be manufactured by mechanically bonding the two geotextiles using a needlepunching process (as defined in Section 100-1.1 Definitions) to improve frictional and shear strength characteristics.
 - 2. Adhesives and/or other non-mechanical bonding processes may be used in addition to needlepunching to improve GCL strength characteristics, but not in lieu of needlepunching.
- D. Manufacturers: Acceptable GCLs for this project include Bentomat® CL, manufactured by CETCO, or other needlepunched GCLs that meet the requirements of this specification as approved by the Engineer.
- E. GCL Manufacturing: The GCL supplied in accordance with this project shall be manufactured by needlepunching as described in Section 100-1.1, Definitions.
- F. GCL Physical Properties: The GCL material shall be in accordance with the test methods, test frequencies and material physical properties listed in Table X-100-A and shall consist of a layer of natural sodium bentonite clay encapsulated between two geotextiles which are needlepunched together and laminated to a thin flexible membrane liner. Unreinforced GCLs and bentonite-adhered-to-geomembrane GCLs shall not be allowed. The laminated GCL shall have multi-axial tension testing data per ASTM D5617 and shall achieve a minimum multi-axial strain of 9.49%
- G. Overlap Markings: A six-inch guide-line shall be imprinted with non-toxic ink on both edges of the GCL panel to ensure the accuracy of the seam. These lines shall be used during CQA to ensure the minimum 6-inch overlap is achieved.

101-2.2 GCL ACCESSORIES

- A. Accessory Bentonite: Any accessory bentonite used for overlapped seams, penetrations, or repairs shall be the same granular bentonite as used in the production of the GCL.

101-2.3 GCL SOURCE QUALITY CONTROL

- A. Manufacturing Quality Assurance (MQA) Documentation:
 - 1. Third party GCL MQA sampling and testing for compliance with this specification shall be coordinated by the manufacturer's CQA inspector as necessary to support the manufacturer's quality data.
 - 2. Reinforced GCL shall be shear tested under hydrated conditions. The displacement shall be 0.07 inches or less at a constant shear load of 250 psf and a normal load of 500 psf.
 - 3. Provide test data showing that the seam flow with a grooved cut in one of the geotextiles is less than $1 \times 10^{-8} \text{ m}^3/\text{m}^2/\text{sec.}$ at a two-psi hydraulic pressure.

101-2.4 CUSHION GEOTEXTILE

- A. The cushion geotextile shall be non-woven, and be manufactured from new, first quality materials.
- B. The cushion geotextile shall retain its integrity during handling, placement, and long-term service; be capable of withstanding outdoor exposure prior to deployment for a minimum of 30 days with no measurable deterioration.
- C. General: The cushion geotextile product supplied to the project shall be in full accordance with the requirements of this section.
- D. Cushion Geotextile Physical Properties: The Cushion Geotextile material shall be in accordance with the test methods, test frequencies and material physical properties listed in Tables X-100-B and X-100-C.

101-2.5 CUSHION GEOTEXTILE SOURCE QUALITY CONTROL

- A. Manufacturing Quality Assurance (MQA) Documentation:
 - 1. Third party geotextile MQA sampling and testing for compliance with this specification shall be coordinated by the manufacturer's CQA inspector as necessary to support the manufacturer's quality data.

CONSTRUCTION

101-3.1 INSTALLERS

- A. The following installation procedures are as specific as possible while recognizing that the specific requirements of the project may necessitate minor modifications. Significant deviations from these procedures shall be pre-approved by the Engineer.
- B. GCL Installer: The GCL installer shall be employed by the Contractor and shall demonstrate a minimum of 1,000,000 square feet of GCL installation experience, or shall provide sufficient evidence of installation experience and competence with other Geosynthetic materials to the satisfaction of the Engineer.

101-3.2 EXAMINATION

- A. Subgrade Inspection: The earthen or geosynthetic subgrade shall be continuously inspected, approved and certified by the CQA inspector and the Engineer prior to GCL placement.
- B. Upon approval by the CQA inspector, it shall be the installer's responsibility to indicate to the Engineer any change in the condition of the subgrade that could cause it to be out of compliance with any of the requirements of this section or the project specific specification.

101-3.3 PREPARATION

- A. General: The surfaces upon which the GCL shall be suitable for the placement of GCL material, subject to the applicable section of this specification.
- B. Earthen Subgrade: The surface upon which the GCL material will be installed shall be inspected by the manufacturer's CQA Inspector and Engineer and certified by the Contractor and CQA Inspector to be in accordance with the requirements of the subgrade preparation specification.
 - 1. The subgrade soil shall be well graded containing less than 10% gravel 1/2 inch or larger and no sharp stones within the thickness of the subgrade/foundation layer.
 - 2. In applications where the GCL is the sole barrier and will be subjected to a hydraulic head that exceeds the confining stress, subgrade surfaces consisting of gravel or granular soils may not be appropriate due to their large void content. For these applications, the top six inches of the subgrade soil should possess a particle size distribution where at least 80 percent of the soil is finer than 0.2 mm (#60 sieve).
 - 3. Site specific compaction requirements should be followed in accordance with the project drawings and specifications. At a minimum, the level of compaction should be such that no rutting is caused by installation equipment or other construction vehicles which traffic the area of deployment (typically 90% of standard proctor or greater).
 - 4. The surfaces to be lined shall be smooth drum rolled and free of any debris, vegetation, roots, sticks, sharp rocks, or other deleterious materials larger than 3/4 inch as well as free of any voids, large cracks or standing water.
 - 5. Directly prior to deployment of the GCL, the subgrade shall be final-graded to fill remaining voids or desiccation cracks, and proof-rolled to eliminate sharp irregularities or abrupt elevation changes. The surfaces to be lined shall be maintained in this smooth condition, free of standing water. At the completion of this activity, no wheel ruts, footprints, or other irregularities shall exist in the subgrade. Furthermore, all protrusions extending more than 1/2 inch from the surface shall be removed, crushed, or pushed into the surface with a smooth-drum compactor.

101-3.4 GCL INSTALLATION

- A. General: GCL material shall be placed in general accordance with the procedures specified below, or modified to account for site specific conditions.
- B. GCL Orientation: In the absence of specific guidelines, GCL panels should be placed with the nonwoven side up on slopes to maximize the shear strength characteristics.
 - 1. In base or flat areas, the GCL does not require any particular orientation; however, in composite liner applications, intimate contact may be facilitated by placing the woven face of the GCL against the overlying flexible membrane liner (FML).

- C. GCL Panel Position: Where possible, all slope panels should be installed parallel to the maximum slope while panels installed in flat areas require no particular orientation.
- D. Panel Deployment: GCL materials shall be installed in general accordance with the procedures set forth in this section, subject to site specific conditions which would necessitate modifications.
- E. Reinforced GCL shall be used on both slopes as well as the flat areas to ensure the GCL withstands the rigors of the installation and subsequent low load hydration.
1. Deployment should proceed from the lowest elevation to the highest to minimize tensile stress on the GCL during cover installation.
 2. The GCL may be deployed on slopes by pulling the material from a suspended roll, or securing a roll end into an anchor trench and unrolling each panel as the handling equipment slowly moves backwards.
 3. Deployment on flat areas shall be conducted in the same manner as that for the slopes, however, care should be taken to minimize dragging the GCL. Slip-sheets may be used to facilitate positioning of the liner while ensuring the GCL is not damaged from underlying sources.
 4. All GCL shall be overlapped. Along the length of the mat, the overlap shall be a minimum of six inches. Along the width of the mat, the overlap shall be a minimum of 24 inches. The edges of GCL panels should be adjusted to smooth out any wrinkles, creases, or "fishmouths" in order to maximize contact with the under-lying panel. The overlaps shall not be nailed or stapled to the underlying mat.
 5. The Contractor shall only install as much GCL as can be covered at the end of the day. No GCL shall be left exposed overnight. The exposed edge of the GCL shall be covered by a temporary tarpaulin or other such water resistant sheeting until the next working day. If the GCL is hydrated when no confining stress is present, it may be necessary to remove or replace the hydrated material. The CQA Inspector or Engineer shall determine areas that will need replacement.
 6. GCL shall be cut using only a GCL cutter approved by the GCL Manufacturer and the CQA Inspector. Special care shall be taken to protect other geosynthetic materials (if any) from damage.
 7. During placement, care shall be taken not to entrap in the GCL, stones, excessive dust, or moisture that could damage the GCL, geomembrane, generate clogging of the drains or filters, or hamper subsequent seaming. Care shall be taken not to walk on or drag equipment across the exposed GCL. Equipment which could damage the GCL shall not be allowed to travel directly on it. If the installation equipment causes rutting of the subgrade, the subgrade must be restored to its originally accepted condition before placement continues.
 8. The GCL shall not be installed on a saturated subgrade or on standing water. The GCL shall be installed in a way to prevent hydration of the mat prior to completion of construction of the liner system.
 9. The GCL shall not be installed during precipitation, high winds, or other conditions that may cause hydration of or damage to the GCL.
 10. Immediately after installation of a GCL panel, an examination of the GCL over the entire surface shall be conducted to ensure that no potentially harmful foreign objects, such as needles, are present. Any foreign objects encountered shall be removed or the GCL shall be replaced.

- F. Anchoring: All GCL material installed on slopes greater than 7:1 shall be anchored to prevent potential GCL panel movement.
1. Anchor Trench: Where called for on the Plans, an anchor trench shall be excavated by the Contractor or liner installer to the lines and grades and in accordance with the details shown on the project drawings at the top of slopes.
 - a. The anchor trench shall be constructed free of sharp edges or corners and maintained in a dry condition. No loose soil shall be permitted beneath the GCL within the trench.
 - b. The anchor trench shall be inspected as well as approved by the CQA Inspector and the Engineer prior to GCL placement, back-filling and compaction of the anchor key material.
 - c. The GCL shall be placed into, across, but not up the back wall of the anchor trench.
 2. Run-Out Anchor: Unless otherwise shown on the Plans, the GCL shall be anchored by a material run-out past the crest of the slope. The minimum length of the run-out shall be as shown on the Plans or as directed by the Engineer.
- G. Seaming: A six-inch lap line shall be imprinted on both edges of the upper geotextile component of the GCL to assist in installation overlap quality control. Lines shall be printed as continuous dashes in easily observable non-toxic ink.
1. Overlap seams shall be a minimum of six inches on panel edges and 24 inches on panel ends.
 2. Loose granular bentonite should be placed between panels at a rate of 1/4 pound per lineal foot of seam if the GCL is the primary hydraulic seal.
- H. Detailing: Detail work, defined as the sealing of the liner to pipe penetrations, foundation walls, drainage structures, spillways, and other appurtenances, shall be performed as detailed in the Project Drawings or in the absence of details within the Project Drawings, as recommended by the GCL manufacturer.

101-3.5 CUSHION GEOTEXTILE INSTALLATION

- A. General: Geotextile material shall be placed in general accordance with the procedures specified below, or modified to account for site specific conditions.
- B. Geotextile Orientation: In the absence of specific guidelines, geotextile panels should be placed with any marked side up to maximize the shear strength characteristics and soil filtering properties.
- C. The Installer shall take any necessary precautions to prevent damage to underlying layers during placement of the geotextile.
- D. After unwrapping the geotextile from its opaque cover, the geotextile shall not be left exposed for a period in excess of 15 days unless a longer exposure period is approved by the CQA Inspector, based on a formal demonstration from the Contractor that the geotextile is stabilized against U.V. degradation for the proposed period of exposure.
- E. The Installer shall weight all geotextiles with sandbags, or the equivalent, in the presence of wind. Such sandbags shall be installed during placement and shall remain until replaced with protective soil cover or other components of the liner system.

- F. The install shall examine the entire geotextile surface after installation to ensure that no potentially harmful foreign objects are present. The Installer shall remove any such foreign objects and shall replace any damaged geotextile.
- G. All geotextiles shall be continuously sewn (i.e., spot sewing is not allowed) as directed by the CQA Inspector or the Engineer. Geotextiles shall be overlapped a minimum of 6 inches prior to seaming. No horizontal seams shall be allowed on slopes steeper than 5 horizontal to 1 vertical (i.e., seams shall be along, not across, the slopes). Other seaming techniques may be approved by the Engineer.
- H. Polymeric thread, with chemical resistance properties equal to or exceeding those of the nonwoven geotextile, shall be used for all sewing. The seams shall be sewn to provide a flat (prayer) seam, J seam, or butterfly-folded seam and shall be a two-thread, double-lock stitch or a double row of single-thread, chain stitch.
- I. When sewing a flat seam, the stitching shall be approximately 1-1/2 inches from the outside edge of the fabric (not in the selvage or at the selvage edge). The J fold and Butterfly fold seams require a fold 1-1/4 inches to 2 inches from the fabric edge with the stitching approximately 1 inch from the folded edge.
- J. During placement of geotextile in contact with a geomembrane surface, care will be taken not to entrap stones, sharp objects, or broken needles that could damage the geomembrane.

101-3.6 COVER MATERIAL

- A. Cover Material:
 - 1. The cover materials shall be compatible as well as appropriate for use over the GCL and Cushion Geotextile, and placed in a manner appropriate to the particular subgrade.
 - 2. Regardless of the cover material, the uncovered edge of GCL panels shall be protected at the end of the working day with a waterproof sheet which is adequately secured with sandbags or other ballast.
 - 3. Earthen Cover Soil: A minimum thickness of 12 inches of soil cover shall be placed over the GCL and cushion geotextile. The soil cover shall be free of sharp-edged stones greater than 3/4 inch in size.
 - a. Equipment: Soil cover shall be placed with low ground pressure equipment. Care should be taken to avoid damaging the GCL or geotextile by prohibiting sharp turns or pivots with equipment as well as sudden starts or stops.
 - b. Placement: Soils may be deposited on the GCL and cushion geotextile by pushing soils with a track dozer, dumping with a loader or by carefully placing it with a backhoe. The use of scrapers or pans over the GCL, without any soil buffer thickness, is strictly prohibited.
 - c. Thickness: A minimum soil cover thickness of 12 inches shall be provided between heavy equipment and the GCL and cushion geotextile at all times. No heavy vehicles may be driven directly on the GCL or cushion geotextile until the proper thickness of cover or temporary access material has been placed.
 - d. Compaction: To prevent damage to the GCL, the initial lift of soil cover shall not be compacted in excess of 95 percent Standard Proctor density or as specified by the Engineer.
 - e. Slope Placement: When covering GCL installed on sloped areas steeper than 7H:1V, the cover should be pushed up-slope to minimize tension on the GCL.

4. Aggregate Cover: A minimum thickness of 8 inches of P-154 Subbase course material shall be placed over the GCL and cushion geotextile.
 - a. Equipment: Aggregate cover shall be placed with low ground pressure equipment for the first 4 inch compacted lift. Care should be taken to avoid damaging the GCL or geotextile by prohibiting sharp turns or pivots with equipment as well as sudden starts or stops.
 - b. Placement: Aggregate may be deposited on the GCL and cushion geotextile by pushing the P-154 Subbase course with a track dozer, dumping with a loader or by carefully placing it with a backhoe. The use of trucks, mechanical spreaders, scrapers or pans over the GCL and cushion geotextile, without any buffer thickness, is strictly prohibited.
 - c. Thickness: A minimum aggregate cover thickness of 4 inches shall be provided between heavy equipment and the GCL and cushion geotextile at all times. No heavy vehicles may be driven directly on the GCL or cushion geotextile until the proper thickness of cover or temporary access material has been placed.
 - d. Compaction: To prevent damage to the GCL, care should be taken when using vibratory rollers or other compaction methods over the GCL and cushion geotextile. The P-154 Subbase course shall be compacted to the Standard Proctor density as specified by the Engineer.
 - e. Slope Placement: When covering GCL installed on sloped areas steeper than 7H:1V, the cover should be pushed up-slope to minimize tension on the GCL.

B. GCL Activation and Hydration: The GCL shall not be pre-hydrated or otherwise "activated".

101-3.7 GCL REPAIR/RESTORATION

- A. Damage Repair: Prior to cover material placement, damage to the GCL shall be identified and repaired by the installer. Damage is defined as any rips or tears in the geotextiles, delamination of geotextiles or a displaced panel.
1. Rip and Tear Repair (Flat Surfaces): Rips or tears may be repaired by completely exposing the affected area, removing all foreign objects or soil, and then placing a patch cut from unused GCL over the damage (damaged material may be left in place), with a minimum overlap of 12 inches on all edges.
 - a. Accessory bentonite should be placed between the patch edges and the repaired material at a rate of a quarter pound per lineal foot of edge spread in a continuous six inch fillet.
 2. Rip and Tear Repair (Slopes): Damaged GCL material on slopes shall be repaired by the same procedures above; however, the edges of the patch should also be adhered to the repaired liner with an adhesive preapproved by the Engineer to keep the patch in position during backfill or cover operations.
 3. Displaced Panels: Displaced panels shall be adjusted to the correct position and orientation. The adjusted panel shall then be inspected for any geotextile damage or bentonite loss. Damage shall be repaired by the above procedure.
 4. All repairs shall be noted on the as-built drawings.

101-3.8 CUSHION GEOTEXTILE REPAIR/RESTORATION

- A. Damage Repair: Prior to cover material placement, damage to the cushion geotextile shall be identified and repaired by the installer. Damage is defined as any rips or tears in the geotextile or a displaced panel.

- B. Any holes or tears in the geotextile shall be repaired as follows:
1. On slopes steeper than 5 horizontal to 1 vertical, a patch made from the same geotextile shall be double seamed into place (with each seam 1/4 inch to 3/4 inch apart and no closer than 1 inch from any edge). Should any tear exceed 10 percent of the width of the roll, that roll shall be removed from the slope, replaced with new material, and sewn.
 2. On slopes flatter than or equal to 5 horizontal to 1 vertical, a patch made from the same geotextile shall be sewn in place with a minimum of 2 feet overlap in all directions.

101-3.9 FIELD QUALITY CONTROL

- A. Subgrade Inspection: The earthen or geosynthetic subgrade shall be continuously inspected, approved and certified by the manufacturer's CQA inspector and the Engineer prior to GCL placement.
- B. All repairs shall be approved by the CQA Inspector and the Engineer prior to soil cover placement. All repairs shall be noted on the as-built drawings.

METHOD OF MEASUREMENTS AND PAYMENT

101-4.1 GCL shall be measured by the total surface area in square yards covered by the GCL as shown on the contract drawings. Final quantities will be based on as-built conditions. Allowance will be made for GCL in anchor and drainage trenches but no allowance will be made for waste, overlap, or materials used for the convenience of the Contractor. GCL installed and accepted will be paid for at the respective contract unit price in the bidding schedule.

101-4.2 Cushion Geotextile shall be measured by the total surface area in square yards covered by the cushion geotextile as shown on the contract drawings. Final quantities will be based on as-built conditions. Allowance will be made for cushion geotextile in anchor and drainage trenches but no allowance will be made for waste, overlap, or materials used for the convenience of the Contractor. Cushion Geotextile installed and accepted will be paid for at the respective contract unit price in the bidding schedule

BASIS OF PAYMENT

101-5.1 Payment for accepted GCL and Cushion Layer will be made at the contract unit price per square yard of GCL and Cushion Layer. This price shall be compensation for furnishing all materials for preparation, placing and upon completion, removal of the materials and for all the labor, equipment, tools and incidentals necessary to complete and maintain this item.

Payment will be made under:

ITEM S-101.5.1 GEOSYNTHETIC CLAY LINER AND CUSHION LAYER – PER SQUARE YARD

TABLE S-101-A

Geotextile Properties	Test Method	Minimum Test Frequency	Value - English -	Value - SI -
Nonwoven -1 Mass/Unit Area	ASTM D-5261	1/200,000 sq. ft. (1/20,000 sq. m)	2.2 oz/yd ² Typical	77 g / m ² Typical
HDPE Laminate Mass/Unit Area	ASTM D-5261	1/200,000 sq. ft. (1/20,000 sq. m)	150 microns ± 10% Typical	--- Typical
Nonwoven -2 Mass/Unit Area	ASTM D-5261	1/200,000 sq. ft. (1/20,000 sq. m)	6.0 oz/yd ² Typical	200 g / m ² Typical
Woven Mass/Unit Area	ASTM D-5261	1/200,000 sq. ft. (1/20,000 sq. m)	3.2 oz/yd ² Typical	112 g / m ² Typical

Bentonite				
Swell Index	ASTM D-5890	1/100,000 lbs. (1/50,000 kg)	24 ml / 2g min.	24 ml / 2g min.
Moisture Content	ASTM D-4643	1/100,000 lbs. (1/50,000 kg)	12% max.	12% max.
Fluid Loss	ASTM D-5891	1/100,000 lbs. (1/50,000 kg)	18 ml max.	18 ml max.

Finished GCL				
Bentonite Mass Per Unit Area ⁽¹⁾	ASTM D-5993	1/40,000 sq. ft. (1/4,000 sq. m)	0.75 lb. / sq. ft. MARV minimum	3.6 kg / m ² MARV minimum
Grab Stength ⁽²⁾	ASTM D-4632	1/200,000 sq. ft. (1/20,000 sq. m)	120 lbs MARV	530 N MARV
Grab Elongation ⁽²⁾	ASTM D-4632	1/200,000 sq. ft. (1/20,000 sq. m)	15% Typical	15% Typical
Peel Strength	ASTM D-4632	1/40,000 sq. ft. (1/4,000 sq. m)	15 lbs. min.	65 N min.
Permeability ⁽³⁾	ASTM D-5887	Periodic	5 x 10 ⁻¹⁰ cm / sec max.	5 x 10 ⁻¹⁰ cm / sec max.
Internal Shear Strength (at 200 psf normal stress)	ASTM D-5321	Periodic	500 psf Typical	24 kPa Typical

1)Oven-dried measurement.

2)Measured at maximum peak, in the weaker principal direction.

3)De-Aired Tap Water at 80 psi (551 kPa) cell pressure, 77 psi (531 kPa) headwater pressure and 75 psi (517 kPa) tailwater pressure.

TABLE S-101-B GEOTEXTILE CUSHION, GEOTEXTILE SEPARATOR (NEEDLE PUNCHED NONWOVEN)				
Properties	Qualifier	Units	Specified Values⁽¹⁾	Test Method
Type	---	---	nonwoven	---
Polymer composition	minimum	%	95 polypropylene or polyester by weight	
Mass per unit area	minimum	oz/yd ²	12	ASTM D5261
<u>Mechanical Requirements</u>				
Grab strength	minimum	lb	340	ASTM D4632 (2)
Tear strength	minimum	lb	135	ASTM D4533 (2)
Puncture strength	minimum	lb	200	ASTM D4833
Burst strength	minimum	psi	640	ASTM D3786

Notes: (1) All values represent minimum average roll values (i.e., any roll in a lot should meet or exceed the values in this table).
(2) Minimum value measured in machine and cross machine direction.

TABLE S-101-C REQUIRED PRE-SHIPING TESTING OF NONWOVEN GEOTEXTILE	
Property	Minimum Frequency
Mass Per Unit Area	Every 100,000 ft ²
Burst Strength	Every 100,000 ft ²
Grab Strength	Every 100,000 ft ²
Puncture Resistance	Every 400,000 ft ²
Trapezoidal Tear	Every 400,000 ft ²

REFERENCES

- A. Construction Quality Assurance (CQA) Plan.
- B. Latest version of the American Society for Testing and Materials (ASTM) Standards:
 - 1. ASTM D3786, Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabric-Diaphragm Bursting Strength Tester Method.
 - 2. ASTM D4355, Standard Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).
 - 3. ASTM D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles
 - 4. ASTM D-4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
 - 5. ASTM D-4643 - Determination of Water (Moisture) Content of Soil by the Microwave Oven Method.
 - 6. ASTM D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 - 7. ASTM D4833, Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
 - 8. ASTM D-5084 - Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
 - 9. ASTM D-5261 - Standard Test Method for Measuring Mass per Unit Area of Geotextiles
 - 10. ASTM D-5321 - Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method
 - 11. ASTM D-5617 - Test Method for Multi-Axial Tension Test for Geosynthetics
 - 12. ASTM D-5887 - Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter
 - 13. ASTM D-5888 - Standard Guide for Storage and Handling of Geosynthetic Clay Liners
 - 14. ASTM D-5889 - Standard Practice for Quality Control of Geosynthetic Clay Liners
 - 15. ASTM D-5890 - Standard Test Method for Swell Index of Clay Mineral Component of Geosynthetic Clay Liners
 - 16. ASTM D-5891 - Standard Test Method for Fluid Loss of Clay Component of Geosynthetic Clay Liners
 - 17. ASTM D-5993 - Test Method for Measuring Mass Per Unit of Geosynthetic Clay Liners
 - 18. ASTM D-6102 - Standard Guide for Installation of Geosynthetic Clay Liners
 - 19. ASTM D-6072 - Standard Guide for Obtaining Samples of Geosynthetic Clay Liners
 - 20. ASTM D-6495 - Standard Guide for Acceptance Testing Requirements for Geosynthetic Clay Liners
 - 21. ASTM D-6496 - Standard Test Method of Determining Average Bonding Peel Strength Between the Top and Bottom Layers of Needle-Punched Geosynthetic Clay Liners

END OF ITEM S-101



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• FORENSICS

REPORT OF GEOTECHNICAL EXPLORATION AND REVIEW

**Duluth International Airport Terminal
Duluth, Minnesota**

AET #07-04216.2

Date:

October 14, 2009

Prepared For:

Mr. John Hippchen, PE, LEED AP
Reynolds, Smith and Hills
4525 Airport Approach Road
Duluth, MN 55811





CONSULTANTS
· ENVIRONMENTAL
· GEOTECHNICAL
· MATERIALS
· FORENSICS

October 14, 2009

Mr. John Hippchen, PE, LEED AP
Reynolds, Smith and Hills
4525 Airport Approach Road
Duluth, MN 55811

Re: Geotechnical Exploration/Review
Proposed Duluth International Airport Terminal
Duluth, Minnesota
AET Project #07-04216.2

Dear Mr. Hippchen:

American Engineering Testing, Inc. (AET) has completed a subsurface exploration and geotechnical engineering review for the above referenced project. We are sending you two copies of our report. Our report documents the exploration/review results and provides our opinions and recommendations to aid you and your design team in planning and construction of the project.

AET appreciates this opportunity to serve you. As your project proceeds, we remain interested in providing additional consulting or testing services. If you have questions about the report, or if we can provide additional services for you, I can be reached at (218) 628-1518 or sleow@amengtest.com.

Sincerely,
American Engineering Testing, Inc.

Sara L. Leow, PE
Geotechnical Engineer

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STANDARD DATA SHEETS

- Excavation and Refilling for Structural Support
- Floor Slab Moisture/Vapor Protection
- Standard Recommendations for Utility Trench Backfilling
- Bedding/Foundation Support of Buried Pipe
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APPENDIX

- Figure 1 – Approximate Test Boring Locations
- Logs of Test Borings
- Boring Log Notes
- Unified Soil Classification System
- Geologic Terminology

**GEOTECHNICAL EXPLORATION/REVIEW
DULUTH INTERNATIONAL AIRPORT TERMINAL
DULUTH, MINNESOTA
AET #07-04216.2**

INTRODUCTION

A new terminal building is planned to be constructed at the Duluth International Airport in Duluth, Minnesota. RS&H authorized American Engineering Testing, Inc. (AET) to conduct a subsurface exploration program and provide geotechnical engineering recommendations for this project. This report presents the field information we obtained at the site and our engineering recommendations.

To protect you, AET, and the public, we authorize use of opinions and recommendations in this report only by you and your project team for this specific project. Contact us if other uses are intended. Even though this report is not intended to provide sufficient information to accurately determine quantities and locations of particular materials, we recommend that your potential contractors be advised of the report availability.

Scope of Services

Our scope of services for this work, outlined in AET Proposal #07-04216.2 and authorized by you, consisted of:

- Arranging for the location of existing public underground utilities through the Gopher State One-Call System and the location of private utilities by a private utility locator.
- Performing ten standard penetration test (SPT) borings. The test borings were performed in general accordance with ASTM designation D1586, and soils classified in general accordance with ASTM D2487.
- Performing limited laboratory testing to aid in soil classification and assessment of soil engineering properties.
- Providing a geotechnical report that presents the results of the test borings, laboratory testing results, recommendations for proposed building foundations and fill, compaction levels, opinions regarding the construction of a retaining wall along the north side of the terminal, and groundwater management.

The scope of our work is intended for geotechnical purposes only. This scope is not intended to explore for the presence or extent of chemical contamination at the site.

PROJECT INFORMATION

Project Background

We understand RS&H is providing design services for the new terminal building at the Duluth International Airport. Information provided to us indicates the new terminal will be a slab-on-grade structure, constructed immediately to the south of the existing terminal. The overall dimensions of the proposed terminal building are approximately 180.5 feet by 330 feet. The new terminal building will be either steel or concrete construction, or a combination of both. You have indicated the tug ramps in the northeastern-most and northwestern-most corners of the building will not be heated, but all other areas of the terminal will be heated above 40 degrees Fahrenheit year-round.

The new terminal will be bordered by concrete aprons on the north and a departure/arrival service road on the south. The grade on the north side of the terminal will be raised 10 feet to 15 feet to match the grade of the existing aircraft apron. According to MBJ (project structural engineer), a sheet-pile retaining wall or mechanically stabilized earth (MSE) wall, may be considered to retain fill placed to raise the grade east and west of the north building wall.

Current structural plans indicate the new terminal will have up to three stories. The south side (front) of the terminal building will be a single-story, high-ceiling area for ticketing. The main entrance to the terminal will include an exterior canopy structure on the south side. The three-story portion of the structure will be situated in the central portion of the building, with the remaining two-story area on the north side of the building, next to the aircraft apron.

Our discussion with the project structural engineer indicates maximum column loads for the terminal are anticipated to be on the order of 500 to 600 kips. We understand that due to these relatively high loads, the structural engineer may want to explore the possibility of using foundation elements with

soil bearing pressures exceeding 5,000 pounds per square foot (psf).

Project Assumptions

The recommendations contained in this report are based on attaining a factor of safety of at least 3 with respect to localized shear or base failure of the foundations. We have also assumed allowable foundation settlements of 1 inch total and ½ inch differential are acceptable.

The presented project information represents our understanding of the proposed construction. This information is an integral part of our engineering review. It is important that you contact us if there are changes from that described so that we can evaluate whether modifications to our recommendations are appropriate.

SITE CONDITIONS

Surface Observations

On the dates the test borings were performed, the ground surface within the new terminal footprint was mainly covered by bituminous pavement for the existing long and short-term parking areas. The ground surface on the north side of the terminal footprint area was covered by grass. This ground surface slopes up from the parking lots to the passenger loading/unloading drive on the south side of the existing terminal.

Subsurface Soils/Geology

Logs of the test borings are included in the Appendix. Please refer to the logs for general information concerning soil layering, soil classification, geologic description, and moisture. Relative density or consistency is also noted, which is based on the standard penetration resistance (N-value).

The boring logs only indicate the subsurface conditions at the sampled locations. Variations often occur between and beyond borings.

The test borings indicate a generalized subsurface profile of existing fill overlying native soils comprised of till, coarse alluvium, and/or fine alluvium. Existing fill depths range between 1½ and

6 feet. Bituminous pavement, organic sandy silt, slightly organic silty sand, silty sand with gravel, lean clay with sand, and sand with silt and gravel compose the existing fill. Between 7¼ and 9½ inches of bituminous pavement was encountered at the ground surface in the test borings advanced in existing pavement areas.

Fine alluvium layers between 2 and 7½ feet thick were encountered in test borings 09-02 and 09-07. The fine alluvium consists of sandy silt and sandy silty clay. The recorded N-values indicate the non-cohesive (silt) fine alluvium is medium dense to dense, and the cohesive (clay) fine alluvium has a very stiff consistency.

Coarse alluvium was encountered in test borings 09-03, 09-04, 09-06, and 09-09. The coarse alluvium layer thicknesses range from 2½ and 9½ feet. The coarse alluvium consists of silty sand with gravel, gravelly sand, sand with silt and gravel, and gravelly sand with silt. Sand with silt between approximately 4 and 5.2 feet in test boring 09-07 may be fill. Based on the recorded N-values, the coarse alluvium is medium dense to very dense.

Till was encountered in each of the test borings, and is composed of silty sand and silty sand with gravel. The silty sand between approximately 2 and 6 feet in test boring 09-05 may be fill. Apparent cobbles were encountered in the till in test borings 09-02 and 09-03. The recorded N-values indicate the till is mainly medium dense to dense.

Auger refusal was encountered in test boring 09-03 at a depth of 20 feet and in test boring 09-09 at a depth of 13 feet. Auger refusal may have been caused by a cobble, a boulder, or bedrock. The cause of auger refusal cannot be documented without performing rock coring.

Water Level Measurements

Groundwater was encountered in test borings 09-02, 09-03, 09-04, 09-07, 09-09, and 09-10 between the depths of 4.4 and 16.5 feet after the boreholes were left open for up to 17 hours. Groundwater was not encountered in test borings 09-05, 09-06, or 09-08 during drilling or after the boreholes

were left open for 5 to 25 minutes. Based on the groundwater levels measured in the test borings, we anticipate groundwater may be present at frost-footing depth in some areas of the building excavation.

The silty sand, sandy silt, and sandy silty clay encountered in the test borings are considered slow draining to relatively impermeable, while the sand and sand with silt are considered fast draining and permeable. Groundwater will tend to flow through more permeable soils and perch on less permeable soils. Groundwater present in the less permeable soils may not have had enough time to collect and/or stabilize in the boreholes before they were abandoned. For this reason, water level measurements from the test borings may not be reliable for assessing the static groundwater level in the area. A discussion of the water level measurement methods is presented in the SUBSURFACE EXPLORATION section of this report.

Ground water levels usually fluctuate. Fluctuations occur due to varying seasonal and yearly rainfall and snow melt, as well as other factors.

LABORATORY TESTING

Limited laboratory testing was performed on select samples from the test borings. Laboratory testing consisted of measuring moisture content. The moisture content of selected samples is listed on the test boring logs in the column labeled 'WC.'

GEOTECHNICAL CONSIDERATIONS

The following considerations are the basis for the recommendations presented later in this report.

Review of Soil Properties

Strength/Stability

The existing fill is considered to have low strength and stability under the anticipated building loads. This is due to the undocumented nature in which fill was placed and the presence of organics. The fine alluvium, coarse alluvium, and till soils are considered to have high strength and stability beneath the anticipated building loads. If the native soils become disturbed or are subjected to

excess moisture, the strength and stability of these soils may decrease.

Compressibility

The existing fill soils are considered moderately to highly compressible beneath the anticipated structural loads. The coarse alluvium, fine alluvium, and till are considered to have moderately low to low compressibility potential.

Frost Susceptibility

Silty sand, sandy silt, sandy silty clay, and soils containing organics are considered highly frost susceptible due to their silt and/or organic content. Sand with silt and lean clay are considered moderately frost susceptible, while the sand is not considered frost susceptible.

Drainage Properties

The silty and clayey soils are considered to have a low permeability, and are slow to very slow draining. The sand and sand with silt soils are considered permeable, and are relatively fast draining.

RECOMMENDATIONS

Grading Procedures

Excavation

All existing fill and soils containing organics should be removed from the building foundation areas. All existing parking lot elements, such as bituminous pavement, curb, and gate structures, should also be removed from the building area. Any disturbed, wet, or soft soils should be removed from the foundation areas, as well. If an excavation extends below the bottom-of-foundation grade, a lateral zone of excavation should extend out horizontally at least 1 foot from the outside edge of perimeter foundations for every foot of new fill placed below the base of the footing (i.e. 1H:1V excavation oversize). This lateral oversize is to be measured at the base of the excavation, not at the surface.

The test borings indicate excavations may need to extend to depths of 6 feet in the building areas to remove existing fill. The required depths of excavation may be different than indicated by the test borings. Suitable excavation depths should be reviewed by a geotechnical engineer or engineering technician performing full-time observation and testing during site preparation.

Filling/Compaction

Where fill is needed to attain building grades, engineered fill should be used. Engineered fill should be a non-organic, granular material void of frozen soil, boulders, and debris. Excavated on-site soils void of organics, boulders, and debris can also be used as engineered fill if these soils have a moisture content suitable for attaining required compaction levels. Laboratory testing of select test boring samples indicate moisture contents of some of the on-site soils may be too high to attain required compaction levels. If used as engineered fill, these soils may need to be conditioned and reworked to reduce their moisture content to levels required for suitable compaction. Reducing the moisture content in silty and clayey soils is typically difficult to accomplish in the Duluth area due to a climate with limited days of drying weather.

Engineered fill should be placed in thin loose lifts and compacted to at least 95% of the maximum Modified Proctor dry density (ASTM D1557). Please refer to the attached standard data sheet entitled "Excavation and Refilling for Structural Support" for general information regarding excavation and fill placement for foundation support.

Building Foundation Support

After preparing the site according to the above building grading procedures, it is our judgment that wall and column loads for the proposed building can be supported by a spread footing system bearing on competent undisturbed fine alluvium, coarse alluvium, or till, or on engineered fill placed directly on these competent native soils. It is our opinion that strip footings and column footing pads placed on competent native soils, or compacted engineered fill placed directly on native soils, can be designed for an allowable bearing pressure of 5,000 psf. A coefficient of sliding friction of 0.45 can

be used between the foundations and native soils.

Strip footings should have a minimum width of 20 inches and column footings should have a minimum dimension of 3 feet. Perimeter footings supporting heated structures, and all footings supporting unheated structures, including the canopy, should extend at least 72 inches below final grade for frost protection. Interior column footings for heated structures should be embedded at least 12 inches below the bottom of the floor slab. A structure is considered heated if an indoor air temperature of at least 40° Fahrenheit is maintained year-round.

Faces of foundations supporting the canopy should be as smooth as possible to prevent adhesion of freezing soils to the sides of the foundations. A bond breaker, such as overlapping sheets of plastic, should be applied to foundation surfaces to minimize adhesion of frost susceptible soils.

It is our judgment that this foundation design will include a factor of safety of greater than 3 against shear or base failure. It is also our judgment that total and differential building settlement should be less than 1 inch and ½ inch, respectively.

Advanced Field Testing

It is our opinion that foundations for the proposed terminal building can potentially be designed for foundation bearing pressures greater than 5,000 psf, based on previous geotechnical explorations AET has performed in similar soils in the Duluth area and at the Duluth International Airport. An advanced testing program AET uses to evaluate soils for heavy soil bearing pressures is in-situ testing with a pressuremeter (the pressuremeter test). We recommend performing pressuremeter testing if foundation loads exceeding 5,000 psf are considered for the proposed terminal building. Pressuremeter testing would be performed as a supplement to the test borings recently performed at the site.

North Wall Backfill and Drainage

Excavation and Backfill

Existing fill, including any elements of the existing terminal building, should be removed within 6 feet of the north building wall that is planned to be constructed into the hillside. Engineered fill should be used for backfill along the north wall. Backfill should consist of a non-frozen, granular material void of organics, boulders, rubble, and debris; also, clayey soils should be avoided as backfill behind the north wall.

To keep lateral earth pressures to a minimum, backfill within 6 horizontal feet of the wall should consist of non-frost susceptible (NFS) sand meeting the gradation in Table I, below. In green areas, the upper 1 foot of backfill should consist of a relatively impermeable soil, such as on-site soils or topsoil, to reduce infiltration of water into the backfill.

Table I: Non-Frost Susceptible Engineered Fill Gradation Recommendation

Sieve Size or Number	Percent Passing by Weight
2"	100
#4	90 - 100
#40	10 - 40
#200	0 - 6

Backfill in zones below future non-aircraft pavement areas should be compacted to at least 90% of the Modified Proctor density. In future aircraft pavement areas, backfill should meet aircraft pavement design criteria for soil gradations and compaction levels. Compaction should be observed by a geotechnical engineer or engineering technician under the supervision of a geotechnical engineer.

Drainage

Suitable drainage should be provided behind the north wall to keep moisture from collecting in the backfill. Moisture retained in the backfill adds to the lateral pressure exerted on the wall. Also, upon freezing, additional pressures can be exerted on the wall from the expansion of moisture in the backfill. The drainage system should allow infiltrating moisture (from both the ground surface and hillside) to migrate through the backfill to a drainage system at the base of the wall. Drainage along the wall can be accomplished by entirely backfilling with free-draining sand, or incorporating layers and/or zones of free-draining sand and/or geosynthetic drainage mats in the backfill. The NFS engineered fill specified by the gradation in Table I is considered free-draining fill.

Retaining Walls

Sheetpile Walls

The encountered soil conditions indicate that installation of sheetpile for the retaining walls may be limited by the dense to very dense till soils that were encountered in the test borings. As indicated in two of the test borings performed at the terminal building site, and based on past projects at the airport, boulders and cobbles are common in the till soils in the airport area. The presence of boulders and cobbles can also cause construction difficulties such as sheetpile obstruction or deflection.

If sheetpile are installed for the retaining walls, the grading, backfill, and drainage should follow the recommendations in the 'North Wall Backfill and Drainage' section.

MSE Walls

It is our opinion the site is suitable for MSE wall construction. Grading procedures, backfill integrated into the MSE wall system, and backfill drainage should also follow the recommendations described above in the 'North Wall Backfill and Drainage' section. Grading procedures should encompass the entire area of reinforced soil. Design of reinforcement and facing may also influence the selection of wall backfill type.

MSE wall reinforcement and facing are typically designed by an MSE wall contractor. Selection of MSE wall facing should consider exposure to deicing chemicals from the aircraft apron, and from any parking areas near the walls. Some MSE wall designs also include a footing to support the wall facing and reduce the potential for direct impacts to the facing from maintenance equipment, such as snow plows. Similar to the building footings, MSE wall footings can be designed for an allowable bearing pressure of 5,000 psf if constructed on competent, native soils or engineered fill over native soils.

Lateral Earth Pressures

Lateral earth pressures acting upon north terminal wall and retaining walls will differ depending on the backfill composition. Table II below provides lateral earth pressure recommendations for NFS sand, and Table III provides lateral earth pressure recommendations for silty sand soil (e.g. till soils at the site). Backfill soils other than those listed below will result in different earth pressure values. The values shown in Tables II and III also do not include any surcharge loads that may be present behind the north building wall and retaining walls, such as surcharge loads from aircraft, the aircraft pavement section, and aircraft support vehicles and equipment.

Table II: Estimated Lateral Earth Pressure Parameters for NFS Engineered Fill

Soil Condition	Coefficient of Lateral Earth Pressure	Equivalent Fluid Weight - Drained (pcf)	Equivalent Fluid Weight - Saturated (pcf)
At Rest	0.47	55	88
Active	0.31	40	80
Passive	3.25	390	235

Table III: Estimated Lateral Earth Pressure Parameters for Silty Sand Soil

Soil Condition	Coefficient of Lateral Earth Pressure	Equivalent Fluid Weight - Drained (pcf)	Equivalent Fluid Weight - Saturated (pcf)
At Rest	0.5	65	95
Active	0.33	45	85
Passive	3.0	390	265

Floor Slab Support

Excavation of unsuitable soils from the building areas, and replacement of the excavated soils with engineered fill as described above, will prepare the area for floor slab support. If the floor slab is constructed over existing fill, there is a potential for cracking to occur in the slab. The risk of cracking can be reduced by removing the existing fill from floor slab areas. The risk of floor slab cracking can also be reduced in unheated areas by removing frost susceptible soils to a depth of 6 feet below final grade, and backfilling with NFS sand.

The floor slab should be constructed on a layer of clean sand fill meeting the gradation for NFS sand in Table I. The clean sand layer should have a thickness of at least 6 inches to provide a capillary break for moisture. All engineered fill supporting the floor slab should be compacted to a minimum of 95% of Modified Proctor density. This includes utility and foundation trench backfill in floor slab areas.

A value of 300 lb/in^3 can be used as the modulus of subgrade reaction for floor slab design over the recommended engineered fill. If moisture sensitive floor coverings are used, a polyethylene vapor membrane can provide added moisture protection beneath the floor slab. For standard recommendations pertaining to moisture and vapor protection of the building floor slab, we refer you to the attached standard sheet entitled "Floor Slab Moisture/Vapor Protection."

Site Drainage

We recommend that site grades be established that promote drainage of surface water away from the

planned terminal building. Also, the building should be equipped with a sufficient collection system that collects precipitation from the roof and directs it away from the building and associated pavement areas.

Utility Construction

Care should be taken to ensure that utilities outside the building are designed with sufficient flexibility to accommodate potential differential movements than can occur between frozen and unfrozen soils. As utilities enter building areas, they cross a transition from a frost susceptible zone to a zone not susceptible to freezing, which can result in local differential movement within the transition zone. We recommend that utility lines be provided with a minimum of 7 feet of soil cover for protection from frost. If utilities are placed at shallower depths, they should be protected from frost with insulation.

Standard data sheets entitled “Standard Recommendations for Utility Trench Backfilling” and “Bedding/Foundation Support of Buried Pipe” are also included with this report. These standard sheets provide recommendations for backfill materials and placement of backfill in trenches.

CONSTRUCTION CONSIDERATIONS

Potential Difficulties

Cobbles and Boulders

Apparent cobbles were encountered in two test borings, and auger refusal was encountered in test borings 09-03 and 09-09. Cobbles and boulders are common in till soils, and shallow bedrock has been observed in past excavations at the airport. Cobbles, boulders, or bedrock may be present within planned excavation areas, and could present excavation difficulties or problems for the construction of the building and underground utilities.

Runoff Water in Excavations

The silty and clayey soils encountered in the borings are likely to perch water during periods of wet

weather. To allow observation of the excavation bottom, reduce the potential for soil disturbance, and to facilitate filling operations, we recommend that all free-standing water within the excavations be removed prior to proceeding with construction. Based on the soils encountered, we anticipate that any groundwater which enters the excavations can be handled with conventional sump pumping.

Soil Disturbance

The soils encountered in the test borings are susceptible to disturbance and weakening when exposed to construction equipment and/or foot traffic, especially when moist or saturated. If soils do become disturbed, they should be carefully excavated and be replaced with compacted, engineered fill.

Cold Weather Construction

If construction occurs during freezing temperatures, there are certain precautions that should be considered for placement of fill and backfilling around structures. We refer you to the attached sheet entitled “Freezing Weather Effects on Building Construction” for information regarding cold weather precautions.

Temporary Sidesloping and Shoring

Temporary sideslopes should be excavated in accordance with OSHA Regulations (Standards 29 CFR), Part 1926, Subpart P, “Excavations” (can be found on www.osha.gov). Sideslopes should be protected to prevent erosion. Further testing and geotechnical review should be performed where temporary sideslopes are designed to be steeper than OSHA Regulations applicable to site soil types.

If used, temporary shoring should be designed by a professional structural engineer. Geotechnical recommendations for temporary shoring are beyond the scope of services for this report, but can be provided by AET, if requested.

Observation and Testing

The recommendations in this report are based on the subsurface conditions found at our test boring locations. Since the soil conditions can be expected to vary away from the soil boring locations, we

recommend on-site observations by a geotechnical engineer, or the engineer's representative, during construction to evaluate the effect of these potential changes.

We recommend that all foundation excavations be observed by a geotechnical engineer immediately prior to placement of engineered fill or concrete. The soils at the site are very susceptible to disturbance from moisture or construction traffic, and should be protected until a final observation can be made immediately prior to engineered fill or concrete. Soil density testing should also be performed on all fill placed at the site to document that project recommendations or specifications for compaction and moisture have been satisfied. Where fill material type is important, sieve analysis tests should be performed to document the actual fill meets the recommended gradation criteria.

SUBSURFACE EXPLORATION

General

Our subsurface exploration program included advancing ten standard penetration test (SPT) borings at the site on September 15th and 16th, 2009. The approximate locations of the borings are shown on the Figure 1 sketch in the Appendix. The test boring elevations were not available as of the date of this report.

Drilling Methods

The standard penetration test borings were advanced using 3¼ inch inside diameter hollow stem augers. The boreholes were backfilled in compliance with Minnesota Department of Health regulations.

Sampling Methods

Split-Spoon Samples (SS)

Standard Penetration (split-spoon) samples were collected in general accordance with ASTM D1586. This method consists of driving a 2" O.D. split-barrel sampler into the in-situ soil with a 140-pound hammer dropped from a height of 30". The sampler is driven a total of 18" into the soil.

After an initial set of 6 inches, the number of hammer blows to drive the sampler the final 12 inches is known as the Standard Penetration resistance or N-value.

Sampling Limitations

Unless actually observed in a sample, contacts between soil layers are estimated based on the spacing of samples and the action of drilling tools. Cobbles, boulders, and other large objects generally cannot be recovered from test borings, and they may be present in the ground even if they are not noted on the boring logs.

Classification Methods

Soil classifications shown on the boring logs are generally based on the Unified Soil Classification System (USCS). The USCS is described in ASTM D2487 and D2488. Where laboratory classification tests (sieve analysis or Atterberg Limits) have been performed, classifications per ASTM D2487 are possible. Otherwise, soil classifications shown on the boring logs are visual-manual judgments. We have attached charts in the Appendix illustrating the USCS, the descriptive terminology, and the symbols used on the boring logs.

The boring logs include judgments of the geologic depositional origin. This judgment is primarily based on observation of the soil samples, which can be limited. Observations of the surrounding topography, vegetation and development can sometimes aid this judgment.

Water Level Observations

The water level measurements are shown at the bottom of the boring logs. The following information appears under “Water Level Measurements” on the logs:

- Date and Time of measurement
- Sampled Depth: lowest depth of soil sampling at the time of measurement
- Casing Depth: depth to bottom of casing or hollow-stem auger at time of measurement
- Cave-in Depth: depth at which measuring tape stops in the borehole
- Water Level: depth in the borehole where free water is encountered

- **Drilling Fluid Level:** same as Water Level, except that the liquid in the borehole is drilling fluid

The true location of the water table at the boring locations may be different than the water levels measured in the boreholes. This is possible because there are several factors that can affect the water level measurements in the borehole. Some of these factors include: permeability of each soil layer in profile, presence of perched water, amount of time between water level readings, presence of drilling fluid, weather conditions, and use of borehole casing.

Sample Storage

We will retain representative samples of the soils recovered from the borings for a period of 30 days. The samples will then be discarded unless you notify us otherwise.

LIMITATIONS

The data derived through the exploration program have been used to develop our opinions about the subsurface conditions at your site. However, because no exploration program can reveal totally what is in the subsurface, conditions between borings and between samples and at other times, may differ from conditions described in this report. The exploration we conducted identified subsurface conditions only at those points where we took samples or observed ground water conditions. Depending on the sampling methods and sampling frequency, every soil layer may not be observed, and some materials or layers which are present in the ground may not be noted on the boring logs.

If conditions encountered during construction differ from those indicated by our borings, it may be necessary to alter our conclusions and recommendations, or to modify construction procedures, and the cost of construction may be affected.

The extent and detail of information about the subsurface condition are directly related to the scope of the exploration. It should be understood, therefore, that information can be obtained by means of additional exploration.

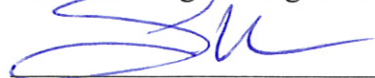
STANDARD OF CARE

Our services for your project have been conducted to those standards considered normal for services of this type at this time and location. Other than this, no warranty, express or implied, is intended.

SIGNATURES

We have appreciated the opportunity to provide our services for this project. If you have questions regarding this report, or if we may provide additional assistance, please contact us.

Report Prepared by:
American Engineering Testing, Inc.



Sara L. Leow, PE
Geotechnical Engineer
MN License No. 47103

Report Reviewed by:
American Engineering Testing, Inc.



Robert J. Wahlstrom, PE, PG
Senior Geotechnical Engineer

EXCAVATION AND REFILLING FOR STRUCTURAL SUPPORT

EXCAVATION

Excavations for structural support at soil boring locations should be taken to depths recommended in the geotechnical report. Since conditions can vary, recommended excavation depths between and beyond the boring locations should be evaluated by geotechnical field personnel. If ground water is present, the excavation should be dewatered to avoid the risk of unobservable poor soils being left in-place. Excavation base soils may become disturbed due to construction traffic, ground water or other reasons. Such soils should be subcut to underlying undisturbed soils. Where the excavation base slopes steeper than 4:1, the excavation bottom should be benched across the slope parallel to the excavation contour.

Soil stresses under footings spread out with depth. Therefore, the excavation bottom and subsequent fill system should be laterally oversized beyond footing edges to support the footing stresses. A lateral oversize equal to the depth of fill below the footing (i.e., 1:1 oversize) is usually recommended. The lateral oversize is usually increased to 1.5:1 where compressible organic soils are exposed on the excavation sides. Variations in oversize requirements may be recommended in the geotechnical report or can be evaluated by the geotechnical field personnel.

Unless the excavation is retained, the backslopes should be maintained in accordance with OSHA Regulations (Standards - 29 CFR), Part 1926, Subpart P, "Excavations" (found on www.osha.gov). Even with the required OSHA sloping, ground water can induce sideslope raveling or running which could require that flatter slopes or other approaches be used.

FILLING

Filling should proceed only after the excavation bottom has been approved by the geotechnical engineer/technician. Approved fill material should be uniformly compacted in thin lifts to the compaction levels specified in the geotechnical report. The lift thickness should be thin enough to achieve specified compaction through the full lift thickness with the compaction equipment utilized. Typical thicknesses are 6" to 9" for clays and 12" to 18" for sands. Fine grained soils are moisture sensitive and are often wet (water content exceeds the "optimum moisture content" defined by a Proctor test). In this case, the soils should be scarified and dried to achieve a water content suitable for compaction. This drying process can be time consuming, labor intensive, and requires favorable weather.

Select fill material may be needed where the excavation bottom is sensitive to disturbance or where standing water is present. Sands (SP) which are medium to coarse grained are preferred, and can be compacted in thicker lift thicknesses than finer grained soils.

Filling operations for structural support should be closely monitored for fill type and compaction by a geotechnical technician. Monitoring should be on a full-time basis in cases where vertical fill placement is rapid; during freezing weather conditions; where ground water is present; or where sensitive bottom conditions are present.

EXCAVATION/REFILLING DURING FREEZING TEMPERATURES

Soils that freeze will heave and lose density. Upon thawing, these soils will not regain their original strength and density. The extent of heave and density loss depends on the soil type and moisture condition; and is most pronounced in clays and silts. Foundations, slabs, and other improvements should be protected from frost intrusion during freezing weather. For earthwork during freezing weather, the areas to be filled should be stripped of frozen soil, snow and ice prior to new fill placement. In addition, new fill should not be allowed to freeze during or after placement. For this reason, it may be preferable to do earthwork operations in small plan areas so grade can be quickly attained instead of large areas where much frost stripping may be needed.

FLOOR SLAB MOISTURE/VAPOR PROTECTION

Floor slab design relative to moisture/vapor protection should consider the type and location of two elements, a granular layer and a vapor membrane (vapor retarder, water resistant barrier or vapor barrier). In the following sections, the pros and cons of the possible options regarding these elements will be presented, such that you and your specifier can make an engineering decision based on the benefits and costs of the choices.

GRANULAR LAYER

In American Concrete Institute (ACI) 302.1-96, a “base material” is recommended, rather than the conventional cleaner “sand cushion” material. The manual maintains that clean sand (common “cushion” sand) is difficult to compact and maintain until concrete placement is complete. ACI recommends a clean, fine graded material (with at least 10% to 30% of particles passing a #100 sieve) which is not contaminated with clay, silt or organic material. We refer you to ACI 302.1-96 for additional details regarding the requirements for the base material.

In cases where potential static water levels or significant perched water sources appear near or above the floor slab, an underfloor drainage system may be needed wherein a daintile system is placed within a thicker clean sand or gravel layer. Such a system should be properly engineered depending on subgrade soil types and rate/head of water inflow.

VAPOR MEMBRANE

The need for a vapor membrane depends on whether the floor slab will have a vapor sensitive covering, will have vapor sensitive items stored on the slab, or if the space above the slab will be a humidity controlled area. If the project does not have this vapor sensitivity or moisture control need, placement of a vapor membrane may not be necessary. Your decision will then relate to whether to use the ACI base material or a conventional sand cushion layer. However, if any of the above sensitivity issues apply, placement of a vapor membrane is recommended. Some floor covering systems (adhesives and flooring materials) require a vapor membrane to maintain a specified maximum slab moisture content as a condition of their warranty.

VAPOR MEMBRANE/GRANULAR LAYER PLACEMENT

A number of issues should be considered when deciding whether to place the vapor membrane above or below the granular layer. The benefits of placing the slab on a granular layer, with the vapor membrane placed **below** the granular layer, include **reduction** of the following:

- Slab curling during the curing and drying process.
- Time of bleeding, which allows for quicker finishing.
- Vapor membrane puncturing.
- Surface blistering or delamination caused by an extended bleeding period.
- Cracking caused by plastic or drying shrinkage.

The benefits of placing the vapor membrane **over** the granular layer include the following:

- The moisture emission rate is achieved faster.
- Eliminates a potential water reservoir within the granular layer above the membrane.
- Provides a “slip surface”, thereby reducing slab restraint and the associated random cracking.

If a membrane is to be used in conjunction with a granular layer, the approach recommended depends on slab usage and the construction schedule. The vapor membrane should be placed above the granular layer when:

- Vapor sensitive floor covering systems are used or vapor sensitive items will be directly placed on the slab.
- The area will be humidity controlled, but the slab will be placed before the building is enclosed and sealed from rain.
- Required by a floor covering manufacturer’s system warranty.

The vapor membrane should be placed below the granular layer when:

- Used in humidity controlled areas (without vapor sensitive coverings/stored items), with the roof membrane in place, and the building enclosed to the point where precipitation will not intrude into the slab area. Consideration should be given to slight sloping of the membrane to edges where daintile or other disposal methods can alleviate potential water sources, such as pipe or roof leaks, foundation wall damp proofing failure, fire sprinkler system activation, etc.

There may be cases where membrane placement may have a detrimental effect on the subgrade support system (e.g., expansive soils). In these cases, your decision will need to weigh the cost of subgrade options and the performance risks.

STANDARD RECOMMENDATIONS FOR UTILITY TRENCH BACKFILLING

GENERAL

Clayey and silty soils are often difficult to compact, as they may be naturally wet or may become wet due to ground water or surface/rain water during construction. Soils will need to be placed within a certain range of water (moisture) content to attain desired compaction levels. Moisture conditioning to within this range can be time consuming, labor intensive, and requires favorable weather.

The degree of compaction and the soil type used for backfill within open cut utility trenches depends on the function of the overlying land surface. Details are as follows:

ROADWAYS

Where trenches are located below roadways, we recommend using inorganic fill and compacting these soils per Mn/DOT Specification 2105.3F1 (Specified Density Method). This specification requires 100% of the Standard Proctor density in the upper one meter subgrade zone, and 95% below this. Note that this specification includes moisture content range requirements which are important for proper subgrade stability.

Where available soils are wet or of poor quality, it may be possible to use the "Quality Compaction Method" (Mn/DOT Specification 2105.3F2) for soils below the upper one meter subgrade zone if you can tolerate some subsidence. However, a high level of stability is still important within the upper subgrade zone and recommend that the "Specified Density Method" be used in this upper subgrade area. We caution that if backfill soils in the lower trench area are significantly unstable, it may be difficult or even impossible to properly compact soils within the upper one meter subgrade zone. In this case, placing a geotextile fabric directly over the unstable soils can aid in offsetting the instability.

STRUCTURAL AREAS

If fill is placed beneath or within the significant zone of influence of a structure (typically a 1:1 lateral oversize zone), the soil type and minimum compaction level will need to be evaluated on an individual basis. Because trenches result in variable fill depths over a short lateral distance, higher than normal compaction levels and/or more favorable (sandy) soil fill types may be needed. If this situation exists, it is important that special geotechnical engineering review be performed.

NON-STRUCTURAL AREAS

In grass/ditch areas, backfill soils should be placed in reasonable lift thicknesses and compacted to a minimum of 90% of the Standard Proctor density (ASTM:D698) and/or per the Mn/DOT "Quality Compaction Method." If lower compaction levels are attained, more noticeable subsidence at the surface can occur. Steep or high slopes require special consideration.

BEDDING/FOUNDATION SUPPORT OF BURIED PIPE

GENERAL

This page addresses soil bedding and foundation support of rigid pipe, such as reinforced concrete, and flexible pipe, such as steel and plastic. This does not address selection of pipe based on loads and allowable deflections, but rather addresses the geotechnical/soil aspects of uniform pipe support. Bedding/foundation support needs relate to local conditions directly beneath and to the sides of the pipe zone, which may be influenced by soft in-situ ground conditions or by soil disturbance due to soil sensitivity or ground water. Bedding relates to granular materials placed directly beneath the bottom of the pipe (usually 4" to 6" thick), which is intended to provide increased support uniformity. We refer to foundation soils as thicker layers of sands and/or gravels (beneath the bedding zone) intended to provide increased foundation strength support, usually needed due to soft, unstable and/or waterbearing conditions.

GRANULAR BEDDING

With circular pipes, high local loads (approaching point loads) develop if pipes are placed on hard surfaces. Load distribution is improved by placing granular bedding materials beneath the pipe, which are either shaped to match the pipe bottom or are placed without compaction to allow "settling in." The bedding should be placed in such a manner that the pipe will be at the proper elevation and slope when the pipe is laid on the bedding. Common bedding material is defined in Mn/DOT Specification 3149.2F, Granular Bedding. Published documents recommend rigid pipes having a diameter of 12" to 54" be placed on a bedding thickness of 4", which increases to 6" of bedding for pipe diameters ranging from 54" to 72". Beyond a 72" diameter, the bedding thickness can be equal to the pipe outside diameter divided by 12. Typically, the need for bedding under small diameter pipes (less than 12") depends on the pipe designer's specific needs, although in obvious point loads situations (bedrock, cobbles, significant coarse gravel content), bedding is recommended. Note that bedding should also account for larger diameter bells at joints.

FOUNDATION FILL

Positive uniform strength is usually compromised in soft or unstable trench bottom conditions. In this case, deeper subcuts and foundation fill placement is needed beneath the pipe. In moderate instability conditions, improvement can likely be accomplished with a thicker bedding layer. However, in more significant instability situations, particularly where ground water is present, coarser materials may be needed to provide a stronger foundation. Thicker gravel layers can also be a favorable media from which to dewater. The following materials would be appropriate for stability improvement, with the coarser materials being appropriate for higher instability/ground water cases.

- C Fine Filter Aggregate – Mn/DOT Specification 3149.2J

- C Coarse Filter Aggregate –Mn/DOT Specification 3149.2H

When using a coarser material which includes significant void space, we highly recommend enveloping the entire gravel layer within a geotextile fabric. The gravel material includes open void space, and the fabric acts as a separator which minimizes the intrusion of fines into the open void space. If an additional granular bedding sand is used above foundation gravel, the fabric would also prevent downward infiltration of bedding sand into the rock void space.

Although it is preferred to not highly compact thin granular bedding zones directly beneath the pipe center, it is desirable to compact the foundation materials to prevent more significant pipe settlement. We recommend foundation fill be compacted to a minimum of 95% of the Standard Proctor density (ASTM:D698). It is not possible to test coarse rock fill, although this material should still be well compacted/ tamped.

Often, pipes entering structures such as catch basins, lift stations, etc., enter the structure at a higher elevation than the structure bottom, and are therefore placed on the structure backfill. Fill beneath these pipes should be considered foundation fill. Depending on the flexibility of the connection design, it may be necessary to increase the minimum compaction level to reduce differential settlements, particularly with thicker fills.

SIDE FILL SUPPORT

If the pipe designer requires support from the side fill, granular bedding should also be placed along the sides of the pipe. In poor soil conditions, the sand fill may need to be placed laterally up to two pipe diameters on both sides of the pipe. With rigid pipe, compacted sand placement up to the spring line (within the haunch area) is usually sufficient. With flexible pipe, side fill should be placed and compacted at least to the top of the pipe. For positive support, it is very important to properly compact the sands within the haunch area.

FREEZING WEATHER EFFECTS ON BUILDING CONSTRUCTION

GENERAL

Because water expands upon freezing and soils contain water, soils which are allowed to freeze will heave and lose density. Upon thawing, these soils will not regain their original strength and density. The extent of heave and density/strength loss depends on the soil type and moisture condition. Heave is greater in soils with higher percentages of fines (silts/clays). High silt content soils are most susceptible, due to their high capillary rise potential which can create ice lenses. Fine grained soils generally heave about 1/4" to 3/8" for each foot of frost penetration. This can translate to 1" to 2" of total frost heave. This total amount can be significantly greater if ice lensing occurs.

DESIGN CONSIDERATIONS

Clayey and silty soils can be used as perimeter backfill, although the effect of their poor drainage and frost properties should be considered. Basement areas will have special drainage and lateral load requirements which are not discussed here. Frost heave may be critical in doorway areas. Stoops or sidewalks adjacent to doorways could be designed as structural slabs supported on frost footings with void spaces below. With this design, movements may then occur between the structural slab and the adjacent on-grade slabs. Non-frost susceptible sands (with less than 12% passing a #200 sieve) can be used below such areas. Depending on the function of surrounding areas, the sand layer may need a thickness transition away from the area where movement is critical. With sand placement over slower draining soils, subsurface drainage would be needed for the sand layer. High density extruded insulation could be used within the sand to reduce frost penetration, thereby reducing the sand thickness needed. We caution that insulation placed near the surface can increase the potential for ice glazing of the surface.

The possible effects of adfreezing should be considered if clayey or silty soils are used as backfill. Adfreezing occurs when backfill adheres to rough surfaced foundation walls and lifts the wall as it freezes and heaves. This occurrence is most common with masonry block walls, unheated or poorly heated building situations and clay backfill. The potential is also increased where backfill soils are poorly compacted and become saturated. The risk of adfreezing can be decreased by placing a low friction separating layer between the wall and backfill.

Adfreezing can occur on exterior piers (such as deck, fence or other similar pier footings), even if a smooth surface is provided. This is more likely in poor drainage situations where soils become saturated. Additional footing embedment and/or widened footings below the frost zones (which include tensile reinforcement) can be used to resist uplift forces. Specific designs would require individual analysis.

CONSTRUCTION CONSIDERATIONS

Foundations, slabs and other improvements which may be affected by frost movements should be insulated from frost penetration during freezing weather. If filling takes place during freezing weather, all frozen soils, snow and ice should be stripped from areas to be filled prior to new fill placement. The new fill should not be allowed to freeze during transit, placement or compaction. This should be considered in the project scheduling, budgeting and quantity estimating. It is usually beneficial to perform cold weather earthwork operations in small areas where grade can be attained quickly rather than working larger areas where a greater amount of frost stripping may be needed. If slab subgrade areas freeze, we recommend the subgrade be thawed prior to floor slab placement. The frost action may also require reworking and recompaction of the thawed subgrade.

Appendix

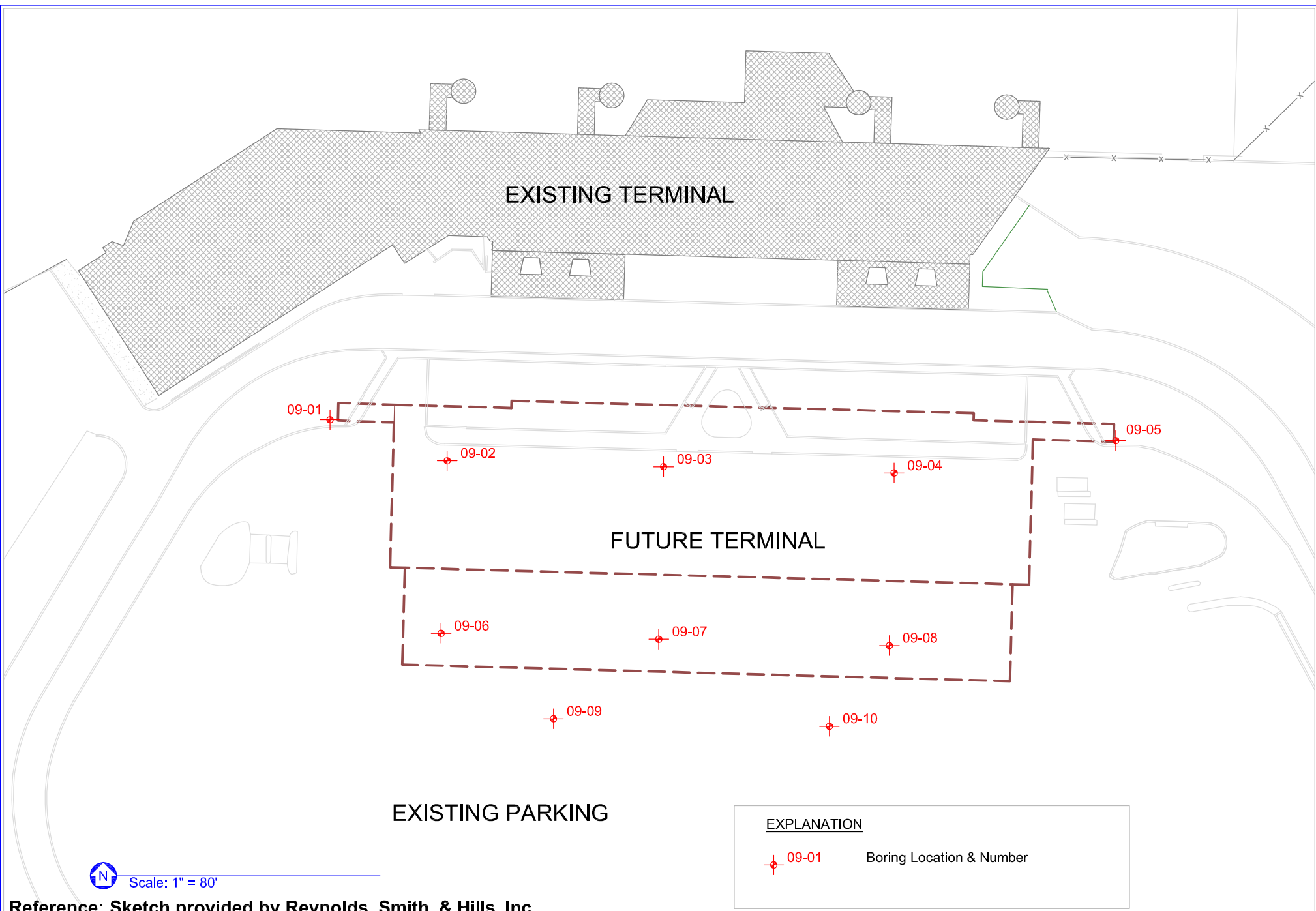
Figure 1 –Approximate Test Boring Locations

Logs of Test Borings

Boring Log Notes


Unified Soil Classification System


Geologic Terminology



Reference: Sketch provided by Reynolds, Smith, & Hills, Inc.

EXPLANATION

 09-01 Boring Location & Number

	PROJECT NO.	07-04216.02
	ALTERED BY:	DWA
	CHECKED BY:	
	DATE:	10/06/09
FIGURE NO.	APPROXIMATE BORING LOCATIONS	

DULUTH INTERNATIONAL AIRPORT TERMINAL
Duluth, Minnesota





AMERICAN
ENGINEERING
TESTING, INC.

SUBSURFACE TEST BORING LOG

AET JOB NO: **07-04216.2**

LOG OF BORING NO. **09-01 (p. 1 of 1)**

PROJECT: **Duluth International Airport Terminal; Duluth, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DD	LL	PL	%-#200
1	FILL, organic sandy silt with roots, dark brown	FILL		M	SU						
2	FILL, coarse sand and gravel, dark brown (pea rock)			M	SS	3					
3			4	M	SS						
4	SILTY SAND, dark brown, moist, medium dense (SM)	TILL		M	SS	16	11				
5			21	M	SS						
6				M	SS	18					
7	SILTY SAND, a little gravel, dark brown, moist to wet, medium dense (SM)		18	M	SS						
8				M	SS	12					
9			23	M	SS						
10				M	SS	0					
11	SILTY SAND, dark brown, moist with wet lenses, very dense to dense (SM)		60	M	SS						
12				M	SS	9					
13			46	W	SS						
14											
15											
16	END OF BORING AT 16.0 FEET Borehole backfilled with auger cuttings										

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-14½'	3.25" HSA	9/16/09	8:43	13.5	12.0	11.8	---	11.0	
		9/16/09	8:50	16.0	14.5	14.5	---	11.4	
BORING COMPLETED: 9/16/09		9/16/09	8:59	16.0	None	3.0	---	None	
DR: LA LG: TDD Rig: 51									



AMERICAN
ENGINEERING
TESTING, INC.

SUBSURFACE TEST BORING LOG

AET JOB NO: **07-04216.2**

LOG OF BORING NO. **09-02 (p. 1 of 1)**

PROJECT: **Duluth International Airport Terminal; Duluth, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DD	LL	PL	%-#200
	Bituminous Pavement - 9½" thickness	PAVEMENT			SU						
1	FILL, silty sand with gravel, dark brown	FILL	12	M	SS	2					
2	FILL, lean clay with sand, a little gravel, reddish brown		8	M	SS	8					
3	SILTY SAND, a little gravel, dark brown, moist, medium dense to dense, lenses of sandy silt below about 8' (SM)		17	M	SS	13	12				
4		TILL	31	M	SS	13					
5			22	M	SS	16					
6											
7											
8											
9	SANDY SILT, dark brown, moist, medium dense (ML)	FINE ALLUVIUM	24	M	SS	16					
10			31	M	SS	14					
11	SANDY SILT, dark brown, moist, dense, laminations of light brown fine grained sand and reddish brown lean clay (ML)		44	M/W	SS	17					
12											
13											
14		TILL	22/0.5'	M	SS	4					
15			50/0.2'								
16											
17											
18											
19	SILTY SAND WITH GRAVEL, apparent cobbles, dark brown, moist with wet lenses, dense (SM)	TILL									
20											
21											
22											
23											
24											
25	END OF BORING AT 25.2 FEET Borehole backfilled with auger cuttings and bituminous patch										

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-24½'	3.25" HSA								
		9/15/09	10:22	25.2	24.5	25.2	---	None	
		9/15/09	10:35	25.2	None	20.0	---	None	
BORING COMPLETED: 9/16/09		9/15/09	15:30	25.2	None	17.0	---	16.0	
DR: LA LG: TDD Rig: 51		9/16/09	9:10	25.2	None	4.5	---	4.4	



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SUBSURFACE TEST BORING LOG

AET JOB NO: **07-04216.2**

LOG OF BORING NO. **09-03 (p. 1 of 1)**

PROJECT: **Duluth International Airport Terminal; Duluth, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DD	LL	PL	%-#200
1	Bituminous Pavement - 8" thickness	PAVEMENT									
2	FILL, sand with silt and gravel, dark brown	FILL		M	SU						
3	SILTY SAND WITH GRAVEL, dark brown, moist, medium dense (SM)		21	M	SS	14					
4											
5	GRAVELLY SAND, medium to coarse grained, brown, moist, dense to very dense (SP)	COARSE ALLUVIUM	32	M	SS	9					
6											
7											
8			58	M	SS	9					
9											
10	GRAVELLY SILTY SAND, brown, moist with wet lenses, very dense (SM)		74	M/W	SS	5					
11											
12											
13	SILTY SAND WITH GRAVEL, apparent cobbles, dark brown, moist with wet lenses to wet, very dense (SM)	TILL	67	M/W	SS	10					
14											
15			58	W	SS	10					
16											
17											
18											
19	GRAVELLY SAND WITH SILT, dark brown, wet (SP-SM)		50/0.2'	W	SS	2					
20	AUGER REFUSAL AT 20.0 FEET Borehole backfilled with auger cuttings and bituminous patch										

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-20'	3.25" HSA								
		9/15/09	11:15	13.5	12.0	12.0	---	11.5	
		9/15/09	11:23	16.0	14.5	14.7	---	7.7	
BORING COMPLETED: 9/15/09		9/15/09	12:06	16.0	None	6.5	---	6.4	
DR: LA LG: TDD Rig: 51									



SUBSURFACE TEST BORING LOG

AET JOB NO: **07-04216.2**

LOG OF BORING NO. **09-04 (p. 1 of 1)**

PROJECT: **Duluth International Airport Terminal; Duluth, MN**

DEPTH IN FEET	SURFACE ELEVATION: MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DD	LL	PL	%-#200
1	Bituminous Pavement - 7/4" thickness	PAVEMENT									
2	FILL, silty sand with gravel, dark brown	FILL		M	SU						
3	SANDY SILT, light brown, moist (ML)			M	SS	16					
4	LEAN CLAY, reddish brown, laminations of silt (CL)	FINE ALLUVIUM	9								
5	SILTY SAND, a little gravel, fine to medium grained, dark brown, moist (SM)	COARSE ALLUVIUM	33	M	SS	8					
6	SILTY SAND, a little gravel, dark brown, moist with wet lenses, medium dense, lenses of silty clay below about 9' (SM)		15	M/W	SS	18	13				
7											
8											
9											
10		TILL	4/0.5' 16/0.5' 50/0.2'	M/W	SS	8					
11	SILTY SAND WITH GRAVEL, dark brown, moist with wet lenses, medium dense, lenses of gravelly sand with silt and silty clayey sand with gravel (SM)		18	M/W	SS	13					
12											
13											
14	GRAVELLY SAND WITH SILT, fine to coarse grained, dark brown, wet, medium dense (SP-SM)	COARSE ALLUVIUM	19	W	SS	5					
15											
16											
17											
18											
19	SILTY SAND WITH GRAVEL, dark brown, wet, dense to very dense (SM)		42	W	SS	7					
20											
21											
22		TILL									
23											
24											
25			56	W	SS	11					
26	END OF BORING AT 26.0 FEET Borehole backfilled with auger cuttings and bituminous patch										

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-24 1/2'	3.25" HSA								
		9/15/09	13:43	21.0	19.5	20.5	---	13.8	
		9/15/09	14:09	26.0	None	16.0	---	11.0	
BORING COMPLETED: 9/15/09									
DR: LA LG: TDD Rig: 51									



SUBSURFACE TEST BORING LOG

AET JOB NO: **07-04216.2**

LOG OF BORING NO. **09-05 (p. 1 of 1)**

PROJECT: **Duluth International Airport Terminal; Duluth, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DD	LL	PL	%-#200
1	FILL, slightly organic silty sand with roots, dark brown	FILL	15	M	SU	15					
2	FILL, medium to coarse sand with gravel, brown			M	SS						
3	SILTY SAND WITH GRAVEL, dark brown, moist, medium dense, trace roots above about 2.5' (SM) (may be fill)	TILL OR FILL	14	M	SS	11					
4				M	SS						
5				M	SS						
6	SILTY SAND, a little gravel, dark brown, moist, medium dense (SM)	TILL	22	M	SS	11					
7				M	SS						
8				M	SS						
9	SILTY SAND WITH GRAVEL, dark brown, moist, dense (SM)	TILL	30	M	SS	15					
10				M	SS						
11				M	SS						
12	SILTY SAND, a little gravel, dark brown, moist, medium dense (SM)	TILL	37	M	SS	5					
13				M	SS						
14				M	SS						
15	SILTY SAND, a little gravel, dark brown, moist, medium dense (SM)	TILL	29	M	SS	17					
16				M	SS						
16	END OF BORING AT 16.0 FEET Borehole backfilled with auger cuttings										

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-14½'	3.25" HSA	9/15/09	14:57	16.0	14.5	15.0	---	None	
		9/15/09	15:03	16.0	None	12.7	---	None	
BORING COMPLETED: 9/15/09									
DR: LA LG: TDD Rig: 51									





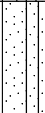



SUBSURFACE TEST BORING LOG

AET JOB NO: **07-04216.2**

LOG OF BORING NO. **09-06 (p. 1 of 1)**

PROJECT: **Duluth International Airport Terminal; Duluth, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION		GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
								WC	DD	LL	PL	%-#200
1	Bituminous Pavement - 8½" thickness		PAVEMENT		M	SU						
2	FILL, silty sand with gravel, dark brown		FILL	14	M	SS	8					
3	SILTY SAND, a little gravel, dark brown, moist, medium dense to dense (SM)		TILL	17	M	SS	10	13				
4												
5				21	M	SS	14					
6												
7												
8				36	M	SS	14					
9	SAND WITH SILT AND GRAVEL, fine to coarse grained, dark brown, wet, dense (SP-SM)		COARSE ALLUVIUM									
10				39	W	SS	10					
11	SILTY SAND WITH GRAVEL, dark brown, wet, dense (SM)		TILL									
12				44	M	SS	9					
13												
14												
15				43	M	SS	18					
16	END OF BORING AT 16.0 FEET Borehole backfilled with auger cuttings and bituminous patch <i>Boring offset 3' N of staked location</i>											

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-14½'	3.25" HSA	9/16/09	9:56	16.0	14.5	15.0	---	None	
		9/16/09	10:03	16.0	None	10.7	---	None	
BORING COMPLETED: 9/16/09									
DR: LA LG: TDD Rig: 51									












SUBSURFACE TEST BORING LOG

AET JOB NO: **07-04216.2**

LOG OF BORING NO. **09-07 (p. 1 of 1)**

PROJECT: **Duluth International Airport Terminal; Duluth, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DD	LL	PL	%-#200
	Bituminous Pavement - 8" thickness	 PAVEMENT									
1	FILL, silty sand with gravel, dark brown			M	SU						
2											
3			10	M	SS	11					
4	SAND WITH SILT AND GRAVEL, fine to medium grained, dark brown, moist, medium dense (SP-SM) (may be fill)										
5			16	M	SS	12					
6	SILTY SAND WITH GRAVEL, dark brown, moist (SM)										
7											
8	SANDY SILTY CLAY, brown, moist, very stiff, lenses of reddish brown sandy lean clay (CL-ML)										
9			22	M	SS	14	21				
10	SAND WITH SILT AND GRAVEL, medium to coarse grained, dark brown, wet, medium dense (SP-SM)										
11			22	W	SS	7					
12	SILTY SAND WITH GRAVEL, fine to coarse grained, dark brown, wet (SM)										
13			34	W	SS	13					
14	SANDY SILT, dark brown, wet, dense to medium dense (ML)										
15											
16			23	W	SS	13					
17	SILTY SAND WITH GRAVEL, dark brown, wet, very dense (SM)										
18											
19											
20			79	W	SS	10					
21											
22											
23	SILTY SAND, a little gravel, dark brown, wet, dense (SM)										
24											
25			48	W	SS	14					
26	END OF BORING AT 26.0 FEET Borehole backfilled with auger cuttings and bituminous patch										

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-24½'	3.25" HSA	9/16/09	11:10	11.0	9.5	9.5	---	7.5	
		9/16/09	11:45	26.0	24.5	24.5	---	16.5	
BORING COMPLETED: 9/16/09									
DR: LA LG: TDD Rig: 51									



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SUBSURFACE TEST BORING LOG

AET JOB NO: **07-04216.2**

LOG OF BORING NO. **09-08 (p. 1 of 1)**

PROJECT: **Duluth International Airport Terminal; Duluth, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DD	LL	PL	%-#200
1	Bituminous Pavement - 7½" thickness	PAVEMENT									
2	FILL, silty sand with gravel, dark brown, apparent cobbles below about 2'	FILL	50/0.3'	M	SU	0					
3											
4	SILTY SAND, a little gravel, dark brown, moist, medium dense (SM)		18	M	SS	13	11				
5											
6											
7											
8			16	M	SS	12					
9											
10	SILTY SAND WITH GRAVEL, dark brown, moist with wet lenses, medium dense to dense (SM)	TILL	18	M/W	SS	5					
11											
12											
13			35		SS	0					
14											
15			30	M/W	SS	16					
16	END OF BORING AT 16.0 FEET Borehole backfilled with auger cuttings and bituminous patch										

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-14½'	3.25" HSA	9/16/09	13:30	16.0	14.5	14.5	---	None	
		9/16/09	13:35	16.0	None	11.0	---	None	
BORING COMPLETED: 9/16/09									
DR: LA LG: TDD Rig: 51									








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SUBSURFACE TEST BORING LOG

AET JOB NO: **07-04216.2**

LOG OF BORING NO. **09-09 (p. 1 of 1)**

PROJECT: **Duluth International Airport Terminal; Duluth, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DD	LL	PL	%-#200
	Bituminous Pavement - 9½" thickness	 PAVEMENT									
1	FILL, mostly silty sand with gravel, a little clayey sand, brown	 FILL	11	M	SU						
2				M	SS	2					
3				M	SS						
4	SILTY SAND, a little gravel, lenses of sandy silt, dark brown, moist, medium dense (SM)	 TILL	18	M	SS	14	14				
5				M	SS						
6	GRAVELLY SAND WITH SILT, fine to coarse grained, dark brown, wet, dense (SP-SM)	 COARSE ALLUVIUM	37	W	SS	11					
7				W	SS						
8	SILTY SAND, a little gravel, dark brown, moist with wet lenses, medium dense (SM)	 TILL	21	M	SS	15					
9				M	SS						
10				M	SS						
11											
12											
13	AUGER REFUSAL AT 13.0 FEET Borehole backfilled with auger cuttings and bituminous patch										

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-13'	3.25" HSA								
		9/16/09	15:10	11.0	9.5	9.5	---	None	
		9/16/09	15:23	12.5	13.0	13.0	---	None	
BORING COMPLETED: 9/16/09		9/16/09	15:30	12.5	None	7.5	---	7.0	
DR: LA LG: TDD Rig: 51									















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SUBSURFACE TEST BORING LOG

AET JOB NO: **07-04216.2**

LOG OF BORING NO. **09-10 (p. 1 of 1)**

PROJECT: **Duluth International Airport Terminal; Duluth, MN**

DEPTH IN FEET	SURFACE ELEVATION: _____ MATERIAL DESCRIPTION		GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS						
								WC	DD	LL	PL	%-#200		
	Bituminous Pavement - 8" thickness		PAVEMENT											
1	FILL, silty sand with gravel, dark brown		FILL		M		SU							
2	FILL, silty sand with gravel, trace roots, brown and dark brown				17	M		SS	14					
3														
4														
5						11			SS	0				
6	SILTY SAND WITH GRAVEL, brown, moist, medium dense, lenses of sandy silt (SM)		TILL											
7														
8				22			SS	17	11					
9														
10						15				SS	12			
11	SILTY SAND WITH GRAVEL, dark brown, wet, medium dense, lenses of sand with silt above about 12' (SM)		TILL											
12														
13				19	M/W		SS	10						
14														
15						28	W		SS	10				
16	END OF BORING AT 16.0 FEET Borehole backfilled with auger cuttings and bituminous patch													

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-14½'	3.25" HSA	9/16/09	14:20	13.5	12.0	12.0	---	11.0	
		9/16/09	14:31	16.0	None	11.0	---	8.5	
BORING COMPLETED: 9/16/09									
DR: LA LG: TDD Rig: 51									

BORING LOG NOTES

DRILLING AND SAMPLING SYMBOLS

Symbol	Definition
B,H,N:	Size of flush-joint casing
CA:	Crew Assistant (initials)
CAS:	Pipe casing, number indicates nominal diameter in inches
CC:	Crew Chief (initials)
COT:	Clean-out tube
DC:	Drive casing; number indicates diameter in inches
DM:	Drilling mud or bentonite slurry
DR:	Driller (initials)
DS:	Disturbed sample from auger flights
FA:	Flight auger; number indicates outside diameter in inches
HA:	Hand auger; number indicates outside diameter
HSA:	Hollow stem auger; number indicates inside diameter in inches
LG:	Field logger (initials)
MC:	Column used to describe moisture condition of samples and for the ground water level symbols
N (BPF):	Standard penetration resistance (N-value) in blows per foot (see notes)
NQ:	NQ wireline core barrel
PQ:	PQ wireline core barrel
RD:	Rotary drilling with fluid and roller or drag bit
REC:	In split-spoon (see notes) and thin-walled tube sampling, the recovered length (in inches) of sample. In rock coring, the length of core recovered (expressed as percent of the total core run). Zero indicates no sample recovered.
REV:	Revert drilling fluid
SS:	Standard split-spoon sampler (steel; 1d" is inside diameter; 2" outside diameter); unless indicated otherwise
SU	Spin-up sample from hollow stem auger
TW:	Thin-walled tube; number indicates inside diameter in inches
WASH:	Sample of material obtained by screening returning rotary drilling fluid or by which has collected inside the borehole after falling through drilling fluid
WH:	Sampler advanced by static weight of drill rod and 140-pound hammer
WR:	Sampler advanced by static weight of drill rod
94mm:	94 millimeter wireline core barrel
?	Water level directly measured in boring
I	Estimated water level based solely on sample appearance

TEST SYMBOLS

Symbol	Definition
CONS:	One-dimensional consolidation test
DEN:	Dry density, pcf
DST:	Direct shear test
E:	Pressuremeter Modulus, tsf
HYD:	Hydrometer analysis
LL:	Liquid Limit, %
LP:	Pressuremeter Limit Pressure, tsf
OC:	Organic Content, %
PERM:	Coefficient of permeability (K) test; F - Field; L - Laboratory
PL:	Plastic Limit, %
q _p :	Pocket Penetrometer strength, tsf (<u>approximate</u>)
q _c :	Static cone bearing pressure, tsf
q _u :	Unconfined compressive strength, psf
R:	Electrical Resistivity, ohm-cms
RQD:	Rock Quality Designation of Rock Core, in percent (aggregate length of core pieces 4" or more in length as a percent of total core run)
SA:	Sieve analysis
TRX:	Triaxial compression test
VS _R :	Vane shear strength, remoulded (field), psf
VS _U :	Vane shear strength, undisturbed (field), psf
WC:	Water content, as percent of dry weight
%-200:	Percent of material finer than #200 sieve

STANDARD PENETRATION TEST NOTES

The standard penetration test consists of driving the sampler with a 140 pound hammer and counting the number of blows applied in each of three 6" increments of penetration. If the sampler is driven less than 18" (usually in highly resistant material), permitted in ASTM:D1586, the blows for each complete 6" increment and for each partial increment is on the boring log. For partial increments, the number of blows is shown to the nearest 0.1' below the slash.

The length of sample recovered, as shown on the AREC@column, may be greater than the distance indicated in the N column. The disparity is because the N-value is recorded below the initial 6" set (unless partial penetration defined in ASTM:D1586 is encountered) whereas the length of sample recovered is for the entire sampler drive (which may even extend more than 18").

UNIFIED SOIL CLASSIFICATION SYSTEM

ASTM Designations: D 2487, D2488

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Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification	
				Group Symbol	Group Name ^B
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines ^C	$Cu \geq 4$ and $1 < Cc \leq 3^E$	GW	Well graded gravel ^F
			$Cu < 4$ and/or $1 > Cc > 3^E$	GP	Poorly graded gravel ^F
	Gravels with Fines more than 12% fines ^C	Fines classify as ML or MH	GM	Silty gravel ^{F,G,H}	
		Fines classify as CL or CH	GC	Clayey gravel ^{F,G,H}	
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines ^D	$Cu \geq 6$ and $1 < Cc \leq 3^E$	SW	Well-graded sand ^I
			$Cu < 6$ and $1 > Cc > 3^E$	SP	Poorly-graded sand ^I
Fine-Grained Soils 50% or more passes the No. 200 sieve (see Plasticity Chart below)	Sils and Clays Liquid limit less than 50	inorganic	Fines classify as ML or MH	SM	Silty sand ^{G,H,I}
			Fines classify as CL or CH	SC	Clayey sand ^{G,H,I}
		organic	PI > 7 and plots on or above "A" line ^J	CL	Lean clay ^{K,L,M}
			PI < 4 or plots below "A" line ^J	ML	Silt ^{K,L,M}
	Sils and Clays Liquid limit 50 or more	inorganic	Liquid limit—oven dried <0.75 Liquid limit – not dried	OL	Organic clay ^{K,L,M,N} Organic silt ^{K,L,M,O}
			PI plots on or above "A" line	CH	Fat clay ^{K,L,M}
		organic	PI plots below "A" line	MH	Elastic silt ^{K,L,M}
			Liquid limit—oven dried <0.75 Liquid limit – not dried	OH	Organic clay ^{K,L,M,P} Organic silt ^{K,L,M,Q}
Highly organic soil		Primarily organic matter, dark in color, and organic in odor	PT	Peat ^R	

^ABased on the material passing the 3-in (75-mm) sieve.

^BIf field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^CGravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

^DSands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

^E $Cu = D_{60} / D_{10}$, $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

^FIf soil contains $\geq 15\%$ sand, add "with sand" to group name.

^GIf fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^HIf fines are organic, add "with organic fines" to group name.

^IIf soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^JIf Atterberg limits plot is hatched area, soils is a CL-ML silty clay.

^KIf soil contains 15 to 29% plus No. 200 add "with sand" or "with gravel", whichever is predominant.

^LIf soil contains $\geq 30\%$ plus No. 200, predominantly sand, add "sandy" to group name.

^MIf soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^NPI ≥ 4 and plots on or above "A" line.

^OPI < 4 or plots below "A" line.

^PPI plots on or above "A" line.

^QPI plots below "A" line.

^RFiber Content description shown below.

SIEVE ANALYSIS

Equation of "A"-line
Horizontal at PI = 4 to LL = 25.5,
then PI = 0.73 (LL-20)

Equation of "U"-line
Vertical at LL = 16 to PI = 7,
then PI = 0.9 (LL-8)

$C_u = \frac{D_{60}}{D_{10}} = \frac{15}{2.5} = 200$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = \frac{2.5^2}{2.5 \times 15} = 5.6$

PLASTICITY CHART

For classification of fine-grained soils and fine-grained fraction of coarse-grained soils.

Equation of "A"-line
Horizontal at PI = 4 to LL = 25.5,
then PI = 0.73 (LL-20)

Equation of "U"-line
Vertical at LL = 16 to PI = 7,
then PI = 0.9 (LL-8)

Plasticity Chart

Notes

^ABased on the material passing the 3-in (75-mm) sieve.

^BIf field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^CGravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

^DSands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

^E $Cu = D_{60} / D_{10}$, $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

^FIf soil contains $\geq 15\%$ sand, add "with sand" to group name.

^GIf fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^HIf fines are organic, add "with organic fines" to group name.

^IIf soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^JIf Atterberg limits plot is hatched area, soils is a CL-ML silty clay.

^KIf soil contains 15 to 29% plus No. 200 add "with sand" or "with gravel", whichever is predominant.

^LIf soil contains $\geq 30\%$ plus No. 200, predominantly sand, add "sandy" to group name.

^MIf soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

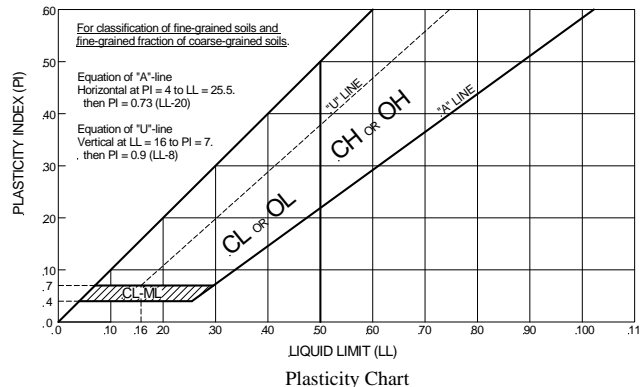
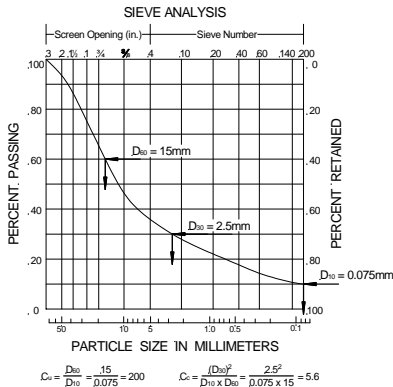
^NPI ≥ 4 and plots on or above "A" line.

^OPI < 4 or plots below "A" line.

^PPI plots on or above "A" line.

^QPI plots below "A" line.

^RFiber Content description shown below.



ADDITIONAL TERMINOLOGY NOTES USED BY AET FOR SOIL IDENTIFICATION AND DESCRIPTION

Grain Size		Gravel Percentages		Consistency of Plastic Soils		Relative Density of Non-Plastic Soils	
Term	Particle Size	Term	Percent	Term	N-Value, BPF	Term	N-Value, BPF
Boulders	Over 12"	A Little Gravel	3% - 14%	Very Soft	less than 2	Very Loose	0 - 4
Cobbles	3" to 12"	With Gravel	15% - 29%	Soft	2 - 4	Loose	5 - 10
Gravel	#4 sieve to 3"	Gravelly	30% - 50%	Firm	5 - 8	Medium Dense	11 - 30
Sand	#200 to #4 sieve			Stiff	9 - 15	Dense	31 - 50
Fines (silt & clay)	Pass #200 sieve			Very Stiff	16 - 30	Very Dense	Greater than 50
				Hard	Greater than 30		
Moisture/Frost Condition		Layering Notes		Fiber Content of Peat		Organic/Roots Description (if no lab tests)	
(MC Column)				Fiber Content (Visual Estimate)		Soils are described as <i>organic</i> , if soil is not peat and is judged to have sufficient organic fines content to influence the soil properties. <i>Slightly organic</i> used for borderline cases.	
D (Dry):	Absence of moisture, dusty, dry to touch.	Laminations: Layers less than 1/2" thick of differing material or color.		Term			
M (Moist):	Damp, although free water not visible. Soil may still have a high water content (over "optimum").			Fibric Peat:	Greater than 67%		
W (Wet/ Waterbearing):	Free water visible intended to describe non-plastic soils. Waterbearing usually relates to sands and sand with silt.			Hemic Peat:	33 - 67%		
F (Frozen):	Soil frozen	Lenses: Pockets or layers greater than 1/2" thick of differing material or color.		Sapric Peat:	Less than 33%		
						With roots: Judged to have sufficient quantity of roots to influence the soil properties.	
						Trace roots: Small roots present, but not judged to be in sufficient quantity to significantly affect soil properties.	

GEOLOGIC TERMINOLOGY (SOILS)

General categories of geologic deposits used, descriptive information and common soil types is as follows:

FILL (F): Soils, rock and/or waste products placed or disturbed by man rather than through geologic processes. Mixed soils are usually easy to identify. Uniform material is more difficult, and signs such as small inclusions, underlying topsoil, topography or knowledge of below grade improvements (e.g., basement backfill, utility trenches, etc.) may be needed to properly judge. When mixed condition is stratified horizontally, the soil may be a weathered natural soil rather than fill.

TOPSOIL (TS): Upper darker colored layer formed by weathering of inorganic soil and accumulation of organic material. Usually black, dark brown, dark gray or dark grayish brown. Often transitions from darker to lighter color.

SLOPEWASH (SW): Organic and/or inorganic materials (sometimes interlayered) washed from slopes and redeposited. Usually stratified. Will be located in depressed areas where they can be washed in from slopes. When topsoil layers are thick in depressed areas, there is a good chance the soil is slopewash.

SWAMP DEPOSITS (SD): Highly organic material (peats and organic clays) which are formed through accumulation of organic material under water. **Peat, Organic clay**

COARSE ALLUVIUM (CA): Sandy (and gravelly). Stratified. Deposited from fast moving waters in streams and rivers. Includes glacial outwash. **Sand, Sand with silt, Silty sand, Gravels**

FINE ALLUVIUM (FA): Clayey and/or silty. Stratified. Deposited from slow moving waters in streams, rivers, lakes and ponds. Includes glacial outwash. **Lean clay, Fat clay, Silty clay, Silt, Sandy silt**

MIXED ALLUVIUM (MA): Combination of Fine and Coarse Alluvium. **Clayey sand, Sandy lean clay**, interlayered CA/FA

LACUSTRINE (LAC): Fine grained lake bed deposits (lakes may or may not still be in existence). Usually in very flat topography. **Fat clay, Lean clay, Silty clay, Silt**

LOESS (LOESS): Uniform, non-stratified, silty material (or very fine sand) which is deposited by wind. Can include significant clay content, and grain contacts may be cemented by clay or calcareous (limestone/chalky) material. **Silt, Sandy silt, Silty clay, Lean clay**

TILL (T): Normally contains a wide range of grain sizes, from boulders through clay. Usually non-stratified (not sorted through water action). Deposited directly from glaciers. **Silty sand, Clayey sand, Sandy lean clay**, usually contains gravel

WEATHERED TILL (WT): Tills which have been altered by exposure to the action of frost, water, or chemicals. Often softer than underlying soils. May be stratified with varying colors/soil types due to filling in or other changes in frost lensed zones.

COLLUVIUM (COL): Dominantly gravel, boulders and rock slabs, sometimes intermixed or layered with soils. Deposited from gravity flow down hills or cliffs.



AMERICAN
ENGINEERING
TESTING, INC.

CONSULTANTS
· ENVIRONMENTAL
· GEOTECHNICAL
· MATERIALS
· FORENSICS

January 29, 2010

Mr. John Hippchen, PE, LEED AP
Reynolds, Smith, and Hills
4525 Airport Approach Road, Suite A
Duluth, MN 55811

Re: Duluth International Airport Terminal
Pressuremeter Testing
Duluth, Minnesota
AET Project #07-04216.3

Dear Mr. Hippchen,

This letter presents the results of field pressuremeter testing and engineering review American Engineering Testing, Inc. (AET) performed for the new Duluth International Airport Terminal in Duluth, Minnesota. This letter is an addendum to our "Report of Geotechnical Exploration and Review," AET #07-04216.2 dated October 14, 2009 (October 14 Report), that was prepared for the new airport terminal.

Background Information

The project structural engineer (MBJ) has indicated current structural plans for the new terminal structure that will include up three stories. The front (south side) of the terminal building will be a single-story, high-ceiling area for ticketing. The main entrance to the terminal will include an exterior canopy structure on the south side of the building leading to the ticketing area. The three-story portion of the structure will be situated in the central portion of the building, with the remaining area on the north side of the building, next to the apron, being two stories. MJB indicated maximum column loads for the terminal are anticipated to be on the order of 500 to 600 kips.

The October 14 Report presented our geotechnical recommendations for the new airport terminal building. Our foundation recommendations for the terminal building included an allowable soil pressure of 5,000 pounds per square foot (psf). RS&H and MJB expressed interest in the possibility of designing foundation elements with a higher soil pressure. RS&H authorized AET to perform pressuremeter testing at the planned terminal site to assess the ability of subgrade soils to support a greater foundation bearing pressure.

Field Methods

AET performed three pressuremeter tests within the new terminal building footprint on December 16, 2009. The pressuremeter tests were used to measure strength (pressuremeter limit pressure) and strain (pressuremeter modulus) properties of subsurface soils at the planned terminal site. The measured pressuremeter limit and modulus properties were used to evaluate the potential bearing capacity and settlement of foundations with bearing pressures exceeding 5,000 psf. Pressuremeter tests were performed in boreholes offset from test borings 09-03 and 09-07. Two borings were offset from test boring 09-03 due to soil caving conditions in the borehole. The pressuremeter tests were conducted in general accordance with ASTM:D4719, Method A (Equal Pressure Method).

At the pressuremeter test locations, the borehole was extended with a drill rig using 3.25 inch inside-diameter hollow stem auger. A 3 inch outside diameter split-spoon sampler was driven to create the hole for the pressuremeter probe. The pressuremeter probe was then inserted into the hole to the desired test depth.

Pressuremeter Test Method and Results

Numerous strain readings were recorded for each test, with the pressure to the probe increased for each incremental reading. As the pressure is increased, the probe expands within the borehole causing the soil in the sides of the borehole to deform. The pressure is incrementally increased until the maximum volume of the probe is reached, or the soil has been tested beyond desired bearing capacity. For the pressuremeter test performed in borehole 09-03B, the probe membrane failed prior to reaching the pressure limit value.

The pressuremeter test results are plotted on a graph as a pressuremeter curve and a yield pressure curve. An apparent limit pressure is estimated from the yield pressure curve of the corrected pressure versus the normalized probe volume change. The pressuremeter modulus (E) is calculated from the slope of the straight line portion of this pressuremeter curve. The results of the pressuremeter testing are presented in Table I, below.

Table I: Pressuremeter Test Results

Boring Number	Test Depth (ft)	Net Limit Pressure (tsf)	Pressuremeter Modulus (tsf)
09-03B	11-13	13.0	209
09-07A	12.5-14.5	20.0	506
09-07A	18.5-20.6	24.5	672

Mr. John Hippchen, PE, LEED AP
Duluth International Airport Terminal
January 29, 2010
AET #07-04216.3
Page 3 of 3

Recommendations

Based on our engineering review of the pressuremeter test results, it is our opinion foundations for the new airport terminal building can be designed for a maximum soil bearing pressure of 8,000 psf, if constructed directly on undisturbed native soils. Any native soils that become disturbed should be excavated down to undisturbed soils. Foundation grades should be attained with a concrete fill capable of supporting foundation pressures of 8,000 psf. Perimeter footings, and any footings in unheated structures, should extend to a minimum of 72 inches below the final grade. Interior footings in heated structures should be embedded a minimum of 48 inches below at-grade slab. Other recommendations in the October 14 Report remain applicable. It is our judgment that this foundation design will include a factor of safety of greater than 3 against shear or base failure. It is also our judgment that total and differential building settlement should be less than 1 inch and ½ inch, respectively.

As previously discussed in the October 14 Report, we recommend foundation excavations be observed by a geotechnical engineer prior to placing foundation concrete. The geotechnical engineer should review foundation excavations for the presence of disturbed soils.

Closing

We appreciate the opportunity to provide additional geotechnical engineering services for this project. If you have questions, or if we can be of additional service, please contact us. We can be reached at (218) 628-1518.

American Engineering Testing, Inc.



Sara L. Leow, PE
Geotechnical Engineer
sleow@amengtest.com



Robert J. Wahlstrom, PE, PG
Senior Geotechnical Engineer
rwahlstrom@amengtest.com

Attachments: Figure 1: Boring Locations for Pressuremeter Testing
Pressuremeter Test Results



DULUTH INTERNATIONAL AIRPORT TERMINAL
Duluth, Minnesota

APPROXIMATE BORING LOCATIONS

PROJECT NO. 07-04216.03
DWA
SLL
1/26/10
ALTERED BY:
CHECKED BY:
DATE:

1
FIGURE NO.

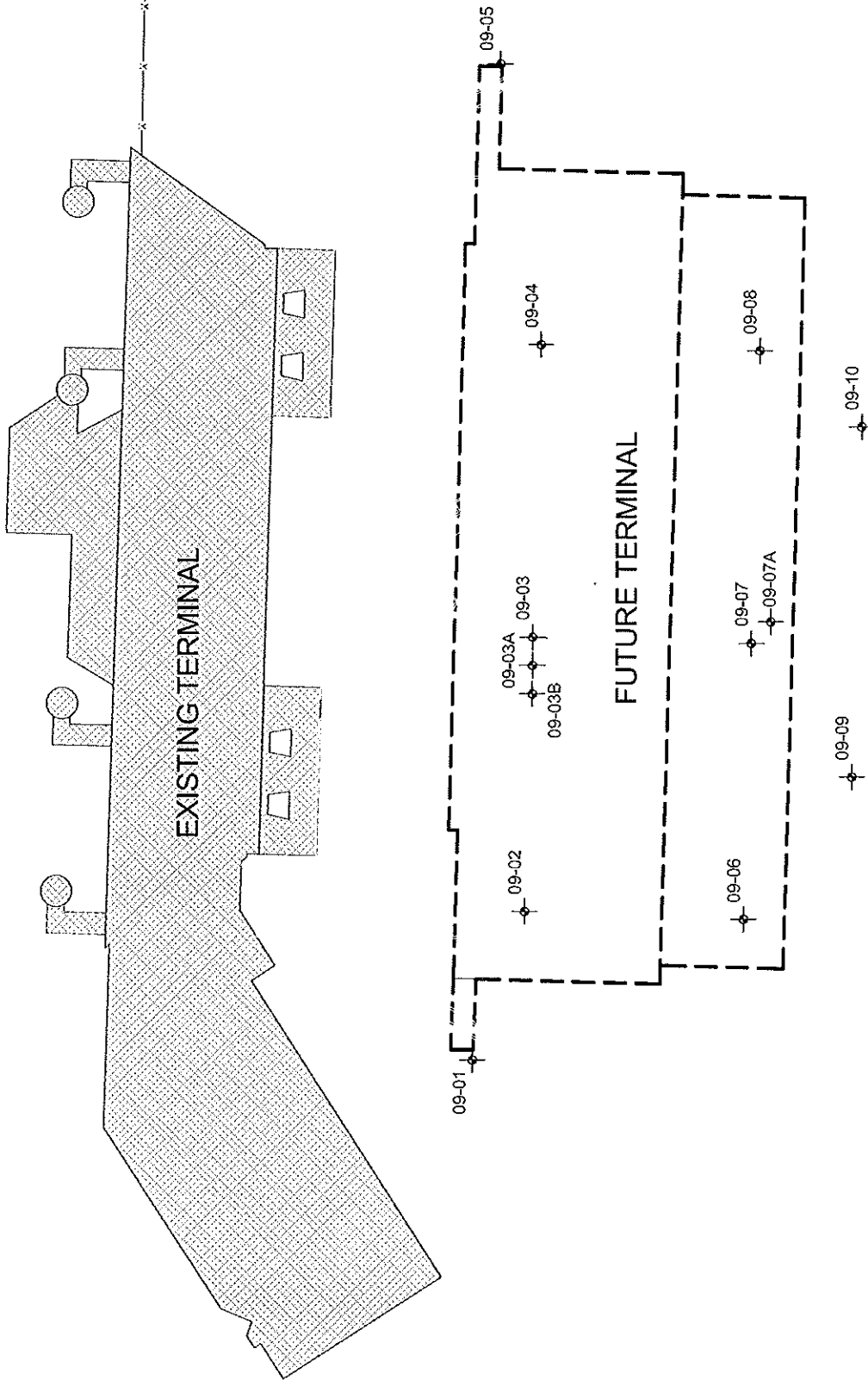
Reference: Sketch provided by Reynolds, Smith, & Hills, Inc.

N Scale: 1" = 80'

EXISTING PARKING

EXPLANATION

- 09-01 2009 Boring Location & Number
- 09-03A Test Boring Location & Number for Pressuremeter Testing

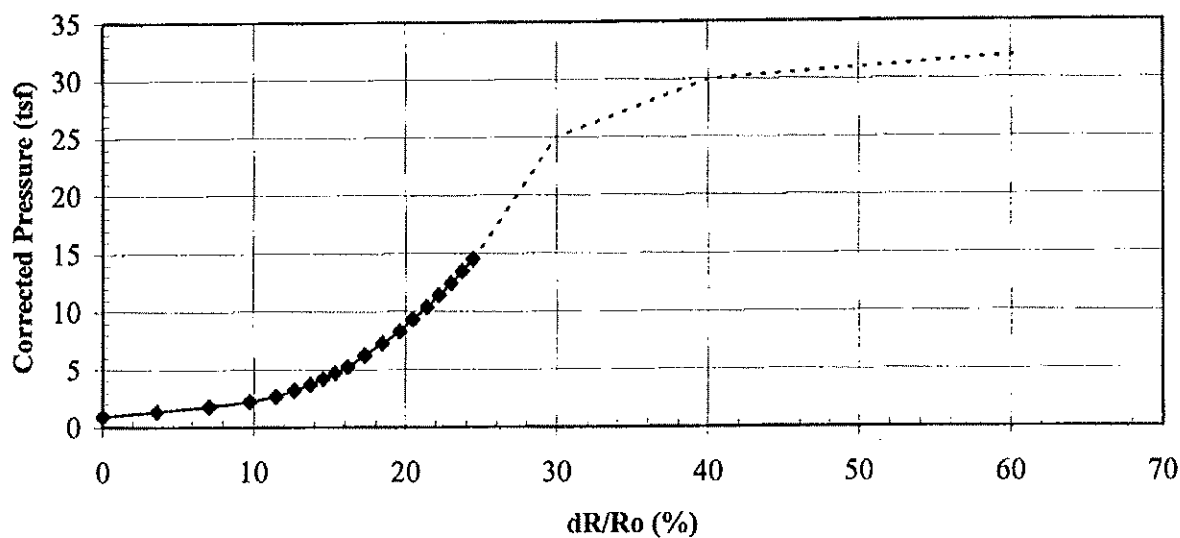


PRESSUREMETER TEST RESULTS

Airport Terminal Duluth

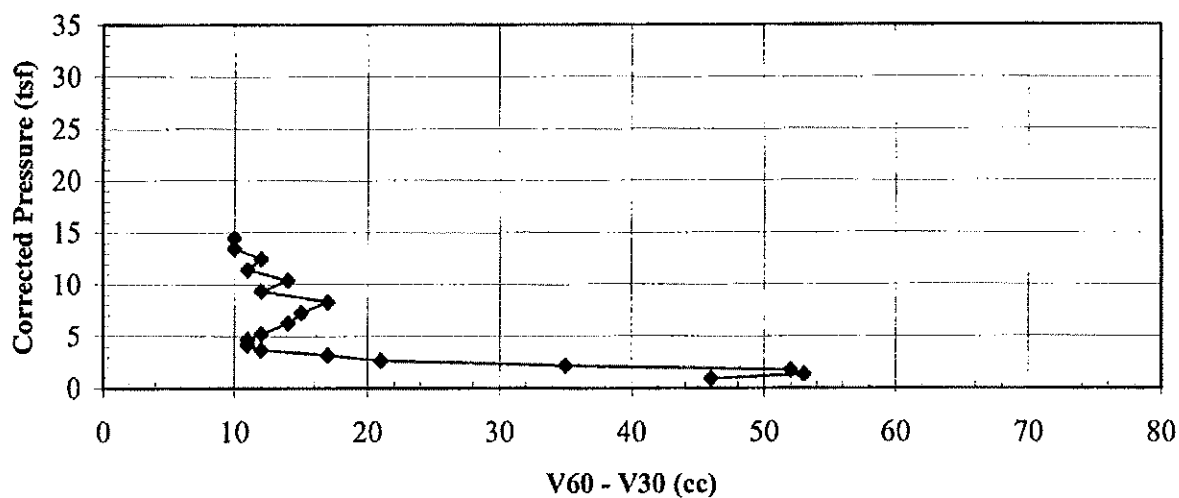
AET No. 07-04216.03

PRESSUREMETER CURVE



Boring No. : 3	$P_L(\text{tsf}) > 15.0$	$E_o(\text{tsf}) = 209$	$E_o / P_1^* = 16.1$
Depth (ft) : 11-13	$P_o(\text{tsf}) = 2.0$	Points Used = 13 to 19	$E_o / N = 3.0$
Soil : SM & Gravel	$P_L^*(\text{tsf}) > 13.0$	$P_y(\text{tsf}) > 15.0$	$P_y / P_1 = 1.00$
$N_{ave}(\text{bpf}) : 70$			

YIELD PRESSURE CURVE

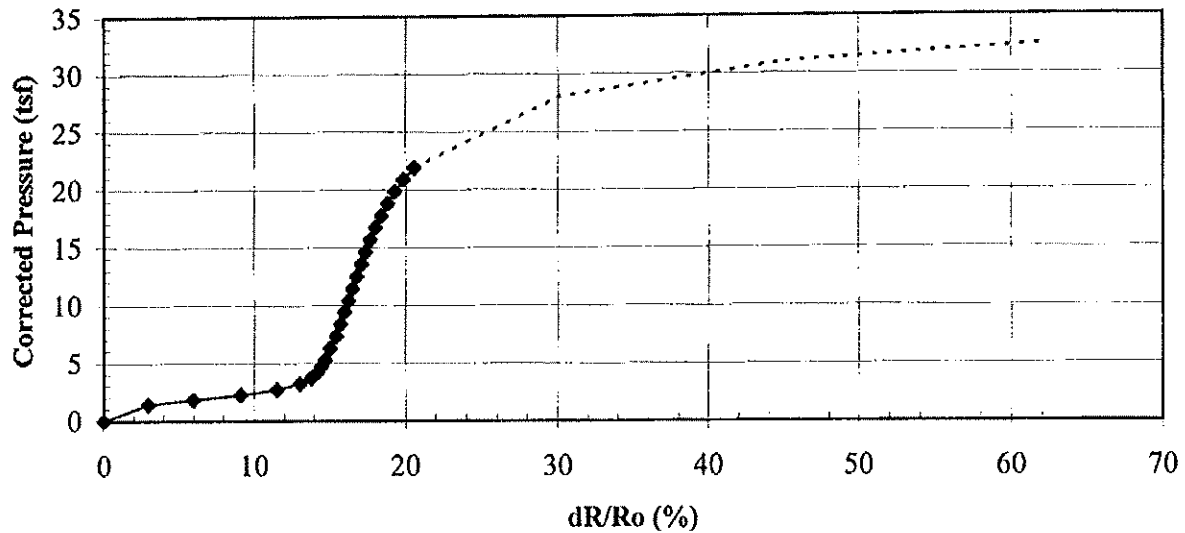


PRESSUREMETER TEST RESULTS

Airport Terminal Duluth

AET No. 07-04216.03

PRESSUREMETER CURVE



Boring No. : 7

Depth (ft) : 12.5-14.5

Soil : SM/ML

N_{ave} (bpf) : 28

P_L(tsf) > 22.0

P_o(tsf) = 2.0

P_L*(tsf) > 20.0

E_o(tsf) = 506

Points Used = 11 to 21

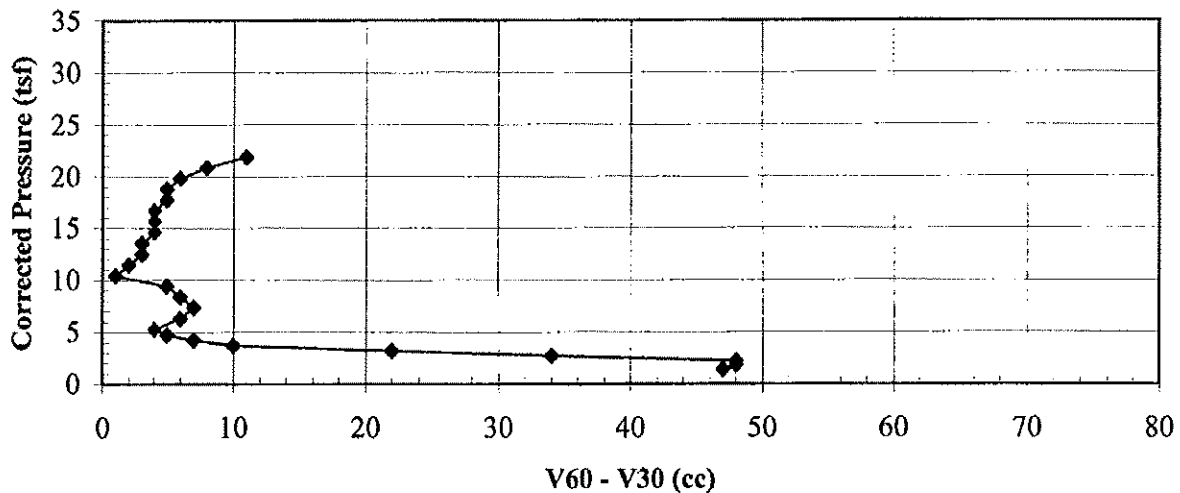
P_y(tsf) = 19.0

E_o / P_L* = 25.3

E_o / N = 18.1

P_y / P_L = 0.86

YIELD PRESSURE CURVE

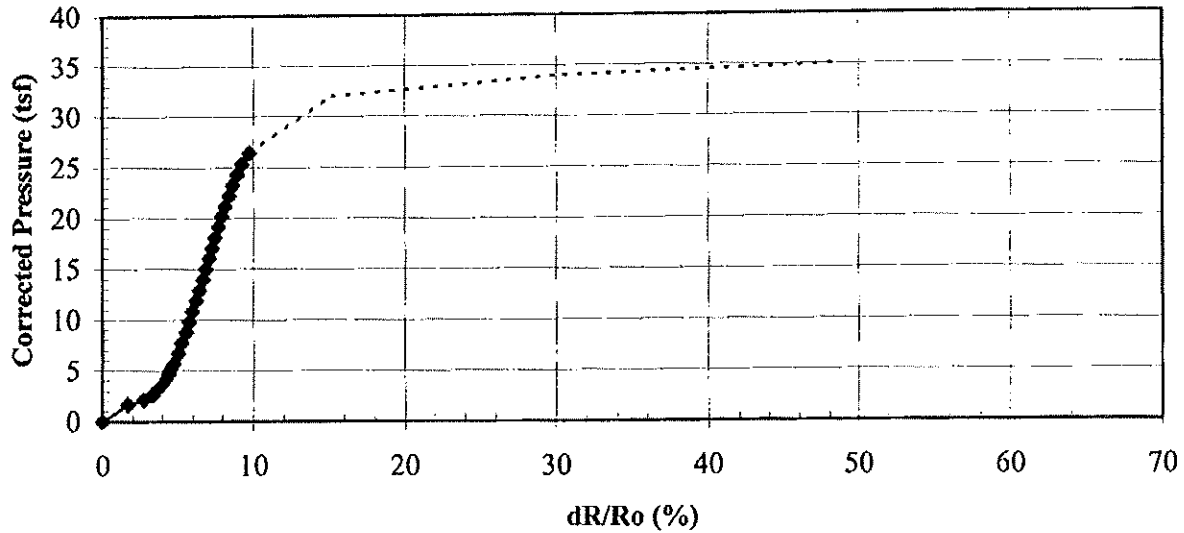


PRESSUREMETER TEST RESULTS

Airport Terminal Duluth

AET No. 07-04216.03

PRESSUREMETER CURVE



Boring No. : 7

Depth (ft) : 18.5-20.5

Soil : SM & Gravel

N_{ave} (bpf) : 79

P_L(tsf) > 27.0

P_o(tsf) = 2.5

P_L*(tsf) > 24.5

E_o(tsf) = 672

Points Used = 12 to 24

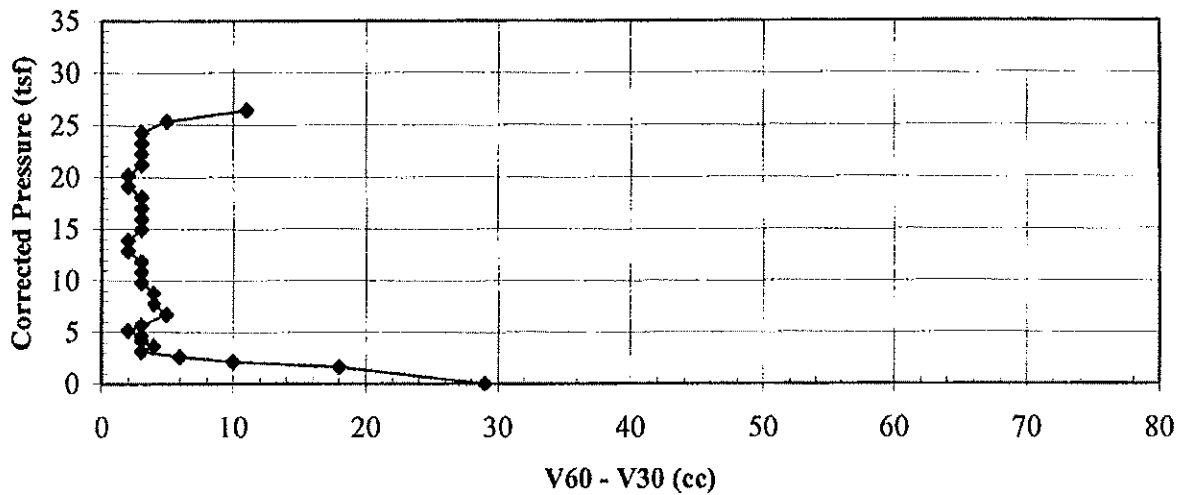
P_y(tsf) = 24.0

E_o / P₁* = 27.4

E_o / N = 8.5

P_y / P₁ = 0.89

YIELD PRESSURE CURVE



PRELIMINARY SOIL AND WATER SAMPLING REPORT

Proposed Development Project – Retention Pond Area
Duluth International Airport
Duluth, MN

Prepared For:

RS & H
4525 Airport Approach Road
Duluth, MN 55811

Prepared By:

EPC Engineering & Testing
539 Garfield Avenue
Duluth, MN 55802

1000

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EPC Engineering & Testing

Geotechnical • Environmental • Materials Engineering

539 Garfield Avenue
Duluth, Minnesota 55802

(218) 727-1239
(218) 727-1248 fax

March 16, 2006
EPC # 06E0102

Mr. Steve Conley, P.E.
RS & H
4525 Airport Approach Road
Duluth, Minnesota 55811

Re: Preliminary Soil and Water Sampling
Proposed Development Project – Retention Pond Area
Duluth International Airport

Dear Mr. Conley,

EPC Engineering & Testing (EPC) was contracted to perform soil and water sampling in an area proposed for development in the vicinity of the existing retention ponds at the above-referenced site. It is our understanding that the results of the sampling will be used to preliminarily evaluate the site from an environmental and geotechnical perspective.

Methods

Between February 24 and 28, 2006, EPC performed three soil borings in a triangular configuration around the retention ponds, and two sediment (soil) cores - one from each of the retention ponds (refer to Attachment 1 - Site Map for sample/boring locations).

The three soil borings (SB-06-1, -2, and -3) were completed with EPC's CME 750 ATV drill rig. The borings were logged in the field and standard penetration test (SPT) data was collected in accordance with ASTM D1586. Laboratory testing for moisture and visual classification of collected soil samples was also performed. Additionally, groundwater samples were collected through clean hollow stem auger via disposable plastic tubing and submitted under proper chain of custody procedures to Pace Analytical. Groundwater samples were analyzed for Volatile Organic Compounds (VOCs), Diesel Range Organics (DRO), Jet Fuel (TPH-JP4), RCRA Metals, and Glycols.

The two pond cores (BP-06-1 and SP-06-1) were completed by augering through the ice and using a hand auger to collect sediment/soil samples. Samples were collected from the water column beneath the ice and analyzed for the same parameters listed above. Samples were also collected from the sediment/soil layer on the bottom of the ponds and analyzed for the same parameters as the water samples, with the exception of the Jet Fuel analysis. Samples collected from the ponds were also submitted to Pace Analytical under proper chain of custody procedures.

Results

GEOTECHNICAL

Generally, the three soil borings indicated a Sandy Clay (CL) or Silty Sand (SM) FILL or COULD BE FILL layer over native Sandy Clay (CL) or Silty Sand (SM). The approximate FILL/COULD BE FILL depths ranged from 16.0 feet below existing ground (BEG) in SB-06-1 to 9.0 feet BEG in SB-06-3. SB-06-3 also contained a 1.5 foot thick layer of organic peat at 3.5 feet BEG. Groundwater elevations in the borings, after drilling, ranged from 1381.0 to 1383.0. More detailed geotechnical information for each boring is included on the Boring Logs (Attachment 2).

Boring Logs were also developed to illustrate the strata encountered during the pond cores/samples and are also included in Attachment 2. Except for visual classification by EPC's field representative, no geotechnical data was obtained from the pond samples.

ENVIRONMENTAL

Results of the analytical laboratory tests are summarized on Table 1 and along with the analytical laboratory reports are included in Attachment 3.

Water

No VOCs were detected in any of the water samples collected. DRO detections ranged from non-detect in SB-06-2 to a high of 7800 ug/L (micrograms per Liter) in surface water sample SP-06-1. Jet Fuel (TPH-JP4) detections ranged from non-detect in borings SB-06-2 and SB-06-3 to 19,000 ug/L in surface water sample SP-06-1. RCRA metal analysis indicated low level detections (total metals) of arsenic, barium, chromium, lead and mercury in the groundwater samples from each of the soil borings. Metals were not detected in the surface water samples from the ponds, except for very low levels of barium. Ethylene glycol was detected in the surface water sample from SP-06-1 at 13.1 milligrams/Liter (mg/L) and propylene glycol at 13,800 mg/L.

Soil

VOCs were not detected in the sediment/soil samples from the ponds, except for Toluene at 1900 ug/Kg (micrograms per kilogram) in SP-06-1. DRO was detected at 9.6 mg/Kg (milligrams per kilogram) and 7.8 mg/Kg in cores BP-06-1 and SP-06-1, respectively. Arsenic, barium, chromium and lead detections were noted in each core sample. Propylene glycol was detected in the sediment/soil in SP-06-1 at 1,290 mg/Kg.

Discussion

GEOTECHNICAL

FILL or COULD BE FILL soils were encountered in all three of the SPT borings to a depth range estimated to be 16.0 feet below BEG in SB-06-1 to 9.0 feet BEG in SB-06-3. SB-06-3 also contained a 1.5 foot thick layer of organic peat at 3.5 feet BEG. Although no specific design

information is known at the time of this report, structures typically are not founded upon FILL soils. Preliminary building foundation and adjacent concrete apron design recommendations, based upon the limited amount of information from the site, would likely include excavating all FILL or Could BE FILL soils (average 13 feet) and placing footings upon the native Silty Sand layer or upon properly compacted and oversized engineered backfill placed upon the native Silty Sand layer. Taxiways would also require excavation of FILL or COULD BE FILL soils, but typically not to the depths required for building foundations, provided some frost movement and settlement can be tolerated. Peat/organic soils should be removed from all pavement areas. More detailed geotechnical recommendations could be provided based on specific building location and design elements, and with the addition of further subsurface investigation at the site.

ENVIRONMENTAL

Contaminants were found in all the water (groundwater and surface water) samples collected. Groundwater samples from the three SPT borings (SB-06-1, 2, and 3) indicated the presence of heavy metals and petroleum compounds. Metals detected in the groundwater samples exceeded State and/or Federal guidelines for Drinking Water standards. Minnesota does not currently have a standard for DRO/Jet Fuel in groundwater, however, the levels detected in SB-06-1 are above the existing "chronic criteria" guidelines for Minnesota, and may require further evaluation according to Minnesota Pollution Control Agency (MPCA) guidance documents. It should be noted that the site may be considered commercial/industrial and may be held to less restrictive clean-up standards, and no drinking water wells are known to exist on airport property and drinking water is supplied by the City of Duluth.

Surface water samples from the retention ponds indicated the presence of petroleum compounds. It is EPC's understanding that the water from the retention ponds is considered "waters of the State", and that the petroleum levels detected in the ponds would likely require further action (ie., investigation and or remediation).

Ethylene and propylene glycol was detected in the surface water of the small pond. No specific standard exists for ethylene glycol in surface water in Minnesota, but the presence of the compound may require further evaluation according to MPCA guidance documents. Although propylene glycol was detected at a higher concentration than ethylene glycol, it is generally not considered a hazardous compound. It should be noted that both compounds usually breakdown (disintegrate into non-hazardous compounds) within several days to a week in water and soil.

Contaminants were detected in each of the sediment/soil samples collected. Heavy metals were detected at levels below Minnesota's Tier 1 Soil Leaching Values (SLVs). Petroleum detections in the sediment/soil samples are below MPCA Tier 1 SLVs or field action levels (< 10 ppm, DRO). Propylene glycol was detected in the sediment/soil of the small pond (SP-06-1) at a concentration of 1,290 mg/Kg. As discussed above, propylene glycol is usually not considered a hazardous compound.

Conclusions


Based upon the limited soil and water testing at the site EPC offers the following:

FILL or COULD BE FILL soils exist in all three SPT soil borings performed at the site. Subsequently, excavation of these soils would likely be required for construction on the site.

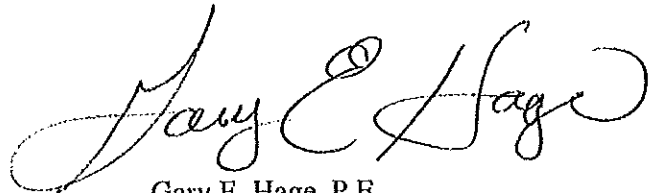
Contamination was detected in each of the water (groundwater and surface water) and sediment/soil samples collected at the site. Based upon the information presented above, EPC recommends that this information be presented to the MPCA for further review prior to making a final decision regarding development of the site.

If you have any questions or comments regarding this report, please call us at (218) 727-1239.

Sincerely,
EPC Engineering & Testing



Brian E. McVean, P.E.
Principal Engineer

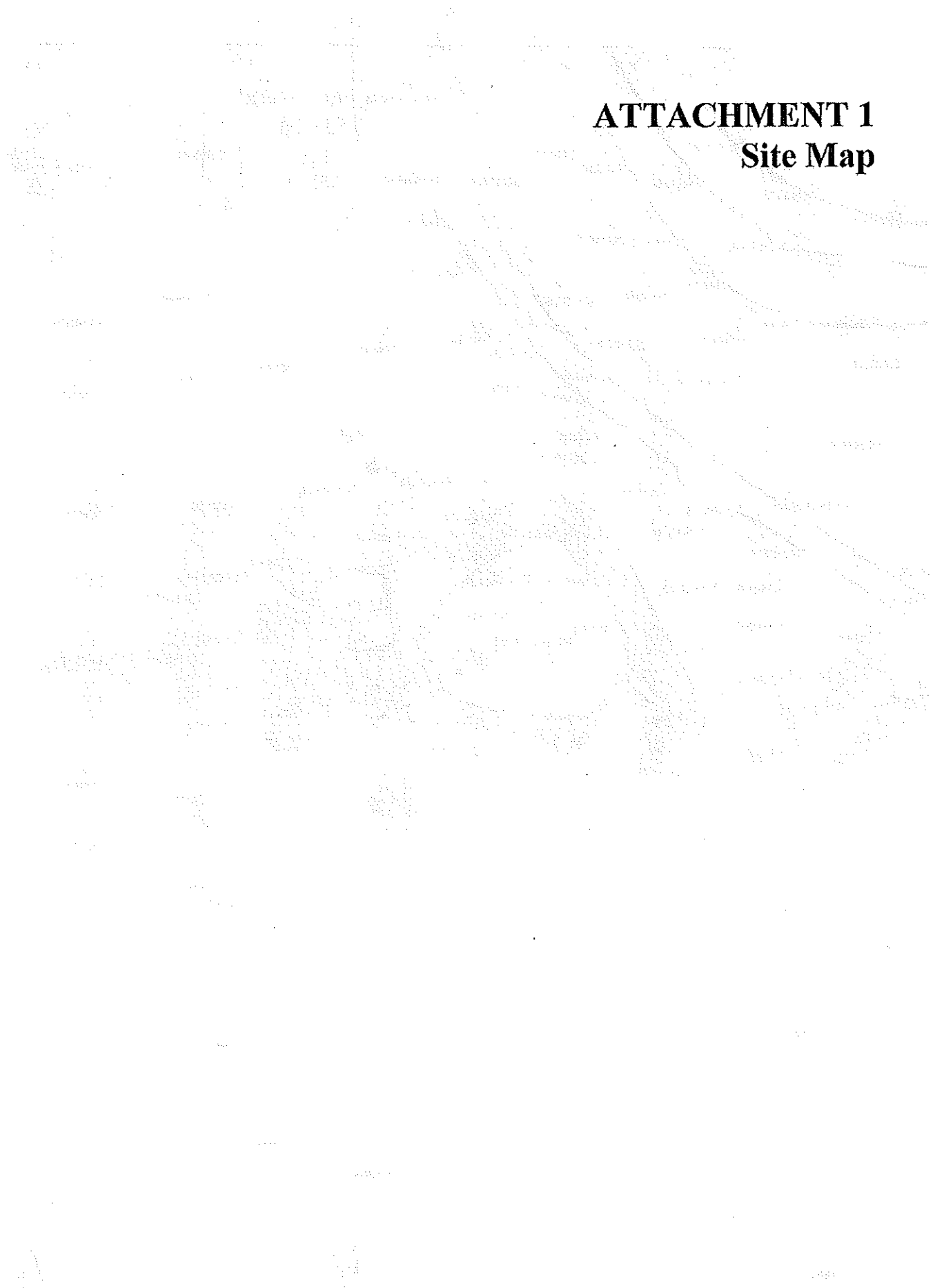


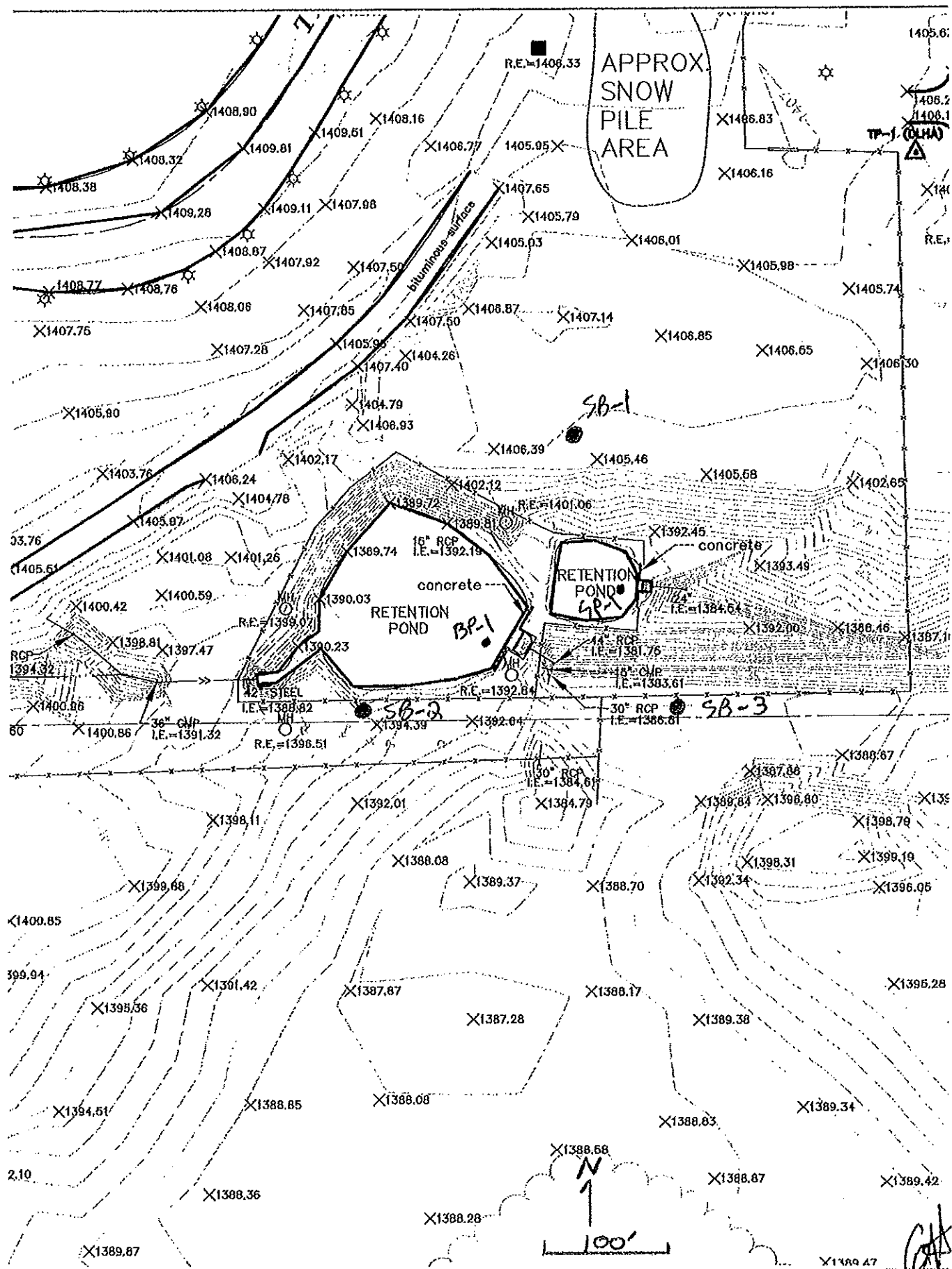
Gary E. Hage, P.E.
Principal Engineer

Enclosures: Attachment 1 – Site Map (w/sample locations)
Attachment 2 – Soil Boring and Core/Hand Auger Logs
Attachment 3 – Table 1 and Laboratory Analytical Reports

ATTACHMENT 1

Site Map





Engineering Partners Company, LLC
 Geotechnical · Environmental · Materials Engineering
 539 Garfield Avenue
 Duluth, Minnesota 55802

BORING NUMBER BP-06-1

PAGE 1 OF 1

CLIENT RS & H PROJECT NAME Airport Ponds
 PROJECT NUMBER 06E0102 PROJECT LOCATION Duluth, Minnesota
 DATE STARTED 2/28/06 COMPLETED 2/28/06 GROUND ELEVATION _____ HOLE SIZE 3"
 DRILLING CONTRACTOR EPC GROUND WATER LEVELS:
 DRILLING METHOD Hand Auger AT TIME OF DRILLING ---
 LOGGED BY BEM CHECKED BY BEM AT END OF DRILLING ---
 NOTES _____ AFTER DRILLING ---

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲			
									20	40	60	80
									PL	MC	LL	
	0		SNOW and SLUSH						20	40	60	80
			ICE									
			WATER									
	5			AR								
			MUD, black, silty and with organic fines.									
			SILTY SAND (SM) Brown.	GRAB 1	100							
			SILTY SAND with Gravel (SM) Grey.									
			Bottom of hole at 9.0 feet.									

Engineering Partners Company, LLC
 Geotechnical · Environmental · Materials Engineering
 539 Garfield Avenue
 Duluth, Minnesota 55802

BORING NUMBER SP-06-1

PAGE 1 OF 1

CLIENT RS & H

PROJECT NAME Airport Ponds

PROJECT NUMBER 06E0102

PROJECT LOCATION Duluth, Minnesota

DATE STARTED 2/28/06 COMPLETED 2/28/06

GROUND ELEVATION _____ HOLE SIZE 3"

DRILLING CONTRACTOR EPC

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

AT TIME OF DRILLING ---

LOGGED BY BEM CHECKED BY BEM

AT END OF DRILLING ---

NOTES _____

AFTER DRILLING ---

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲			
									20	40	60	80
	0		ICE						PL	MC	LL	
			WATER	AR					20	40	60	80
	5		MUD, black, silty and with organic fines. SILTY SAND (SM) Brown.	GRAB 1	100				□ FINES CONTENT (%) □			
			Bottom of hole at 7.0 feet.						20	40	60	80

Handwritten signature

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 539 Garfield Avenue
 Duluth, Minnesota 55802

BORING NUMBER SB-06-3

PAGE 1 OF 1

CLIENT RS & H

PROJECT NAME Airport Ponds

PROJECT NUMBER 08E0102

PROJECT LOCATION Duluth, Minnesota

DATE STARTED 2/27/06 COMPLETED 2/27/06

GROUND ELEVATION 1390 ft HOLE SIZE 6"

DRILLING CONTRACTOR EPC

GROUND WATER LEVELS:

DRILLING METHOD HSA

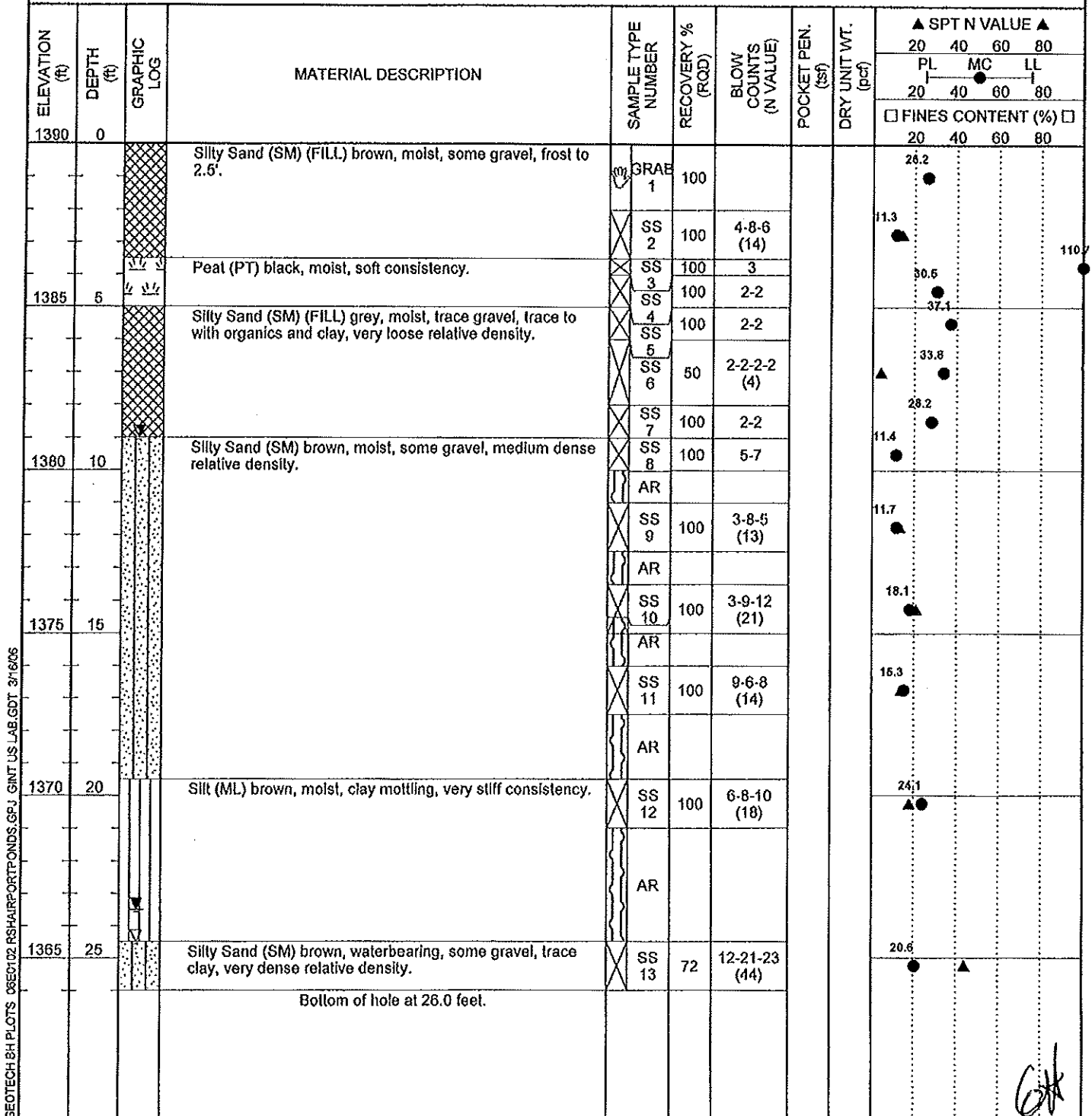
▽ AT TIME OF DRILLING 24.5 ft / Elev 1365.5 ft

LOGGED BY AS CHECKED BY BEM

▽ AT END OF DRILLING 23.5 ft / Elev 1366.5 ft

NOTES

▽ AFTER DRILLING 9.0 ft / Elev 1381.0 ft



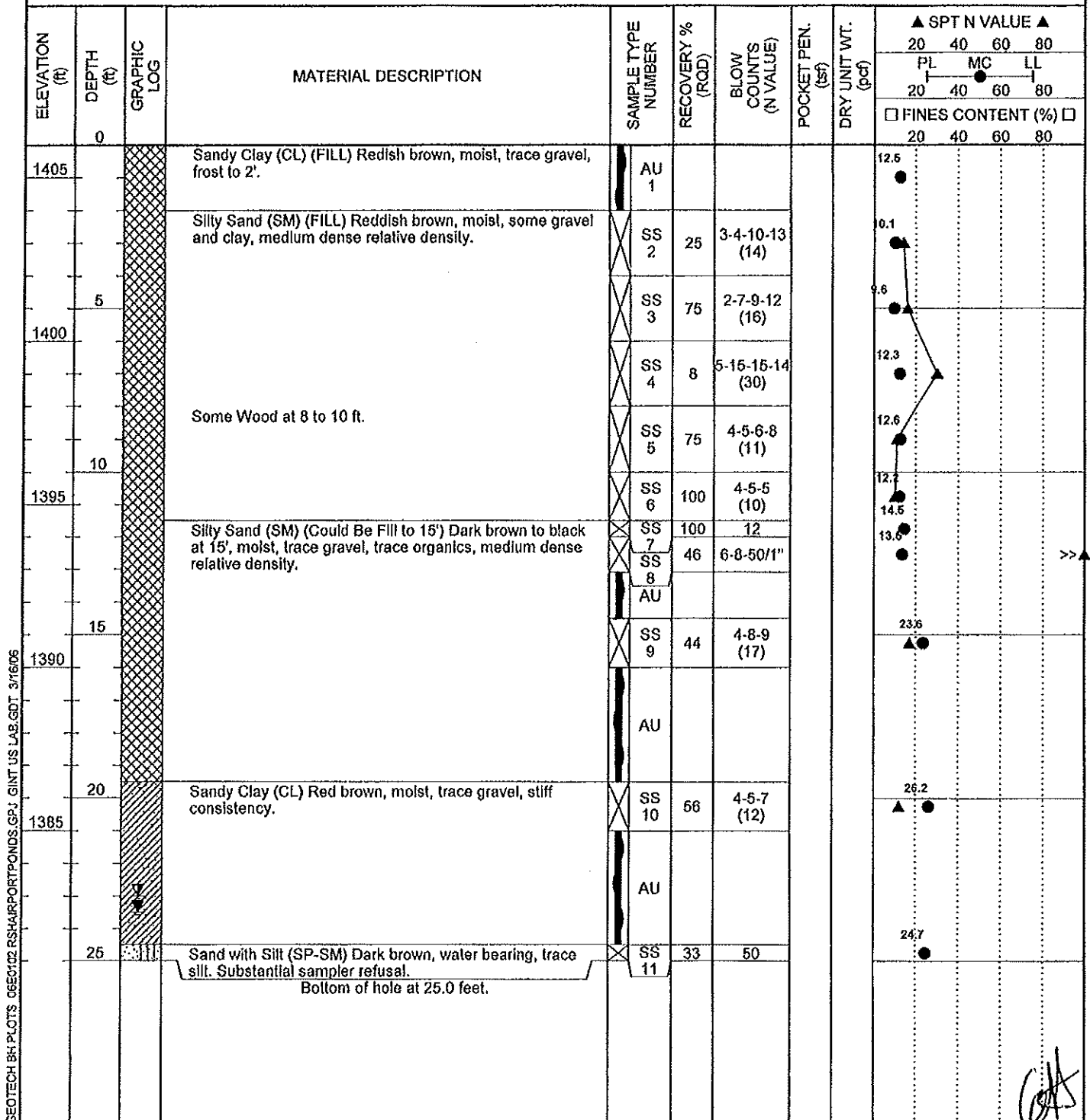
CLIENT RS & H PROJECT NAME Airport Ponds
 PROJECT NUMBER 06E0102 PROJECT LOCATION Duluth, Minnesota
 DATE STARTED 2/27/06 COMPLETED 2/27/06 GROUND ELEVATION 1393 ft HOLE SIZE 6"
 DRILLING CONTRACTOR EPC GROUND WATER LEVELS:
 DRILLING METHOD HSA ∇ AT TIME OF DRILLING 14.0 ft / Elev 1379.0 ft
 LOGGED BY AS CHECKED BY BEM ∇ AT END OF DRILLING 13.5 ft / Elev 1379.5 ft
 NOTES ∇ AFTER DRILLING 11.0 ft / Elev 1382.0 ft

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲ 20 40 60 80 PL MC LL 20 40 60 80 □ FINES CONTENT (%) □ 20 40 60 80
	0		Silty Sand (SM)(FILL) Reddish brown, moist, trace gravel, trace clay and organics, frost to 2', loose relative density.	AU 1					23.5
1390				SS 2	29	5-3-4-3 (7)			13.7
	5		Sandy Clay (CL)(FILL) Reddish brown, moist trace gravel, trace organics, medium consistency.	SS 3	100	3-3-3-5 (8)			18.7
			Silty Sand (SM) (Could Be Fill) Brown, moist to wet, with gravel, trace clay, medium dense to loose relative density.	SS 4	25	3-6-5-4 (11)			14.4
1385				SS 5	33	3-4-4-4 (8)			13.2
	10			SS 6	46	3-3-4-3 (7)			15.8
			Silty Sand (SM) Brown, wet, medium dense relative density.	SS 7	33	3-6-7-10 (13)			9.6
1380				SS 8	71	5-12-11-12 (23)			13.0
	15		Sand with Silt (SP-SM) Brown, water bearing, with gravel, trace clay, medium dense relative density.						
			Bottom of hole at 16.0 feet.						

Handwritten signature

PAGE 1 OF 1

▽ AFTER DRILLING 23.0 ft / Elev 1383.0 ft



ATTACHMENT 2

Soil Boring & Core/Hand Auger Logs

Engineering Partners Company, LLC
Geotechnical - Environmental - Materials Engineering
539 Garfield Avenue
Duluth, Minnesota 55802

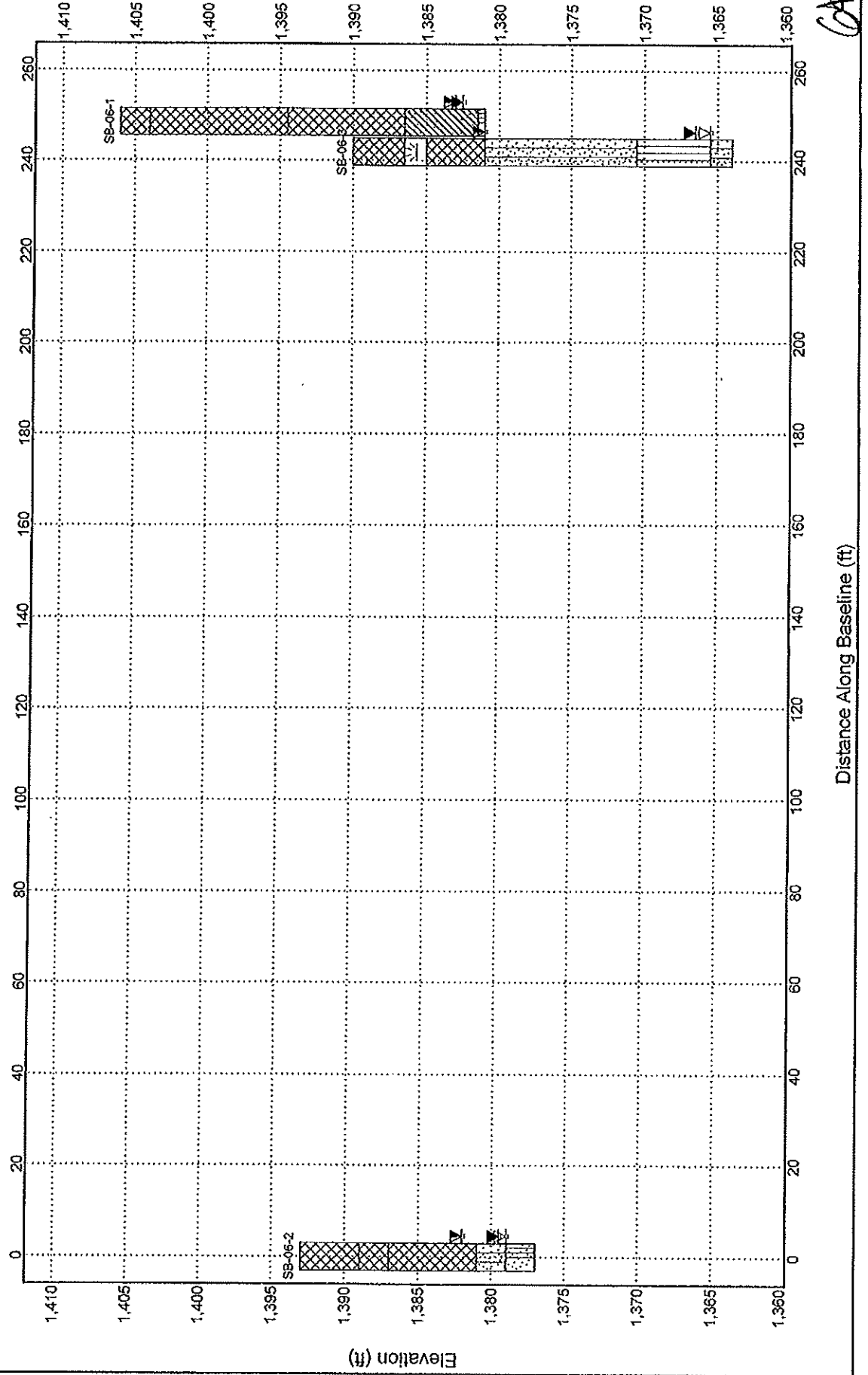
SUBSURFACE DIAGRAM

CLIENT RS & H

PROJECT NAME Airport Ponds

PROJECT NUMBER 06E0102

PROJECT LOCATION Duluth, Minnesota



Engineering Partners Company, LLC
Geotechnical · Environmental · Materials Engineering
539 Garfield Avenue
Duluth, Minnesota 55802

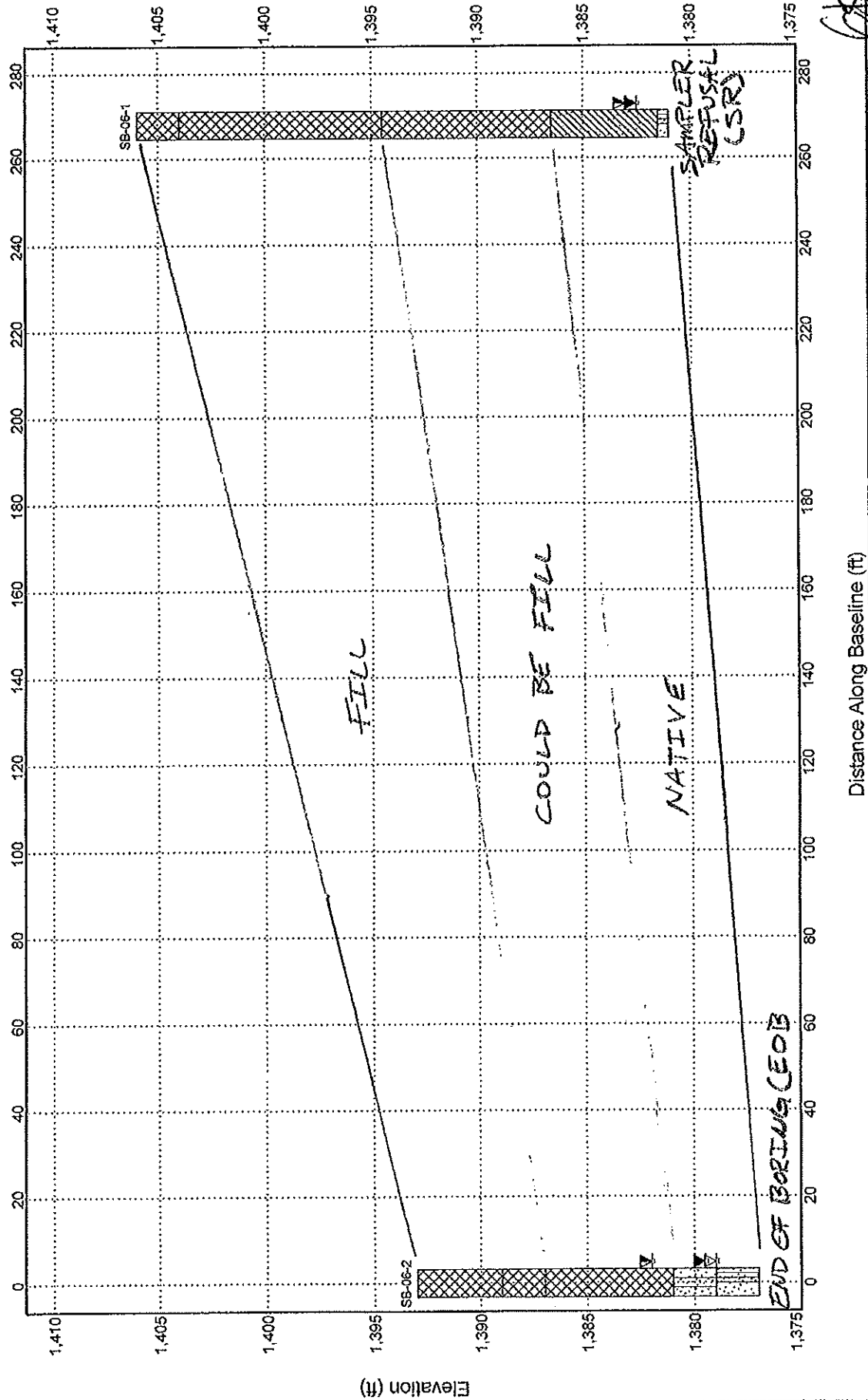
SUBSURFACE DIAGRAM

CLIENT RS & H

PROJECT NAME Airport Ponds

PROJECT NUMBER 06E0102

PROJECT LOCATION Duluth, Minnesota



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539 Garfield Avenue
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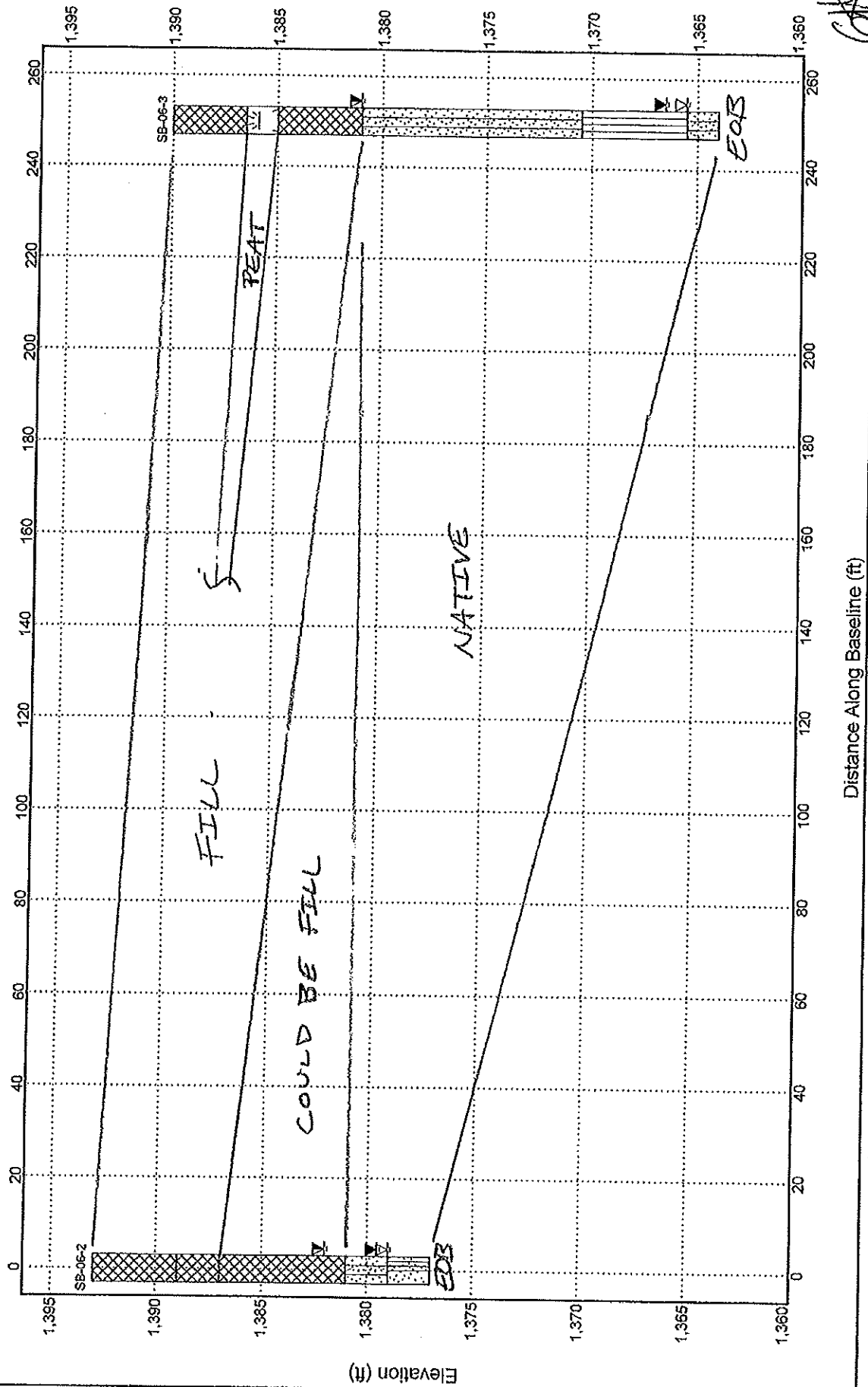
SUBSURFACE DIAGRAM

CLIENT RS & H

PROJECT NUMBER 06E0102

PROJECT NAME Airport Ponds

PROJECT LOCATION Duluth, Minnesota



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 Geotechnical · Environmental · Materials Engineering
 539 Garfield Avenue
 Duluth, Minnesota 55802

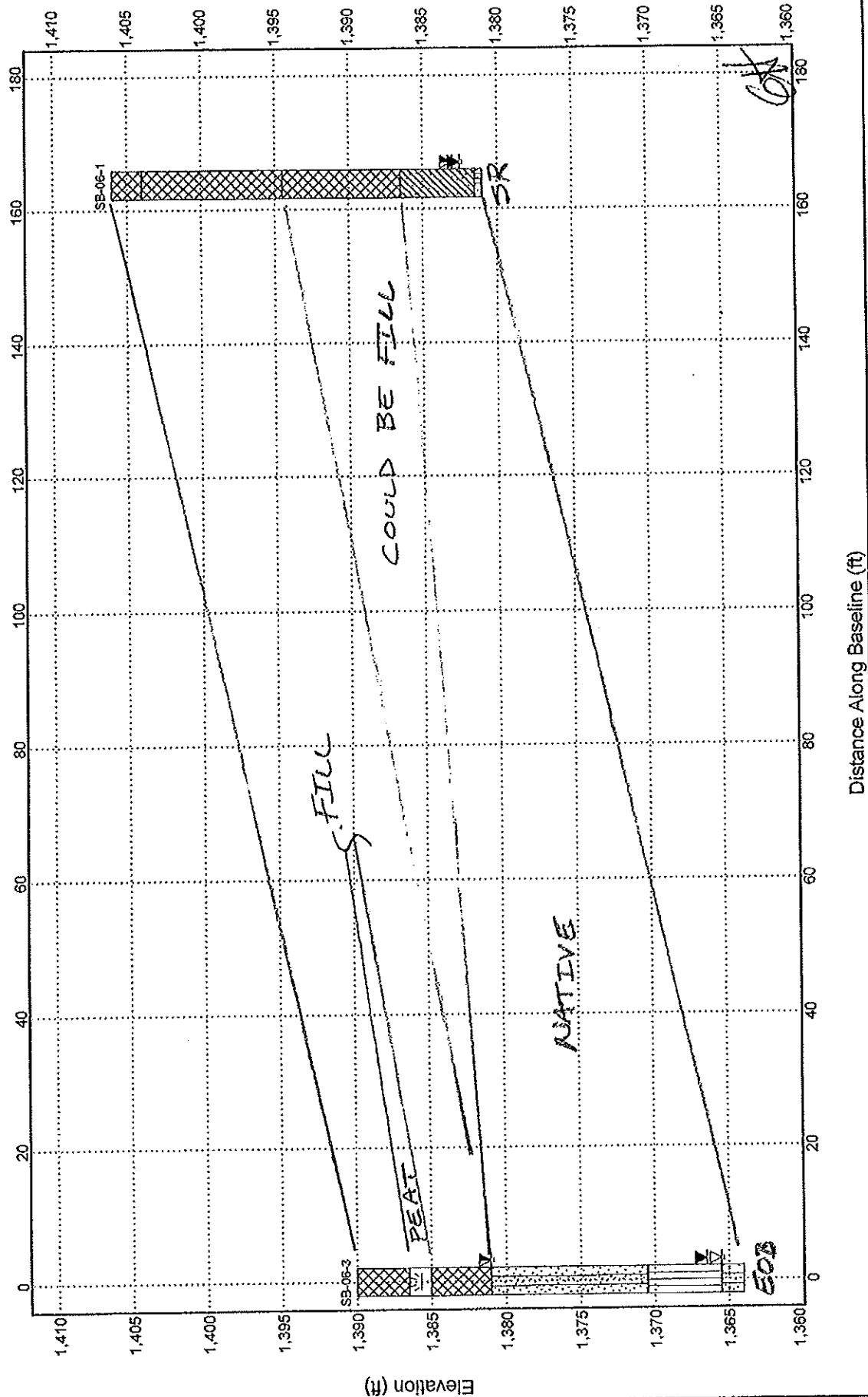
SUBSURFACE DIAGRAM

CLIENT RS & H

PROJECT NAME Airport Ponds

PROJECT NUMBER 06E0102

PROJECT LOCATION Duluth, Minnesota



ATTACHMENT 3
Table 1 and,
Laboratory Analytical Reports

Sample		Date		Time		Location		Description		Analysis		Results		Remarks	

TABLE 1
ANALYTICAL RESULTS SUMMARY

Analyte	Boring			Core/Hand Auger	
	SB-06-1	SB-06-2	SB-06-3	BP-06-1	SP-06-1
Water (ug/L)					
Arsenic	270	120	120	<20	<20
Barium	11000	2100	2500	27	51
Cadmium	<25	<25	<25	<5	<5
Chromium	2500	330	980	<5	<5
Lead	350	<50	140	<10	<10
Mercury	0.75	0.5	3.2	<0.2	<0.4
Selenium	<100	<100	<100	<20	<20
Silver	<50	<50	<50	<10	<10
DRO	420	<100	120	230	7800
TPH-JP4	870	<100	<110	310	19000
VOCs*	<	<	<	<	<
Ethylene Glycol (mg/L)	NT	<	<	<	13.1
Propylene Glycol (mg/L)	NT	<	<	<	13,800
Soil (mg/Kg)					
Arsenic				3.3	2.9
Barium				55	37
Cadmium				<0.62	<0.68
Chromium				28	31
Lead				9.1	5.3
Mercury				0.014	<0.014
Selenium				<2.5	<2.7
Silver				<1.2	<1.4
DRO				9.6	7.8
VOCs**				<	<
Toluene (ug/Kg)				<	1900
Ethylene Glycol (mg/Kg)				<	<
Propylene Glycol (mg/Kg)				<	1290

* = Acetone and 2-Butanone were detected in some samples, but are a common lab contaminant.

** = VOCs non-detect except for acetone in SP-06-1.

NT = Not tested.

< = Non-detect



1241 Bellevue Street, Suite 9
Green Bay, WI 54302
920-469-2436, Fax: 920-469-8827

Analytical Report Number: 869443

Client: ENGINEERING PARTNERS CO.

Lab Contact: Eric Bullock

Project Name: AIRPORT PONDS

Project Number: 06E0102

Lab Sample Number	Field ID	Matrix	Collection Date
869443-001	SB1	WATER	02/27/06 10:30
869443-002	SB2	WATER	02/27/06 12:30
869443-003	SB3	WATER	02/27/06 14:40
869443-004	BIG POND	WATER	02/28/06 09:45
869443-005	BIG POND	SOIL	02/28/06 09:45
869443-006	SM POND	WATER	02/28/06 10:45
869443-007	SM POND	SOIL	02/28/06 10:45

MS/MSD: If the Form 3 header for the MS/MSD QC indicates that the MS/MSD was "Batch QC", then the MS/MSD results may not be directly applicable to your samples

I certify that the data contained in this Final Report has been generated and reviewed in accordance with approved methods and Laboratory Standard Operating Procedure. Exceptions, if any, are discussed in the accompanying sample comments. Release of this final report is authorized by Laboratory management, as is verified by the following signature. This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc. The sample results relate only to the analytes of interest tested.

Approval Signature

3/16/06
Date

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2438

Client : ENGINEERING PARTNERS CO.
Project Name : AIRPORT PONDS
Project Number : 06E0102
Field ID : SB1

Matrix Type : WATER
Collection Date : 02/27/06
Report Date : 03/16/06
Lab Sample Number : 869443-001

INORGANICS

Test	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Arsenic	270	100	5	ug/L		03/08/06	SW846 3010A	SW846 6010B
Barium	11000	25	5	ug/L		03/08/06	SW846 3010A	SW846 6010B
Cadmium	< 25	25	5	ug/L	C	03/08/06	SW846 3010A	SW846 6010B
Chromium	2500	25	5	ug/L		03/09/06	SW846 3010A	SW846 6010B
Lead	350	50	5	ug/L		03/08/06	SW846 3010A	SW846 6010B
Mercury	0.75	0.20	1	ug/L		03/08/06	SW846 7470A	SW846 7470A
Selenium	< 100	100	5	ug/L	C	03/08/06	SW846 3010A	SW846 6010B
Silver	< 50	50	5	ug/L	C	03/08/06	SW846 3010A	SW846 6010B

DIESEL RANGE ORGANICS

Prep Date: 03/08/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	420	110	1	ug/L	M	03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank	< 50	50	1	ug/L		03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike	92	---	1	%Recov		03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	106	---	1	%Recov		03/08/06	WI MOD DRO	WI MOD DRO

TPH - JP4

Prep Date: 03/08/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
TPH - JP4	870	110	1	ug/L	M	03/09/06	SW846 3510C	SW846 M8015

VOLATILES - MDH LIST

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
1,1,1,2-Tetrachloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1,1-Trichloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1,2,2-Tetrachloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1,2-Trichloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1,2-Trichlorotrifluoroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloroethene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloropropene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2,3-Trichlorobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2,3-Trichloropropane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2,4-Trichlorobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2,4-Trimethylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2-Dibromo-3-chloropropane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2-Dibromoethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2-Dichlorobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2-Dichloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2-Dichloropropane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,3,5-Trimethylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,3-Dichlorobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,3-Dichloropropane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,4-Dichlorobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
2,2-Dichloropropane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
2-Butanone	< 5.0	5.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
2-Chlorotoluene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
4-Chlorotoluene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
4-Methyl-2-pentanone	< 5.0	5.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Client : ENGINEERING PARTNERS CO.

Project Name : AIRPORT PONDS

Project Number : 08E0102

Field ID : SB1

Matrix Type : WATER

Collection Date : 02/27/06

Report Date : 03/16/06

Lab Sample Number : 869443-001

VOLATILES - MDH LIST

Prop Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Acetone	9.0	5.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Allyl Chloride	< 5.0	5.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Benzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Bromobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Bromochloromethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Bromodichloromethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Bromoform	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Bromomethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Carbon Tetrachloride	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Chlorobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Chlorodibromomethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Chloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Chloroform	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Chloromethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
cis-1,2-Dichloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
cis-1,3-Dichloropropene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Dibromomethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Dichlorodifluoromethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Dichlorofluoromethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Diethyl Ether	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Ethylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Fluorotrichloromethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Hexachlorobutadiene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Isopropylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Methylene Chloride	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Methyl-tert-butyl-ether	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Naphthalene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
N-Butylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
n-Propylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
p-Isopropyltoluene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
sec-Butylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Styrene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
tert-Butylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Tetrachloroethene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Tetrahydrofuran	< 5.0	5.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Toluene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
trans-1,2-Dichloroethene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
trans-1,3-Dichloropropene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Trichloroethene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Vinyl Chloride	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Xylene, o	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Xylenes, m + p	< 2.0	2.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Surrogate		LCL	UCL					
4-Bromofluorobenzene	107	64	132	1	%	03/06/06	SW846 5030B	SW846 8260B
Toluene-d8	97	73	127	1	%	03/06/06	SW846 5030B	SW846 8260B
Dibromofluoromethane	105	66	122	1	%	03/06/06	SW846 5030B	SW846 8260B

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Client: ENGINEERING PARTNERS CO.
Project Name: AIRPORT PONDS
Project Number: 08E0102
Field ID: SB2

Matrix Type: WATER
Collection Date: 02/27/06
Report Date: 03/16/06
Lab Sample Number: 869443-002

INORGANICS

Test	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Arsenic	120	100	5	ug/L		03/09/06	SW846 3010A	SW846 6010B
Barium	2100	25	5	ug/L		03/09/06	SW846 3010A	SW846 6010B
Cadmium	< 25	25	5	ug/L		03/09/06	SW846 3010A	SW846 6010B
Chromium	330	25	5	ug/L		03/09/06	SW846 3010A	SW846 6010B
Lead	< 50	50	5	ug/L		03/09/06	SW846 3010A	SW846 6010B
Mercury	0.50	0.20	1	ug/L		03/09/06	SW846 7470A	SW846 7470A
Selenium	< 100	100	5	ug/L		03/09/06	SW846 3010A	SW846 6010B
Silver	< 50	50	5	ug/L	C	03/09/06	SW846 3010A	SW846 6010B
Glycols	INCL.							

DIESEL RANGE ORGANICS

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	< 100	100	1	ug/L	M	03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank	< 50	50	1	ug/L		03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike	92	--	1	%Recov		03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	106	--	1	%Recov		03/08/06	WI MOD DRO	WI MOD DRO

TPH - JP4

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
TPH - JP4	< 100	100	1	ug/L	M	03/09/06	SW846 3510C	SW846 M8016

VOLATILES - MDH LIST

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
1,1,1,2-Tetrachloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1,1-Trichloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1,2,2-Tetrachloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1,2-Trichloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1,2-Trichlorotrifluoroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloroethene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloropropene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2,3-Trichlorobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2,3-Trichloropropane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2,4-Trichlorobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2,4-Trimethylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2-Dibromo-3-chloropropane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2-Dibromoethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2-Dichlorobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2-Dichloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2-Dichloropropane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,3,5-Trimethylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,3-Dichlorobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,3-Dichloropropane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,4-Dichlorobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
2,2-Dichloropropane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
2-Butanone	< 5.0	5.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
2-Chlorotoluene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
4-Chlorotoluene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Client : ENGINEERING PARTNERS CO.

Project Name : AIRPORT PONDS

Project Number : 08E0102

Field ID : SB2

Matrix Type : WATER

Collection Date : 02/27/06

Report Date : 03/16/06

Lab Sample Number : 869443-002

VOLATILES - MDH LIST

Prep Date: 03/08/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
4-Methyl-2-pentanone	< 5.0	5.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Acetone	< 5.0	5.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Allyl Chloride	< 5.0	5.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Benzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Bromobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Bromochloromethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Bromodichloromethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Bromoform	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Bromomethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Carbon Tetrachloride	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Chlorobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Chlorodibromomethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Chloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Chloroform	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Chloromethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
cis-1,2-Dichloroethene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
cis-1,3-Dichloropropene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Dibromomethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Dichlorodifluoromethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Dichlorofluoromethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Diethyl Ether	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Ethylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Fluorotrichloromethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Hexachlorobutadiene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Isopropylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Methylene Chloride	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Methyl-tert-butyl-ether	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Naphthalene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
n-Butylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
n-Propylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
p-Isopropyltoluene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
sec-Butylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Styrene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
tert-Butylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Tetrachloroethene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Tetrahydrofuran	< 5.0	5.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Toluene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
trans-1,2-Dichloroethene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
trans-1,3-Dichloropropene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Trichloroethene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Vinyl Chloride	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Xylene, o	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Xylenes, m + p	< 2.0	2.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Surrogate		LCL	UCL					
4-Bromofluorobenzene	106	64	132	1	%	03/06/06	SW846 5030B	SW846 8260B
Toluene-d8	98	73	127	1	%	03/06/06	SW846 5030B	SW846 8260B
Dibromofluoromethane	106	66	122	1	%	03/06/06	SW846 5030B	SW846 8260B

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Client: ENGINEERING PARTNERS CO.
Project Name: AIRPORT PONDS
Project Number: 06E0102
Field ID: SB3

Matrix Type: WATER
Collection Date: 02/27/06
Report Date: 03/16/06
Lab Sample Number: 869443-003

INORGANICS

Test	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Arsenic	120	100	5	ug/L		03/08/06	SW846 3010A	SW846 6010B
Barium	2500	25	5	ug/L		03/08/06	SW846 3010A	SW846 6010B
Cadmium	< 25	25	5	ug/L	C	03/08/06	SW846 3010A	SW846 6010B
Chromium	980	25	5	ug/L		03/09/06	SW846 3010A	SW846 6010B
Lead	140	50	5	ug/L		03/08/06	SW846 3010A	SW846 6010B
Mercury	3.2	0.20	1	ug/L		03/08/06	SW846 7470A	SW846 7470A
Selenium	< 100	100	5	ug/L	C	03/08/06	SW846 3010A	SW846 6010B
Silver	< 50	50	5	ug/L	C	03/08/06	SW846 3010A	SW846 6010B
Glycols	INCL.							

DIESEL RANGE ORGANICS

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	120	110	1	ug/L	M	03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank	< 50	50	1	ug/L		03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike	92	---	1	%Recov		03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	106	---	1	%Recov		03/08/06	WI MOD DRO	WI MOD DRO

TPH - JP4

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
TPH - JP4	< 110	110	1	ug/L	M	03/09/06	SW846 3510C	SW846 M8016

VOLATILES - MDH LIST

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
1,1,1,2-Tetrachloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1,1-Trichloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1,2,2-Tetrachloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1,2-Trichloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1,2-Trichlorotrifluoroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloroethene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloropropene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2,3-Trichlorobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2,3-Trichloropropane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2,4-Trichlorobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2,4-Trimethylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2-Dibromo-3-chloropropane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2-Dibromoethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2-Dichlorobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2-Dichloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,2-Dichloropropane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,3,5-Trimethylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,3-Dichlorobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,3-Dichloropropane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
1,4-Dichlorobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
2,2-Dichloropropane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
2-Butanone	< 5.0	5.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
2-Chlorotoluene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
4-Chlorotoluene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-489-2438

Client : ENGINEERING PARTNERS CO.
Project Name : AIRPORT PONDS
Project Number : 06E0102
Field ID : SB3

Matrix Type : WATER
Collection Date : 02/27/06
Report Date : 03/16/06
Lab Sample Number : 869443-003

VOLATILES - MDH LIST

Prep Date: 03/08/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
4-Methyl-2-pentanone	< 5.0	5.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Acetone	< 5.0	5.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Allyl Chloride	< 5.0	5.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Benzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Bromobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Bromochloromethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Bromodichloromethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Bromoform	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Bromomethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Carbon Tetrachloride	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Chlorobenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Chlorodibromomethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Chloroethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Chloroform	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Chloromethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
cis-1,2-Dichloroethene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
cis-1,3-Dichloropropene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Dibromomethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Dichlorodifluoromethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Dichlorofluoromethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Diethyl Ether	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Ethylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Fluorotrichloromethane	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Hexachlorobutadiene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Isopropylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Methylene Chloride	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Methyl-tert-butyl-ether	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Naphthalene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
N-Butylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
n-Propylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
p-Isopropyltoluene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
sec-Butylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Styrene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
tert-Butylbenzene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Tetrachloroethene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Tetrahydrofuran	< 5.0	5.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Toluene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
trans-1,2-Dichloroethene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
trans-1,3-Dichloropropene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Trichloroethene	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Vinyl Chloride	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Xylene, o	< 1.0	1.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Xylenes, m + p	< 2.0	2.0	1	ug/L	M	03/06/06	SW846 5030B	SW846 8260B
Surrogate		LCL	UCL					
4-Bromofluorobenzene	106	64	132	1	%	03/06/06	SW846 5030B	SW846 8260B
Toluene-d8	97	73	127	1	%	03/06/06	SW846 5030B	SW846 8260B
Dibromofluoromethane	106	68	122	1	%	03/06/06	SW846 5030B	SW846 8260B

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Client : ENGINEERING PARTNERS CO.
Project Name : AIRPORT PONDS
Project Number : 06E0102
Field ID : BIG POND

Matrix Type : WATER
Collection Date : 02/28/06
Report Date : 03/16/06
Lab Sample Number : 869443-004

INORGANICS

Test	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Arsenic	< 20	20	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Barium	27	5.0	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Cadmium	< 5.0	5.0	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Chromium	< 5.0	5.0	1	ug/L		03/09/06	SW846 3010A	SW846 6010B
Lead	< 10	10	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Mercury	< 0.20	0.20	1	ug/L		03/08/06	SW846 7470A	SW846 7470A
Selenium	< 20	20	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Silver	< 10	10	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Glycols	INCL.							

DIESEL RANGE ORGANICS

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	230	100	1	ug/L		03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank	< 50	50	1	ug/L		03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike	92	---	1	%Recov		03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	106	---	1	%Recov		03/08/06	WI MOD DRO	WI MOD DRO

TPH - JP4

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
TPH - JP4	310	100	1	ug/L		03/09/06	SW846 3510C	SW846 M8015

VOLATILES - MDH LIST

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
1,1,1,2-Tetrachloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1,1-Trichloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1,2,2-Tetrachloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1,2-Trichloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1,2-Trichlorotrifluoroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloroethene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloropropene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2,3-Trichlorobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2,3-Trichloropropane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2,4-Trichlorobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2,4-Trimethylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2-Dibromo-3-chloropropane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2-Dibromoethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2-Dichlorobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2-Dichloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,2-Dichloropropane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,3,5-Trimethylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,3-Dichlorobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,3-Dichloropropane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
1,4-Dichlorobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
2,2-Dichloropropane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
2-Butanone	6.3	5.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
2-Chlorotoluene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
4-Chlorotoluene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Client: ENGINEERING PARTNERS CO.

Project Name: AIRPORT PONDS

Project Number: 06E0102

Field ID: BIG POND

Matrix Type: WATER

Collection Date: 02/28/06

Report Date: 03/16/06

Lab Sample Number: 869443-004

VOLATILES - MDH LIST

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
4-Methyl-2-pentanone	< 5.0	5.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Acetone	27	5.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Allyl Chloride	< 5.0	5.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Benzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Bromobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Bromochloromethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Bromodichloromethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Bromoform	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Bromomethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Carbon Tetrachloride	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Chlorobenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Chlorodibromomethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Chloroethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Chloroform	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Chloromethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
cis-1,2-Dichloroethene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
cis-1,3-Dichloropropene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Dibromomethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Dichlorodifluoromethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Dichlorofluoromethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Diethyl Ether	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Ethylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Fluorotrichloromethane	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Hexachlorobutadiene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Isopropylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Methylene Chloride	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Methyl-tert-butyl-ether	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Naphthalene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
N-Butylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
n-Propylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
p-Isopropyltoluene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
sec-Butylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Styrene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
tert-Butylbenzene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Tetrachloroethene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Tetrahydrofuran	< 5.0	5.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Toluene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
trans-1,2-Dichloroethene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
trans-1,3-Dichloropropene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Trichloroethene	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Vinyl Chloride	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Xylene, o	< 1.0	1.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Xylenes, m + p	< 2.0	2.0	1	ug/L		03/06/06	SW846 5030B	SW846 8260B
Surrogate		LCL	UCL					
4-Bromofluorobenzene	106	64	132	1	%	03/06/06	SW846 5030B	SW846 8260B
Toluene-d8	98	73	127	1	%	03/06/06	SW846 5030B	SW846 8260B
Dibromofluoromethane	107	68	122	1	%	03/06/06	SW846 5030B	SW846 8260B

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Client : ENGINEERING PARTNERS CO.
Project Name : AIRPORT PONDS
Project Number : 06E0102
Field ID : BIG POND

Matrix Type : SOIL
Collection Date : 02/28/06
Report Date : 03/16/06
Lab Sample Number : 869443-005

INORGANICS

Test	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Arsenic	3.3	2.5	1	mg/Kg		03/08/06	SW846 3050B	SW846 6010B
Barium	55	0.62	1	mg/Kg		03/08/06	SW846 3050B	SW846 6010B
Cadmium	< 0.62	0.62	1	mg/Kg		03/08/06	SW846 3050B	SW846 6010B
Chromium	28	0.62	1	mg/Kg		03/09/06	SW846 3050B	SW846 6010B
Lead	9.1	1.2	1	mg/Kg		03/08/06	SW846 3050B	SW846 6010B
Mercury	0.014	0.012	1	mg/Kg		03/07/06	SW846 7471A	SW846 7471A
Selenium	< 2.5	2.5	1	mg/Kg		03/08/06	SW846 3050B	SW846 6010B
Silver	< 1.2	1.2	1	mg/Kg		03/08/06	SW846 3050B	SW846 6010B
Percent Solids	81.0	---	1	%		03/03/06	SM M2540G	SM M2540G

DIESEL RANGE ORGANICS

Prep Date: 03/08/06

Preservation Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	9.6	4.1	1	mg/kg		03/07/06	WI MOD DRO	WI MOD DRO
DRO Blank	< 5.0	5.0	1	mg/kg		03/07/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike	79	---	1	%Recov		03/07/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	86	---	1	%Recov		03/07/06	WI MOD DRO	WI MOD DRO

VOLATILES - MDH LIST

Prep Date: 03/07/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
1,1,1,2-Tetrachloroethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1,1-Trichloroethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1,2,2-Tetrachloroethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1,2-Trichloroethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1,2-Trichlorotrifluoroethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1-Dichloroethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1-Dichloroethene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1-Dichloropropene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2,3-Trichlorobenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2,3-Trichloropropane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2,4-Trichlorobenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2,4-Trimethylbenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2-Dibromo-3-chloropropane	< 120	120	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2-Dibromoethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2-Dichlorobenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2-Dichloroethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2-Dichloropropane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,3,5-Trimethylbenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,3-Dichlorobenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,3-Dichloropropane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,4-Dichlorobenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
2,2-Dichloropropane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
2-Butanone	< 310	310	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
2-Chlorotoluene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
4-Chlorotoluene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
4-Methyl-2-pentanone	< 310	310	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Acetone	< 310	310	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Allyl Chloride	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Benzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B

All soil results are reported on a dry weight basis unless otherwise noted.

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2438

Client : ENGINEERING PARTNERS CO.

Project Name : AIRPORT PONDS

Project Number : 06E0102

Field ID : BIG POND

Matrix Type : SOIL

Collection Date : 02/28/06

Report Date : 03/16/06

Lab Sample Number : 869443-005

VOLATILES - MDH LIST			Prep Date: 03/07/06					
Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Bromobenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Bromochloromethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Bromodichloromethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Bromoform	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Bromomethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Carbon Tetrachloride	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Chlorobenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Chlorodibromomethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Chloroethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Chloroform	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Chloromethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
cis-1,2-Dichloroethene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
cis-1,3-Dichloropropene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Dibromomethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Dichlorodifluoromethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Dichlorofluoromethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Diethyl Ether	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Ethylbenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Fluorotrichloromethane	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Hexachlorobutadiene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Isopropylbenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Methylene Chloride	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Methyl-tert-butyl-ether	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Naphthalene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
N-Butylbenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
n-Propylbenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
p-Isopropyltoluene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
sec-Butylbenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Styrene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
tert-Butylbenzene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Tetrachloroethene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Tetrahydrofuran	< 310	310	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Toluene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
trans-1,2-Dichloroethene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
trans-1,3-Dichloropropene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Trichloroethene	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Vinyl Chloride	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Xylene, o	< 62	62	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Xylenes, m + p	< 120	120	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Surrogate		LCL	UCL					
4-Bromofluorobenzene	100	64	133	50	%	03/07/06	5035/5030B	SW846 8260B
Toluene-d8	96	67	139	50	%	03/07/06	5035/5030B	SW846 8260B
Dibromofluoromethane	92	64	140	50	%	03/07/06	5035/5030B	SW846 8260B

GLYCOLS

Prep Date:								
Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Glycols	INCL.							

All soil results are reported on a dry weight basis unless otherwise noted.

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Client : ENGINEERING PARTNERS CO.
Project Name : AIRPORT PONDS
Project Number : 08E0102
Field ID : SM POND

Matrix Type : WATER
Collection Date : 02/28/06
Report Date : 03/16/06
Lab Sample Number : 869443-006

INORGANICS

Test	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Arsenic	< 20	20	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Barium	51	5.0	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Cadmium	< 5.0	5.0	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Chromium	< 5.0	5.0	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Lead	< 10	10	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Mercury	< 0.40	0.40	1	ug/L	C	03/08/06	SW846 7470A	SW846 7470A
Selenium	< 20	20	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Silver	< 10	10	1	ug/L		03/08/06	SW846 3010A	SW846 6010B
Glycols	INCL.							

DIESEL RANGE ORGANICS

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	7800	250	2.5	ug/L		03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank	< 50	50	1	ug/L		03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike	92	---	1	%Recov		03/08/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	106	---	1	%Recov		03/08/06	WI MOD DRO	WI MOD DRO

TPH - JP4

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
TPH - JP4	19000	1600	16	ug/L	D	03/10/06	SW846 3510C	SW846 M8015

VOLATILES - MDH LIST

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
1,1,1,2-Tetrachloroethane	< 25	25	25	ug/L	K	03/08/06	SW846 5030B	SW846 8260B
1,1,1-Trichloroethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,1,2,2-Tetrachloroethane	< 25	25	25	ug/L	K	03/08/06	SW846 5030B	SW846 8260B
1,1,2-Trichloroethane	< 25	25	25	ug/L	K	03/08/06	SW846 5030B	SW846 8260B
1,1,2-Trichlorotrifluoroethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloroethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloroethene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,1-Dichloropropene	< 25	25	25	ug/L	K	03/08/06	SW846 5030B	SW846 8260B
1,2,3-Trichlorobenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,2,3-Trichloropropane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,2,4-Trichlorobenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,2,4-Trimethylbenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,2-Dibromo-3-chloropropane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,2-Dibromoethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,2-Dichlorobenzene	< 25	25	25	ug/L	K	03/08/06	SW846 5030B	SW846 8260B
1,2-Dichloroethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,2-Dichloropropane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,3,5-Trimethylbenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,3-Dichlorobenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,3-Dichloropropane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
1,4-Dichlorobenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
2,2-Dichloropropane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
2-Butanone	< 120	120	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
2-Chlorotoluene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
4-Chlorotoluene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Client : ENGINEERING PARTNERS CO.

Project Name : AIRPORT PONDS

Project Number : 05E0102

Field ID : SM POND

Matrix Type : WATER

Collection Date : 02/28/06

Report Date : 03/16/06

Lab Sample Number : 869443-006

VOLATILES - MDH LIST

Prep Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
4-Methyl-2-pentanone	< 120	120	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Acetone	< 120	120	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Allyl Chloride	< 120	120	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Benzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Bromobenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Bromochloromethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Bromodichloromethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Bromoform	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Bromomethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Carbon Tetrachloride	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Chlorobenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Chlorodibromomethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Chloroethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Chloroform	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Chloromethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
cis-1,2-Dichloroethene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
cis-1,3-Dichloropropene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Dibromomethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Dichlorodifluoromethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Dichlorofluoromethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Diethyl Ether	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Ethylbenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Fluorotrichloromethane	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Hexachlorobutadiene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Isopropylbenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Methylene Chloride	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Methyl-tert-butyl-ether	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Naphthalene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
N-Butylbenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
n-Propylbenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
p-Isopropyltoluene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
sec-Butylbenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Styrene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
tert-Butylbenzene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Tetrachloroethene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Tetrahydrofuran	< 120	120	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Toluene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
trans-1,2-Dichloroethene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
trans-1,3-Dichloropropene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Trichloroethene	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Vinyl Chloride	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Xylene, o	< 25	25	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Xylenes, m + p	< 50	50	25	ug/L	K	03/06/06	SW846 5030B	SW846 8260B
Surrogate		LCL	UCL					
4-Bromofluorobenzene	105	64	132	25	%	03/06/06	SW846 5030B	SW846 8260B
Toluene-d8	97	73	127	25	%	03/06/06	SW846 5030B	SW846 8260B
Dibromofluoromethane	104	68	122	25	%	03/06/06	SW846 5030B	SW846 8260B

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Client : ENGINEERING PARTNERS CO.
Project Name : AIRPORT PONDS
Project Number : 06E0102
Field ID : SM POND

Matrix Type : SOIL
Collection Date : 02/28/06
Report Date : 03/18/06
Lab Sample Number : 869443-007

INORGANICS

Test	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Arsenic	2.9	2.7	1	mg/Kg		03/08/06	SW846 3050B	SW846 6010B
Barium	37	0.68	1	mg/Kg		03/08/06	SW846 3050B	SW846 6010B
Cadmium	< 0.68	0.68	1	mg/Kg		03/08/06	SW846 3050B	SW846 6010B
Chromium	31	0.68	1	mg/Kg		03/09/06	SW846 3050B	SW846 6010B
Lead	5.3	1.4	1	mg/Kg		03/08/06	SW846 3050B	SW846 6010B
Mercury	< 0.014	0.014	1	mg/Kg		03/07/06	SW846 7471A	SW846 7471A
Selenium	< 2.7	2.7	1	mg/Kg		03/08/06	SW846 3050B	SW846 6010B
Silver	< 1.4	1.4	1	mg/Kg		03/08/06	SW846 3050B	SW846 6010B
Percent Solids	73.9	---	1	%		03/03/06	SM M2540G	SM M2540G

DIESEL RANGE ORGANICS

Prep Date: 03/06/06

Preservation Date: 03/06/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	7.8	4.3	1	mg/kg		03/07/06	WI MOD DRO	WI MOD DRO
DRO Blank	< 5.0	5.0	1	mg/kg		03/07/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike	79	---	1	%Recov		03/07/06	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	86	---	1	%Recov		03/07/06	WI MOD DRO	WI MOD DRO

VOLATILES - MDH LIST

Prep Date: 03/07/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
1,1,1,2-Tetrachloroethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1,1-Trichloroethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1,2,2-Tetrachloroethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1,2-Trichloroethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1,2-Trichlorotrifluoroethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1-Dichloroethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1-Dichloroethene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,1-Dichloropropene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2,3-Trichlorobenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2,3-Trichloropropane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2,4-Trichlorobenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2,4-Trimethylbenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2-Dibromo-3-chloropropane	< 140	140	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2-Dibromoethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2-Dichlorobenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2-Dichloroethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,2-Dichloropropane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,3,5-Trimethylbenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,3-Dichlorobenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,3-Dichloropropane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
1,4-Dichlorobenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
2,2-Dichloropropane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
2-Butanone	< 340	340	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
2-Chlorotoluene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
4-Chlorotoluene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
4-Methyl-2-pentanone	< 340	340	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Acetone	940	340	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Allyl Chloride	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Benzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B

All soil results are reported on a dry weight basis unless otherwise noted.

**Pace Analytical
Services, Inc.**

Analytical Report Number: 869443

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Client : ENGINEERING PARTNERS CO.
Project Name : AIRPORT PONDS
Project Number : 06E0102
Field ID : SM POND

Matrix Type : SOIL
Collection Date : 02/28/06
Report Date : 03/16/06
Lab Sample Number : 869443-007

VOLATILES - MDH LIST

Prep Date: 03/07/06

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Bromobenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Bromochloromethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Bromodichloromethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Bromoform	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Bromomethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Carbon Tetrachloride	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Chlorobenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Chlorodibromomethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Chloroethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Chloroform	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Chloromethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
cis-1,2-Dichloroethene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
cis-1,3-Dichloropropene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Dibromomethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Dichlorodifluoromethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Dichlorofluoromethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Diethyl Ether	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Ethylbenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Fluorotrichloromethane	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Hexachlorobutadiene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Isopropylbenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Methylene Chloride	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Methyl-tert-butyl-ether	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Naphthalene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
n-Butylbenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
n-Propylbenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
p-Isopropyltoluene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
sec-Butylbenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Styrene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
tert-Butylbenzene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Tetrachloroethene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Tetrahydrofuran	< 340	340	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Toluene	1900	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
trans-1,2-Dichloroethene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
trans-1,3-Dichloropropene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Trichloroethene	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Vinyl Chloride	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Xylene, o	< 68	68	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Xylenes, m + p	< 140	140	50	ug/Kg		03/07/06	5035/5030B	SW846 8260B
Surrogate		LCL	UCL					
4-Bromofluorobenzene	97	64	133	50 %		03/07/06	5035/5030B	SW846 8260B
Toluene-d8	96	67	139	50 %		03/07/06	5035/5030B	SW846 8260B
Dibromofluoromethane	94	64	140	50 %		03/07/06	5035/5030B	SW846 8260B

GLYCOLS

Prep Date:

Analyte	Result	EQL	Dilution	Units	Code	Anl Date	Prep Method	Anl Method
Glycols	INCL.							

All soil results are reported on a dry weight basis unless otherwise noted.

**Pace Analytical
Services, Inc.**

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436
Fax: 920-469-8827

Lab Number	TestGroupID	Field ID	Comment
869443-001	DRO-W	SB1	Front eluting peaks, late eluting hump and diesel range peaks were present in the chromatogram.
869443-001	M-A-W	SB1	C - Elevated detection limit due to matrix effect. For Silver, Cadmium, and Selenium
869443-001	TPHJP4-W	SB1	Front eluting peaks, late eluting hump and diesel range peaks were present in the chromatogram.
869443-002	DRO-W	SB2	Front eluting peaks were present along with diesel peaks.
869443-002	TPHJP4-W	SB2	Front eluting peaks, late eluting hump and diesel range peaks were present in the chromatogram.
869443-003	DRO-W	SB3	Late eluting hump along with diesel range peaks were present in the chromatogram.
869443-003	M-A-W	SB3	C - Elevated detection limit due to matrix effect. For Silver, Cadmium, and Selenium
869443-004	DRO-W	BIG POND	Front eluting peaks, late eluting hump and diesel range peaks were present in the chromatogram.
869443-004	TPHJP4-W	BIG POND	Front eluting peaks, late eluting hump and diesel range peaks were present in the chromatogram.
869443-005	DRO-S	BIG POND	Late eluting hump along with diesel range peaks were present in the chromatogram.
869443-006	DRO-W	SM POND	Front eluting peaks, late eluting hump and diesel range peaks were present in the chromatogram.
869443-006	M-HG-W	SM POND	C - Elevated detection limit due to matrix effect. Sample diluted 1:2 at prep.
869443-006	TPHJP4-W	SM POND	TPH response was not in the upper half of the curve due to the high concentration of late eluting hydrocarbons.
869443-006	TPHJP4-W	SM POND	Front eluting peaks, late eluting hump and diesel range peaks were present in the chromatogram.
869443-007	DRO-S	SM POND	Front eluting peaks, late eluting hump and diesel range peaks were present in the chromatogram.

Qualifier Codes

Flag Applies To Explanation

A	Inorganic	Analyte is detected in the method blank. Method blank criteria is evaluated to the laboratory method detection limit. Additionally, method blank acceptance may be based on project specific criteria or determined from analyte concentrations in the sample and are evaluated on a sample by sample basis.
B	Inorganic	The analyte has been detected between the method detection limit and the reporting limit.
B	Organic	Analyte is present in the method blank. Method blank criteria is evaluated to the laboratory method detection limit. Additionally, method blank acceptance may be based on project specific criteria or determined from analyte concentrations in the sample and are evaluated on a sample by sample basis.
C	All	Elevated detection limit.
D	All	Analyte value from diluted analysis or surrogate result not applicable due to sample dilution.
E	Inorganic	Estimated concentration due to matrix interferences. During the metals analysis the serial dilution failed to meet the established control limits of 0-10%. The sample concentration is greater than 50 times the IDL for analysis done on the ICP or 100 times the IDL for analysis done on the ICP-MS. The result was flagged with the E qualifier to indicate that a physical interference was observed.
E	Organic	Analyte concentration exceeds calibration range.
F	Inorganic	Due to potential interferences for this analysis by Inductively Coupled Plasma techniques (SW-846 Method 6010), this analyte has been confirmed by and reported from an alternate method.
F	Organic	Surrogate results outside control criteria.
G	All	The result is estimated because the concentration is less than the lowest calibration standard concentration utilized in the initial calibration. The method detection limit is less than the reporting limit specified for this project.
H	All	Preservation, extraction or analysis performed past holding time.
HF	Inorganic	This test is considered a field parameter, and the recommended holding time is 15 minutes from collection. The analysis was performed in the laboratory beyond the recommended holding time.
J	All	Concentration detected equal to or greater than the method detection limit but less than the reporting limit.
K	Inorganic	Sample received unpreserved. Sample was either preserved at the time of receipt or at the time of sample preparation.
K	Organic	Detection limit may be elevated due to the presence of an unrequested analyte.
L	All	Elevated detection limit due to low sample volume.
M	Organic	Sample pH was greater than 2
N	All	Spiked sample recovery not within control limits.
O	Organic	Sample received overweight.
P	Organic	The relative percent difference between the two columns for detected concentrations was greater than 40%.
Q	All	The analyte has been detected between the limit of detection (LOD) and limit of quantitation (LOQ). The results are qualified due to the uncertainty of analyte concentrations within this range.
S	Organic	The relative percent difference between quantitation and confirmation columns exceeds internal quality control criteria. Because the result is unconfirmed, it has been reported as a non-detect with an elevated detection limit.
U	All	The analyte was not detected at or above the reporting limit.
V	All	Sample received with headspace.
W	All	A second aliquot of sample was analyzed from a container with headspace.
X	All	See Sample Narrative.
Z	Organics	This compound was separated in the check standard but it did not meet the resolution criteria as set forth in SW846.
&	All	Laboratory Control Spike recovery not within control limits.
*	All	Precision not within control limits.
+	Inorganic	The sample result is greater than four times the spike level; therefore, the percent recovery is not evaluated.
<	All	The analyte was not detected at or above the reporting limit.
1	Inorganic	Dissolved analyte or filtered analyte greater than total analyte; analyses passed QC based on precision criteria.
2	Inorganic	Dissolved analyte or filtered analyte greater than total analyte; analyses failed QC based on precision criteria.
3	Inorganic	BOD result is estimated due to the BOD blank exceeding the allowable oxygen depletion.
4	Inorganic	BOD duplicate precision not within control limits. Due to the 48 hour holding time for this test, it is not practical to reanalyze and try to correct the deficiency.
5	Inorganic	BOD result is estimated due to insufficient oxygen depletion. Due to the 48 hour holding time for this test, it is not practical to reanalyze and try to correct the deficiency.
6	Inorganic	BOD laboratory control sample not within control limits. Due to the 48 hour holding time for this test, it is not practical to reanalyze and try to correct the deficiency.
7	Inorganic	BOD result is estimated due to complete oxygen depletion. Due to the 48 hour holding time for this test, it is not practical to reanalyze and try to correct the deficiency.



A Siemens Business

ENVIROSCAN SERVICES
301 WEST MILITARY ROAD
ROTHSCHILD, WI 54474

TELEPHONE 800-338-7226
FACSIMILE 715-355-3221
WEBSITE www.usfilter.com

March 13, 2006

PACE Analytical (Green Bay WI)
1241 Bellevue St
Suite 9
Green Bay, WI 54302

Attn: Brian Basten

REPORT NO.: 195885

PROJECT NO.: 869443

Please find enclosed the analytical report, including the Sample Summary, Sample Narrative and Chain of Custody for your sample set received March 3, 2006.

All analyses were performed in accordance with NELAC Standards using approved methods as indicated on this report.

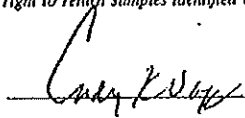
If you have any questions about the results, please call. Thank you for using USFilter, Enviroscan Services for your analytical needs.

Sincerely,

USFilter, Enviroscan Services

James R. Salkowski
Laboratory Director

I certify that the data contained in this report has been generated and reviewed in accordance with the USFilter, Enviroscan Services Quality Assurance Program. Exceptions, if any, are discussed in the sample narrative. Samples will be retained for 30 days from the date of this report, then disposed in an appropriate manner. USFilter, Enviroscan Services reserves the right to return samples identified as hazardous. Release of this Final Report is authorized as verified by the following signature.

Approved by: 

Certifications:

Wisconsin 737053130
Minnesota 055-999-302
Illinois 100317



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ENVIROSCAN SERVICES
301 WEST MILITARY ROAD
ROTHSCHILD, WI 54474

TELEPHONE 800-338-7226
FACSIMILE 715-355-3221
WEBSITE www.usfilter.com

Sample Summary

195885.2

<u>Lab Id</u>	<u>Client Sample ID</u>	<u>Date/Time</u>	<u>Matrix</u>
195885	869443-002	02/27/06	WATER
195886	869443-003	02/27/06	WATER
195887	869443-004	02/28/06	WATER
195888	869443-005	02/28/06	SOIL
195889	869443-006	02/28/06	WATER
195890	869443-007	02/28/06	SOIL

Sample Narrative/Sample Status

LOGIII:

GENERAL:

ANALYSES:

QA/QC:

REPORTING:

Definitions

LOD = Limit of Detection (Not dilution corrected)	$\mu\text{g/l}$ = Micrograms per liter = parts per billion (ppb)
LOQ = Limit of Quantitation (Not dilution corrected)	$\mu\text{g/kg}$ = Micrograms per kilogram = parts per billion (ppb)
< = Less Than	mg/l = Milligrams per liter = parts per million (ppm)
COMP = Complete	mg/kg = Milligrams per kilogram = parts per million (ppm)
SUBCON = Subcontracted analysis	NOT PRES = Not Present
mv = millivolts	ppth = Parts per thousand
pci/l = picocurie per liter	(S) = Surrogate Compound
ml/l = milliliters/Liter	mg/m^3 = Milligrams/meter cube
mg = milligrams	ng/l = Nanograms per liter



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WEBSITE www.usfilter.com

PACE Analytical (Green Bay WI)
1241 Bellevue St
Suite 9
Green Bay, WI 54302

PROJECT NO.: 869443
REPORT NO.: 195885.3
DATE REC'D : 03/03/06
REPORT DATE: 03/13/06
PREPARED BY: JRS

Attn: Brian Basten

Sample ID: 869443-002

Matrix: WATER

Sample Date/Time: 02/27/06

Lab No. 195885

	<u>Result</u>	<u>Units</u>	<u>LOD</u>	<u>LOQ</u>	<u>Dilution Factor</u>	<u>Qualifiers</u>	<u>Date Analyzed</u>	<u>Analyst</u>
<u>EPA 8015</u>								
Ethylene Glycol	<5.00	mg/l	5.0	16.7	1		03/09/06	LMP
Propylene Glycol	<5.00	mg/l	5.0	16.7	1		03/09/06	LMP

Sample ID: 869443-003

Matrix: WATER

Sample Date/Time: 02/27/06

Lab No. 195886

	<u>Result</u>	<u>Units</u>	<u>LOD</u>	<u>LOQ</u>	<u>Dilution Factor</u>	<u>Qualifiers</u>	<u>Date Analyzed</u>	<u>Analyst</u>
<u>EPA 8015</u>								
Ethylene Glycol	<5.00	mg/l	5.0	16.7	1		03/09/06	LMP
Propylene Glycol	<5.00	mg/l	5.0	16.7	1		03/09/06	LMP

Sample ID: 869443-004

Matrix: WATER

Sample Date/Time: 02/28/06

Lab No. 195887

	<u>Result</u>	<u>Units</u>	<u>LOD</u>	<u>LOQ</u>	<u>Dilution Factor</u>	<u>Qualifiers</u>	<u>Date Analyzed</u>	<u>Analyst</u>
<u>EPA 8015</u>								
Ethylene Glycol	<5.00	mg/l	5.0	16.7	1		03/09/06	LMP
Propylene Glycol	<5.00	mg/l	5.0	16.7	1		03/09/06	LMP

Sample ID: 869443-005

Matrix: SOIL

Sample Date/Time: 02/28/06

Lab No. 195888

	<u>Result</u>	<u>Units</u>	<u>LOD</u>	<u>LOQ</u>	<u>Dilution Factor</u>	<u>Qualifiers</u>	<u>Date Analyzed</u>	<u>Analyst</u>
<u>EPA 160.3</u>								
Total Solids	43.1	%	-	0.33	-		03/06/06	AHR
<u>EPA 8015</u>								
Ethylene Glycol	<11.6	mg/kg	5.0	16.7	1		03/09/06	LMP
Propylene Glycol	<11.6	mg/kg	5.0	16.7	1		03/10/06	LMP

All results calculated on a dry weight basis.



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ROTHSCHILD, WI 54474

TELEPHONE 800-338-7226
FACSIMILE 715-355-3221
WEBSITE www.usfilter.com

PACE Analytical (Green Bay WI)
1241 Bellevue St
Suite 9
Green Bay, WI 54302

Attn: Brian Basten

PROJECT NO.: 869443
REPORT NO.: 195885.4
DATE REC'D : 03/03/06
REPORT DATE: 03/13/06
PREPARED BY: JRS

Sample ID: 869443-006

Matrix: WATER

Sample Date/Time: 02/28/06

Lab No. 195889

	<u>Result</u>	<u>Units</u>	<u>LOD</u>	<u>LOQ</u>	<u>Dilution</u> <u>Factor</u>	<u>Qualifiers</u>	<u>Date</u> <u>Analyzed</u>	<u>Analyst</u>
<u>EPA 8015</u>								
Ethylene Glycol	13.1	mg/l	5.0	16.7	1	J	03/09/06	LMP
Propylene Glycol	13,800.	mg/l	5.0	16.7	100		03/10/06	LMP

Sample ID: 869443-007

Matrix: SOIL

Sample Date/Time: 02/28/06

Lab No. 195890

	<u>Result</u>	<u>Units</u>	<u>LOD</u>	<u>LOQ</u>	<u>Dilution</u> <u>Factor</u>	<u>Qualifiers</u>	<u>Date</u> <u>Analyzed</u>	<u>Analyst</u>
<u>EPA 160.3</u>								
Total Solids	66.0	%	-	0.33	-		03/06/06	AMR
<u>EPA 8015</u>								
Ethylene Glycol	<7.58	mg/kg	5.0	16.7	1		03/09/06	LMP
Propylene Glycol	1,290.	mg/kg	5.0	16.7	5		03/10/06	LMP

All results calculated on a dry weight basis.

Qualifier Descriptions

J Estimated concentration below laboratory limit of quantitation.

**Pace Analytical
Services, Inc.**

Analysis Summary by Laboratory

1241 Bellevue Street
Green Bay, WI 54302

Test Group Name	869443-001	869443-002	869443-003	869443-004	869443-005	869443-006	869443-007
ARSENIC	B	B	B	B	B	B	B
BARIUM	B	B	B	B	B	B	B
CADMIUM	B	B	B	B	B	B	B
CHROMIUM	B	B	B	B	B	B	B
DIESEL RANGE ORGANICS	B	B	B	B	B	B	B
GLYCOLS					C	C	
LEAD	B	B	B	B	B	B	B
MERCURY	B	B	B	B	B	B	B
PERCENT SOLIDS					B	B	
SAS		C	C	C		C	
SELENIUM	B	B	B	B	B	B	B
SILVER	B	B	B	B	B	B	B
TPH - JP4	B	B	B	B		B	
VOLATILES - MDH LIST	G	G	G	G	G	G	G

Code	Facility	Address	MN Certification
B	Green Bay Lab (Bellevue St)	1241 Bellevue Street, Suite 9 Green Bay, WI 54302	055-999-334
C	Subcontracted Analysis		See Report
G	Green Bay Lab (Industrial Dr)	1795 Industrial Drive Green Bay, WI 54302	055-999-334

**Pace Analytical
Services, Inc.**

QC Summary

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436
Fax: 920-469-8827

Batch: 869443

Lab Section: VOA

QC Batch Number: 9714

Prep Method: SW846 5030B

Analytical Method: SW846 8260B

Client Sample ID			Lab Sample ID			MB ID	Client Sample ID			Lab Sample ID			MB ID	Client Sample ID			Lab Sample ID			MB ID	
SE1	869443-001	0	SE2	869443-002	0	SE3	869443-003	0	SE4	869443-004	0	SE5	869443-005	0	SE6	869443-006	0	SE7	869443-007	0	
SM POND	869443-008	0	SM POND	869443-009	0	SM POND	869443-010	0	SM POND	869443-011	0	SM POND	869443-012	0	SM POND	869443-013	0	SM POND	869443-014	0	
Test Name	Method Blank Result Conc	LCS Spiked Conc	LCS Recovery %	LCS Recovery Conc	LCS Spiked Conc	LCS Recovery %	LCS Recovery Conc	LCS/LCSD RPD %	LCS/LCSD Control Limits			Parent Sample Number	Parent Result Conc	MS Spiked Conc	MS Recovery %	MS Recovery Conc	MSD Spiked Conc	MSD Recovery %	MSD Recovery Conc	MS/MSD Control Limits	
									LCL	UCL	RPD									LCL	UCL
1,1,1,2-Tetrachloroethane	< 0.32	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,1,2-Trichloroethane	< 0.54	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,1-Dichloropropene	< 0.75	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,2,3-Trichlorobenzene	< 0.74	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,2,3-Trichloropropane	< 0.99	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,2,4-Trichlorobenzene	< 0.97	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,2,4-Trimethylbenzene	< 0.97	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,2-Dibromo-3-chloropropan	< 0.87	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,2-Dibromomethane	< 0.56	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,2-Dichlorobenzene	< 0.83	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,3,5-Trimethylbenzene	< 0.83	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,3-Dichlorobenzene	< 0.87	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,3-Dichloropropane	< 0.67	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1,4-Dichlorobenzene	< 0.95	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2,2-Dichloropropane	< 0.62	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2-Chlorobutene	< 0.85	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4-Chlorobutene	< 0.74	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Allyl Chloride	< 2	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Bromobenzene	< 0.82	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Conc = ug/L unless otherwise noted

C = QC Code, see Qualifier Sheet

Parent Result is reported down to MDL in order to allow Validation of this worksheet

The %R and RPD results are calculated from raw data values with more significant figures than are reported on this form.

Report Date: 3/16/2006

QC Batch Number: 9714

QC Summary

Test Name	Method Blank Result Conc	LCS Spiked Conc	LCS Recovery		LCS Spiked Conc	LCSD Recovery		LCSD Spiked Conc		LCS/LCSD		LCS/LCSD Control Limits		Parent Sample Number	Parent Result Conc	MS		MSD Recovery		MSD Spiked Conc	MS/MSD		MS/MSD Control Limits				
			LCS Conc	LCS %		LCSD Conc	LCSD %	LCS Conc	LCS %	LCS RPD %	LCS C	LCSD Conc	LCSD %			MS Spiked Conc	MS Recovery Conc	MS %	MSD Recovery Conc		MSD %	MSD RPD %	MSD C	LCL	UCL	RPD %	%
Bromochloromethane	< 0.57	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Dibromomethane	< 0.6	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Dichlorodifluoromethane	< 0.59	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Dichlorofluoromethane	< 0.88	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Diethyl Ether	< 0.98	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Fluorochloromethane	< 0.79	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Hexachlorobutadiene	< 0.67	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Isopropylbenzene	< 0.59	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Methyl-tert-butyl-ether	< 0.61	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Naphthalene	< 0.74	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
n-Butylbenzene	< 0.93	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
n-Propylbenzene	< 0.81	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
p-Isopropyltoluene	< 0.67	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
sec-Butylbenzene	< 0.83	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
tert-Butylbenzene	< 0.97	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Tetrahydrofuran	< 1.7	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
1,1,1-Trichloroethane	< 0.9	50	55	110	50	55	110	50	55	110	0.0	75	128	20	868692-021	< 0.9	50	54	109	50	55	110	1.3	70	130	30	
1,1,2,2-Tetrachloroethane	< 0.2	50	42	85	50	42	85	50	42	85	0.2	67	125	20	868692-021	< 0.2	50	44	89	50	46	93	4.4	70	130	30	
1,1,2-Trichloroethane	< 0.42	50	48	95	50	48	95	50	48	95	1.1	75	125	20	868692-021	< 0.42	50	48	96	50	49	99	3.0	70	130	30	
1,1-Dichloroethane	< 0.75	50	53	107	50	53	106	50	53	106	0.3	71	130	20	868692-021	< 0.75	50	53	105	50	53	106	0.7	70	130	30	
1,1-Dichloroethene	< 0.57	50	55	110	50	55	112	50	55	112	1.9	75	125	20	868692-021	< 0.57	50	54	109	50	53	107	1.8	70	130	30	
1,2-Dichloroethane	< 0.36	50	52	105	50	50	99	50	50	99	1.3	71	132	20	868692-021	< 0.36	50	53	105	50	54	107	1.7	70	130	30	
1,2-Dichloropropane	< 0.46	50	50	100	50	40	80	50	40	80	1.0	73	125	20	868692-021	< 0.46	50	51	102	50	51	102	0.0	70	130	30	
2-Butanone	< 4.3	50	38	75	50	38	75	50	38	75	5.9	99	130	20	868692-021	< 4.3	50	47	93	50	45	91	2.6	51	130	30	
4-Methyl-2-pentanone	< 1.2	50	45	88	50	45	88	50	45	88	4.1	99	125	20	868692-021	< 1.2	50	47	94	50	48	95	1.0	62	130	30	
Acetone	< 2.3	50	43	86	50	44	88	50	44	88	1.9	31	150	20	868692-021	< 2.3	50	42	84	50	42	84	0.3	42	132	30	
Benzene	< 0.41	50	53	106	50	53	105	50	53	105	1.3	75	125	20	868692-021	< 0.41	50	53	105	50	53	106	0.6	70	130	30	
Bromochloromethane	< 0.56	50	55	111	50	57	114	50	57	114	2.7	75	125	20	868692-021	< 0.56	50	56	112	50	57	113	1.2	70	130	30	
Bromolorm	< 0.94	50	50	99	50	50	100	50	50	100	0.4	75	125	20	868692-021	< 0.94	50	50	101	50	51	102	0.8	70	130	30	
Bromomethane	< 0.91	50	46	91	50	46	92	50	46	92	1.3	66	125	20	868692-021	< 0.91	50	47	93	50	47	93	0.2	63	147	30	
Carbon Tetrachloride	< 0.49	50	54	109	50	55	110	50	55	110	1.6	75	125	20	868692-021	< 0.49	50	54	108	50	54	108	0.7	70	131	30	
Chlorobenzene	< 0.41	50	49	98	50	50	99	50	50	99	1.7	75	125	20	868692-021	< 0.41	50	49	98	50	49	98	0.7	70	130	30	

Conc = ug/L unless otherwise noted

C = QC Code, see Qualifier Sheet

Parent Result is reported down to MDL in order to allow Validation of this worksheet

The %R and RPD results are calculated from raw data values with more significant figures than are reported on this form.

Report Date: 3/16/2008

QC Batch Number: 9714

QC Summary

Test Name	Method Blank Result Conc	LCS Spiked Conc	LCS Recovery		LCS Spiked Conc	LCSD Recovery		LCS Spiked Conc	LCS/LCSD Control Limits		Parent Sample Number	Parent Result Conc	MS Spiked Conc	MS Recovery		MSD Spiked Conc	MSD Recovery		MS/ MSD RPD	MS/MSD Control Limits	
			Conc	%		Conc	%		LCL	UCL				Conc	%		Conc	%		LCL	UCL
Chlorobromomethane	< 0.31	50	52	103	50	52	104	104	75	125	20	86892-021	< 0.31	50	103	50	51	101	1.4	70	130
Chloroethane	< 0.37	50	51	102	50	50	100	100	72	128	20	86892-021	< 0.37	50	99	50	50	100	0.7	67	138
Chloroform	< 0.37	50	53	107	50	54	108	108	75	125	20	86892-021	< 0.37	50	107	50	55	109	2.2	70	130
Chloromethane	< 0.24	50	42	84	50	42	84	84	46	143	20	86892-021	< 0.24	50	78	50	38	77	0.9	43	150
cis-1,2-Dichloroethane	< 0.63	50	51	102	50	51	102	102	75	125	20	86892-021	< 0.63	50	105	50	52	104	0.8	70	130
cis-1,3-Dichloropropene	< 0.19	50	49	98	50	49	98	98	75	125	20	86892-021	< 0.19	50	48	50	49	99	1.7	70	130
Ethylbenzene	< 0.54	50	52	103	50	52	103	103	75	125	20	86892-021	< 0.54	50	103	50	52	104	0.2	70	136
Methylene Chloride	< 0.43	50	54	108	50	52	105	105	75	125	20	86892-021	< 0.43	50	104	50	52	103	1.1	70	130
Styrene	< 0.86	50	49	99	50	50	99	99	75	125	20	86892-021	< 0.86	50	99	50	50	100	1.0	70	130
Tetrachloroethane	< 0.45	50	51	101	50	50	101	101	75	130	20	86892-021	< 0.45	50	100	50	50	100	0.7	70	130
Toluene	< 0.67	50	50	99	50	50	100	100	75	125	20	86892-021	< 0.67	50	100	50	50	99	0.0	70	130
trans-1,2-Dichloroethane	< 0.89	50	51	102	50	51	102	102	75	125	20	86892-021	< 0.89	50	105	50	51	102	2.2	70	130
trans-1,3-Dichloropropene	< 0.19	50	47	94	50	47	95	95	75	125	20	86892-021	< 0.19	50	47	50	48	95	0.6	70	130
Trichloroethane	< 0.48	50	54	109	50	55	110	110	75	125	20	86892-021	< 0.48	50	109	50	54	107	1.4	70	130
Vinyl Chloride	< 0.18	50	46	92	50	46	93	93	65	130	20	86892-021	< 0.18	50	45	50	44	88	2.6	62	138
Xylene, o	< 0.83	50	50	99	50	50	100	100	75	125	20	86892-021	< 0.83	50	99	50	50	99	0.6	70	130
Xylenes, m + p	< 1.8	100	100	100	100	100	101	101	75	125	20	86892-021	< 1.8	100	101	100	100	101	0.2	70	137
4-Stronofluorobenzene	105%	—	—	106	—	—	108	108	64	132	—	86892-021	105%	—	108	—	—	107	—	64	132
Toluene-d8	97%	—	—	99	—	—	99	99	73	127	—	86892-021	97%	—	99	—	—	99	—	73	127
Dichlorofluoromethane	100%	—	—	99	—	—	101	101	68	122	—	86892-021	100%	—	100	—	—	100	—	68	122

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Report Date: 3/16/2006

QC Batch Number: 9714

QC Summary

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436
Fax 920-469-8827

Batch: 869443

Lab Section: VOA

QC Batch Number: 9745

Prep Method: 5035/5030B

Analytical Method: SW846 8260B

Client Sample ID	Lab Sample ID	MB ID
BIG POND	868443-005	0

Client Sample ID
SM POND

Lab Sample ID	MB ID
869443-007	0

QC Type	Client Sample ID	Lab Sample ID
MB	VOG1882-10MB	VOG1882-10MB
LCS	VOG1882-10LCS	VOG1882-10LCS
LCS D	VOG1882-10LCS D	VOG1882-10LCS D

Test Name	Method Blank Result Conc	LCS Spiked Conc	LCS			LCS Recovery			LCS Spiked Conc	LCS Recovery			LCS Spiked Conc	LCS/LCSD Control Limits			Parent Sample Number	Parent Result Conc	MS Spiked Conc	MS Recovery			MSD Spiked Conc	MS Recovery			MS Spiked Conc	MS/MSD Control Limits					
			Conc	%	C	Conc	%	C		Conc	%	C		LCL	UCL	RPD				Conc	%	C		Conc	%	C		LCL	UCL	RPD	Conc	%	C
1,1,1,2-Tetrachloroethane	< 16	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,1,1,1-Trichloroethane	< 19	2500	2600	103	—	2500	102	1.8	75	125	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,1,1,2-Tetrachloroethane	< 21	2500	2200	88	—	2500	92	4.6	75	125	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,1,1,2-Trichloroethane	< 24	2500	2600	103	—	2500	107	3.7	75	125	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,1,2-Trichloroethane	< 18	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,1-Dichloroethane	< 19	2500	2500	101	—	2500	101	0.3	75	125	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,1-Dichloroethane	< 22	2500	2600	106	—	2500	105	0.6	54	149	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,1-Dichloropropene	< 19	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,2,3-Trichlorobenzene	< 17	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,2,3-Trichloropropane	< 21	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,2,4-Trichlorobenzene	< 16	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,2,4-Trichlorobenzene	< 12	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,2-Dibromo-3-chloropropan	< 12	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,2-Dibromonethane	< 18	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,2-Dichlorobenzene	< 12	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,2-Dichloroethane	< 21	2500	2600	104	—	2500	104	0.4	75	125	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,2-Dichloropropane	< 22	2500	2500	101	—	2500	100	1.4	75	125	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,3,5-Trimethylbenzene	< 12	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,3-Dichlorobenzene	< 16	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,3-Dichloropropane	< 12	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
1,4-Dichlorobenzene	< 18	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				

Conc = ug/Kg unless otherwise noted

C = QC Code, see Qualifier Sheet

Parent Result is reported down to MDL in order to allow Validation of this worksheet

The %R and RPD results are calculated from raw data values with more significant figures than are reported on this form.

Report Date: 3/16/2006

QC Batch Number: 9745

QC Summary

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436
Fax 920-469-8827

<p>Conc = ug/Kg unless otherwise noted</p> <p>C = QC Code, see Qualifier Sheet</p> <p>Parent Result is reported down to MDL in order to allow Validation of this worksheet</p> <p>The %R and RPD results are calculated from raw data values with more significant figures than are reported on this form.</p>	<p>Report Date: 3/16/2006</p> <p>QC Batch Number: 9745</p>
--	--

QC Batch Number: 9745

QC Summary

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436
Fax: 920-469-8827

Test Name	Method Blank Result Conc	LCS Spiked Conc	LCS Recovery Conc %	LCS Spiked Conc	LCS Recovery Conc %	LCS RPD	LCS/LCSD Control Limits			Parent Sample Number	Parent Result Conc	MS Spiked Conc	MS Recovery Conc %		MSD Spiked Conc	MSD Recovery Conc %		MS/ MSD RPD	MS/MSD Control Limits		
							LCL	UCL	RPD				%	C		%	C		LCL	UCL	RPD
N-Butylbenzene	< 12	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
n-Propylbenzene	< 5.5	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
p-Propyltoluene	< 12	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
sec-Butylbenzene	< 8	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Styrene	< 12	2500	2500	99	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
tert-Butylbenzene	< 12	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tetrachloroethane	< 15	2500	2500	103	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tetrahydrofuran	< 75	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Toluene	< 8.5	2500	2500	101	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
trans-1,2-Dichloroethane	< 14	2500	2500	105	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
trans-1,3-Dichloropropene	< 15	2500	2500	101	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Trichloroethane	< 20	2500	2500	104	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Vinyl Chloride	< 14	2500	2100	84	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Xylene, o	< 15	2500	2500	104	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Xylenes, m + p	< 22	5000	5200	104	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4-Bromofluorobenzene	98%	—	—	—	98	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Toluene-d8	101%	—	—	—	103	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dibromofluoromethane	98%	—	—	—	103	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Conc = ug/Kg unless otherwise noted

C = QC Code, see Qualifier Sheet

Parent Result is reported down to MDL in order to allow Validation of this worksheet

The %R and RPD results are calculated from raw data values with more significant figures than are reported on this form.

Report Date: 3/16/2006

QC Batch Number: 9745

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436
Fax: 920-469-8827

Batch:	869443
Lab Section:	METALS
QC Batch Number:	9759
Prep Method:	SW846 3010A

Analytical Method: SW846 6010B

Report Date: 3/16/2005
QC Batch Number: 9759

Conc = ug/L unless otherwise noted
C = QC Code, see Qualifier Sheet
Parent Result is reported down to MDL in order to allow Validation of this worksheet
The %R and RPD results are calculated from raw data values with more significant figures than are reported in this worksheet

**Pace Analytical
Services, Inc.**

QC Summary

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436
Fax: 920-469-8827

Batch: 869443
Lab Section: METALS
QC Batch Number: 9742
Prep Method: SW846 7470A

QC Type	Client Sample ID	Lab Sample ID
MB	MBWMTG1844-18	MBWMTG1844-18
MB	MBDMTG1844-18	MBDMTG1844-18
LCS	LCSWMTG1844-18	LCSWMTG1844-18
LCS	LCSDMTG1844-18	LCSDMTG1844-18
MS	BIG PONDMS	869443-004MS
MS	869334-001MS	869334-001MS
MSD	BIG PONDMSD	869443-004MSD
MSD	869334-001MSD	869334-001MSD

Analytical Method: SW846 7470A

Client Sample ID		Lab Sample ID		MB ID		Client Sample ID		Lab Sample ID		MB ID												
SB1		869443-001	0	SB2		869443-002	0	869443-002		869443-002	0											
SB3		869443-003	0	BIG POND		869443-004	0	869443-004		869443-004	0											
SM POND		869443-006	0																			
Test Name	Method Blank Result Conc	LCS Spiked Conc	LCS Recovery		LCS Spiked Conc	LCS Recovery Conc	LCS/LCSD RPD %	LCS/LCSD Control Limits		Parent Sample Number	Parent Result Conc	MS Spiked Conc	MS Recovery Conc	MSD Spiked Conc	MSD Recovery Conc	MS/MSD RPD %	MS/MSD Control Limits					
			LCS Recovery %	LCS Recovery Conc				LCS Recovery %	LCS Recovery Conc								MS Recovery %	MS Recovery Conc	MSD Recovery %	MSD Recovery Conc	LCL %	UCL %
			RPD %	RPD %				RPD %	RPD %								RPD %	RPD %	RPD %	RPD %	RPD %	RPD %
Mercury	< 0.026	0	4.9	97.5	—	—	—	85	115	20	869443-004	< 0.026	0	94.3	0	0	94.5	0.4	85	115	20	

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C = QC Code, see Qualifier Sheet
Parent Result is reported down to MDL in order to allow Validation of this worksheet
The %R and RPD results are calculated from raw data values with more significant figures than are reported on this form.

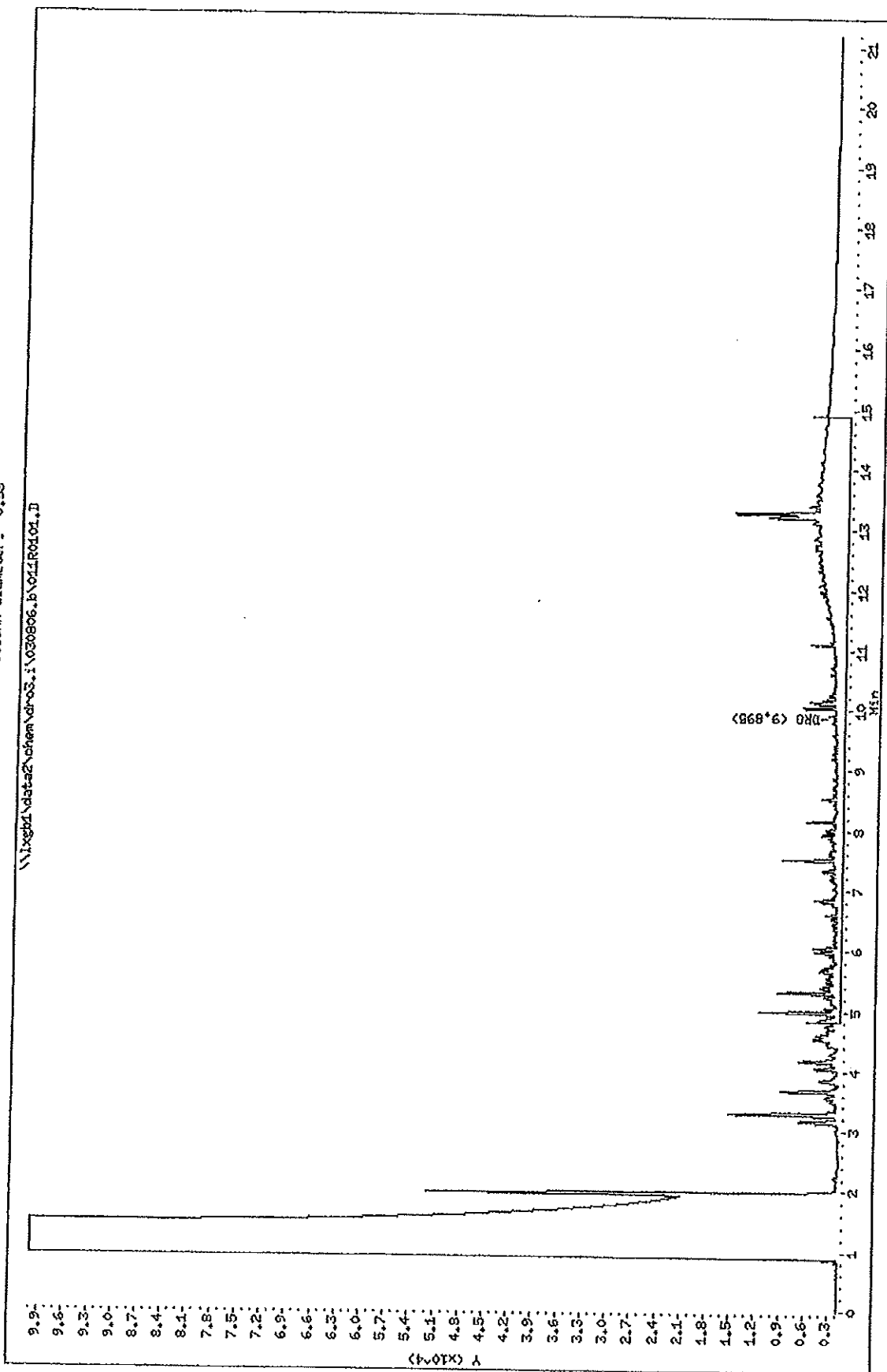
Report Date: 3/16/2006
QC Batch Number: 9742

Data File: \\lgsb1\data2\chem\dro3.i\030806.b\011R0101.D
Data : 08-MAR-2006 11:52
Client ID: 869443-001
Sample Info: 69443D001UJX1
Purge Volume: 1000.0
Column phase: RTX-5/1.6.

Instrument: dro3.i

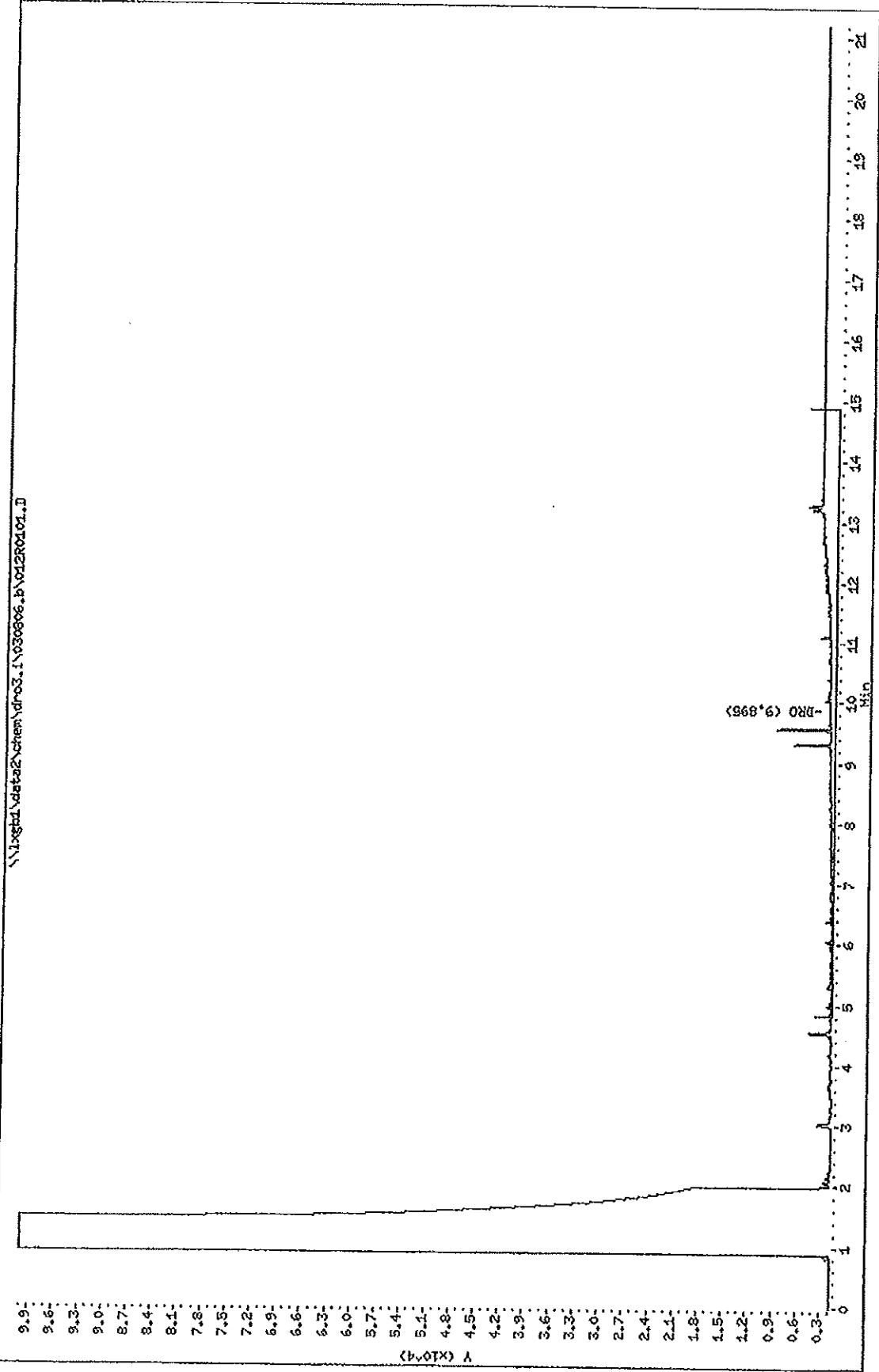
Operator: SVM

Column diameter: 0.53



Data File: \\lxgtd1\data2\chem\dro3.i\030806.b\012R0101.D
Date : 08-MAR-2006 12:18
Client ID: 889443-002
Sample Info: 69443D002MX1
Purge Volume: 1000.0
Column phase: RTX-5/1.6.

Instrument: dro3.i
Operator: SMH
Column diameter: 0.53

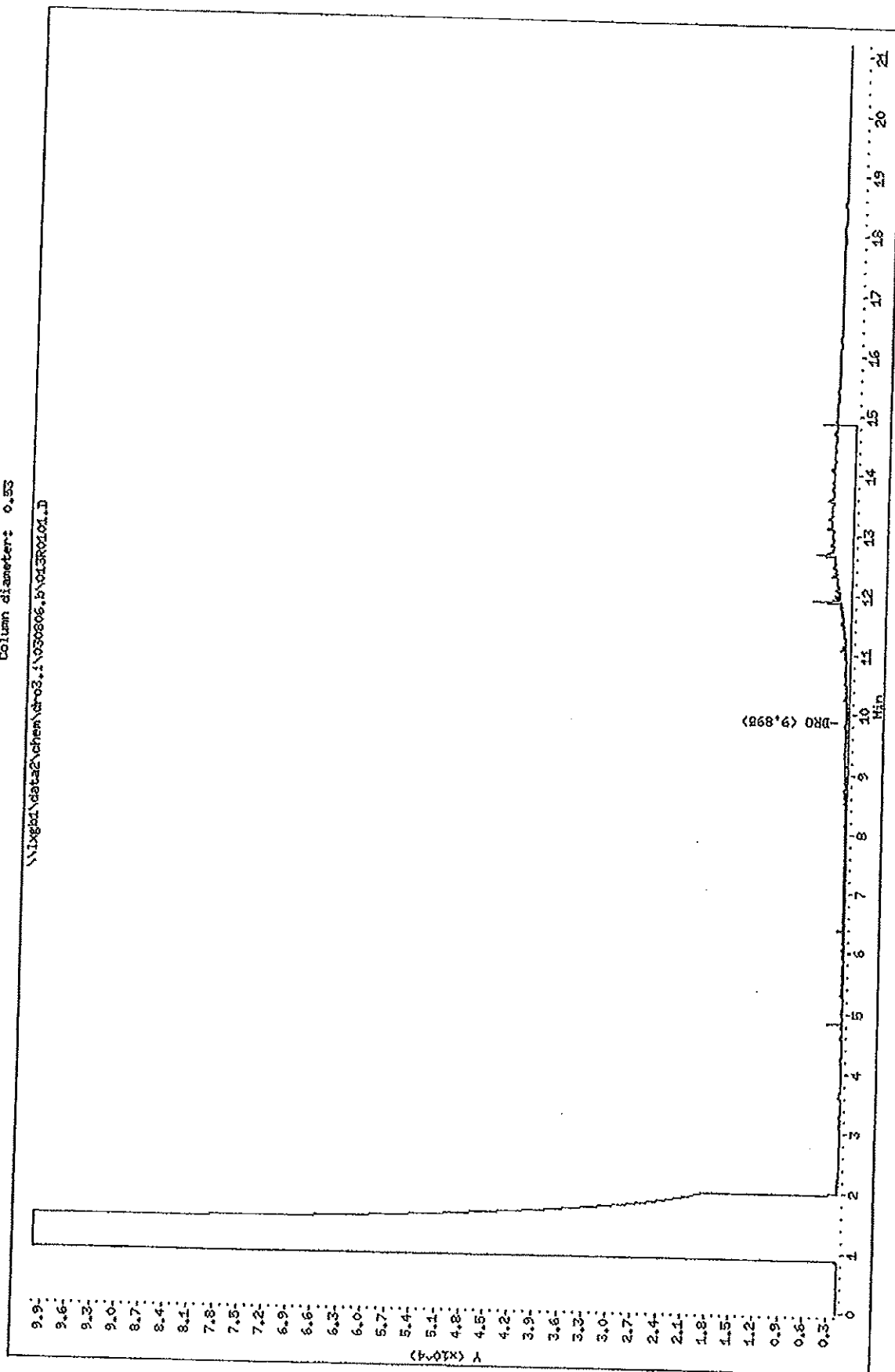


Data File: \\lxgsl\data2\chem\dro3.i\030806.b\013R0101.D
Date : 08-08-2006 12:45
Client ID: B89443-003
Sample Info: 69443D003KJX1
Purge Volume: 1000.0
Column Phases: RTX-5/1.G.

Instrument: dro3.i

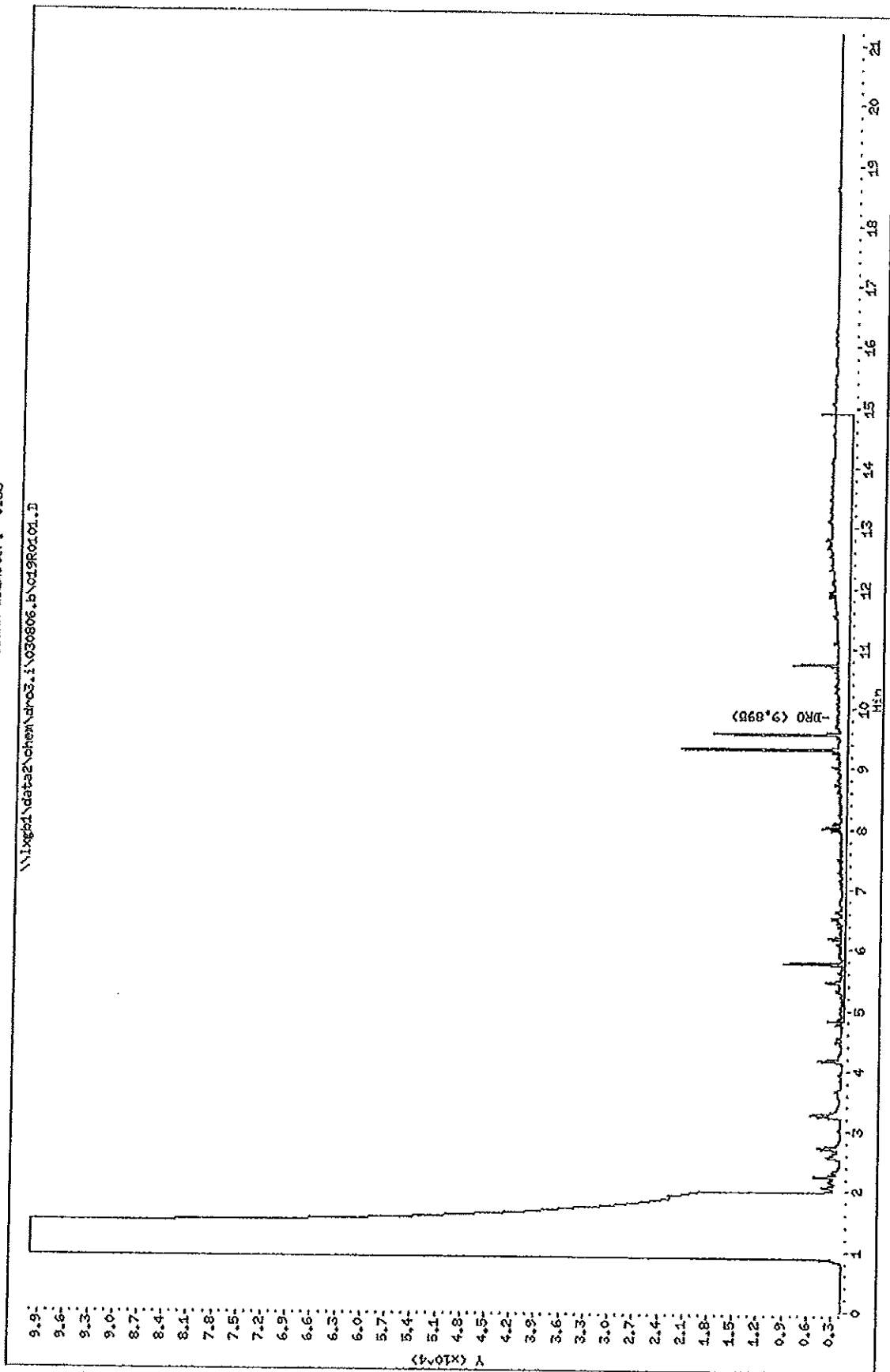
Operator: SVH

Column diameter: 0.53



Data File: \\lxgbl\data2\chem\dro3.i\030806.b\019R0101.D
Date : 08-11-2006 15:26
Client ID: 869443-004
Sample Info: 69443D004JX1
Purge Volume: 1000.0
Column phase: RTX-5/1.6.

Instrument: dro3.i
Operator: SVM
Column diameter: 0.53

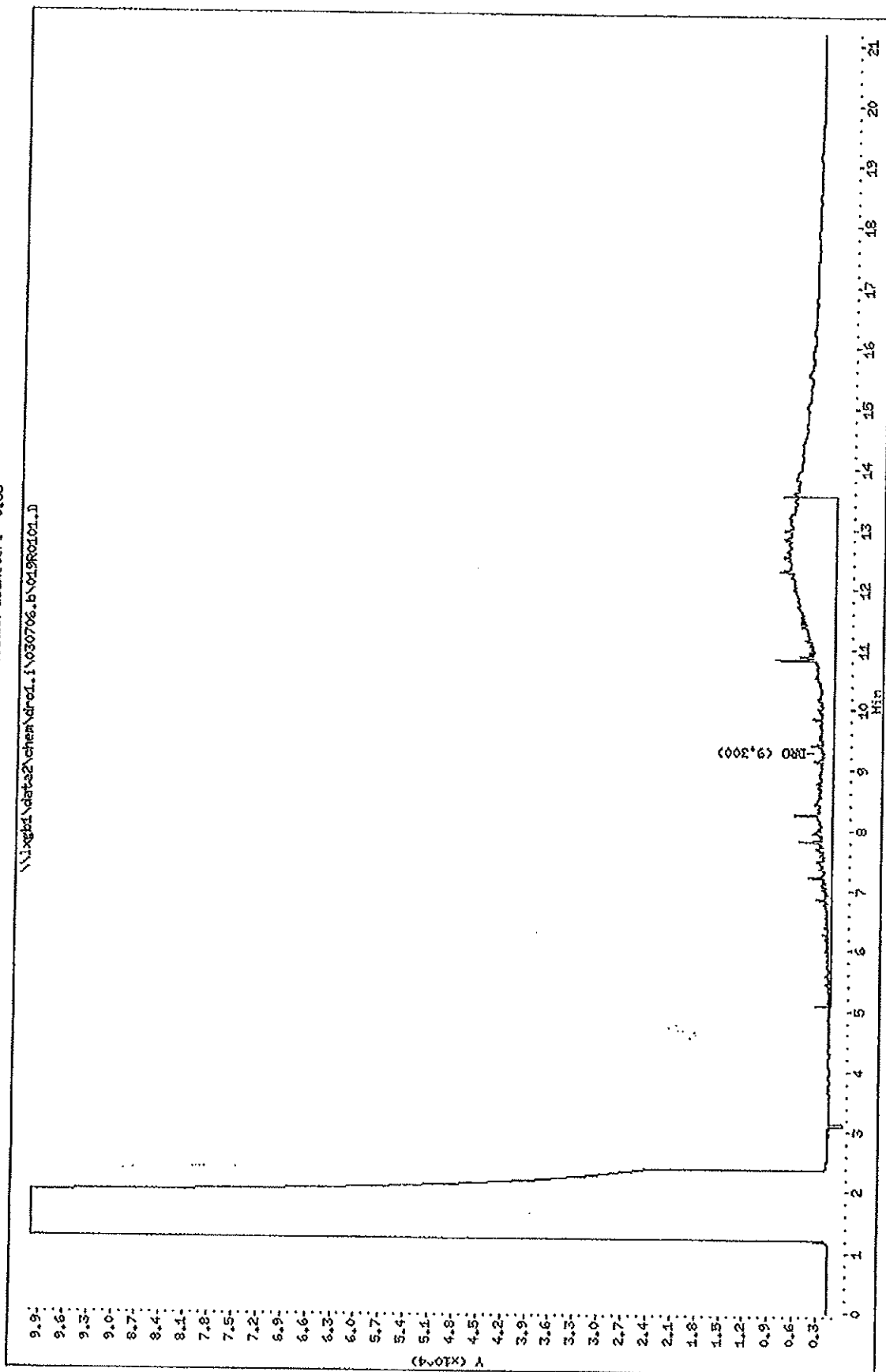


Data File: \\lxbt1\data2\chem\dro1.i\030706.b\019R0101.D
Date : 07-MAR-2006 16:02
Client ID: 869443-005
Sample Info: 69443D005DX1

Instrument: dro1.i

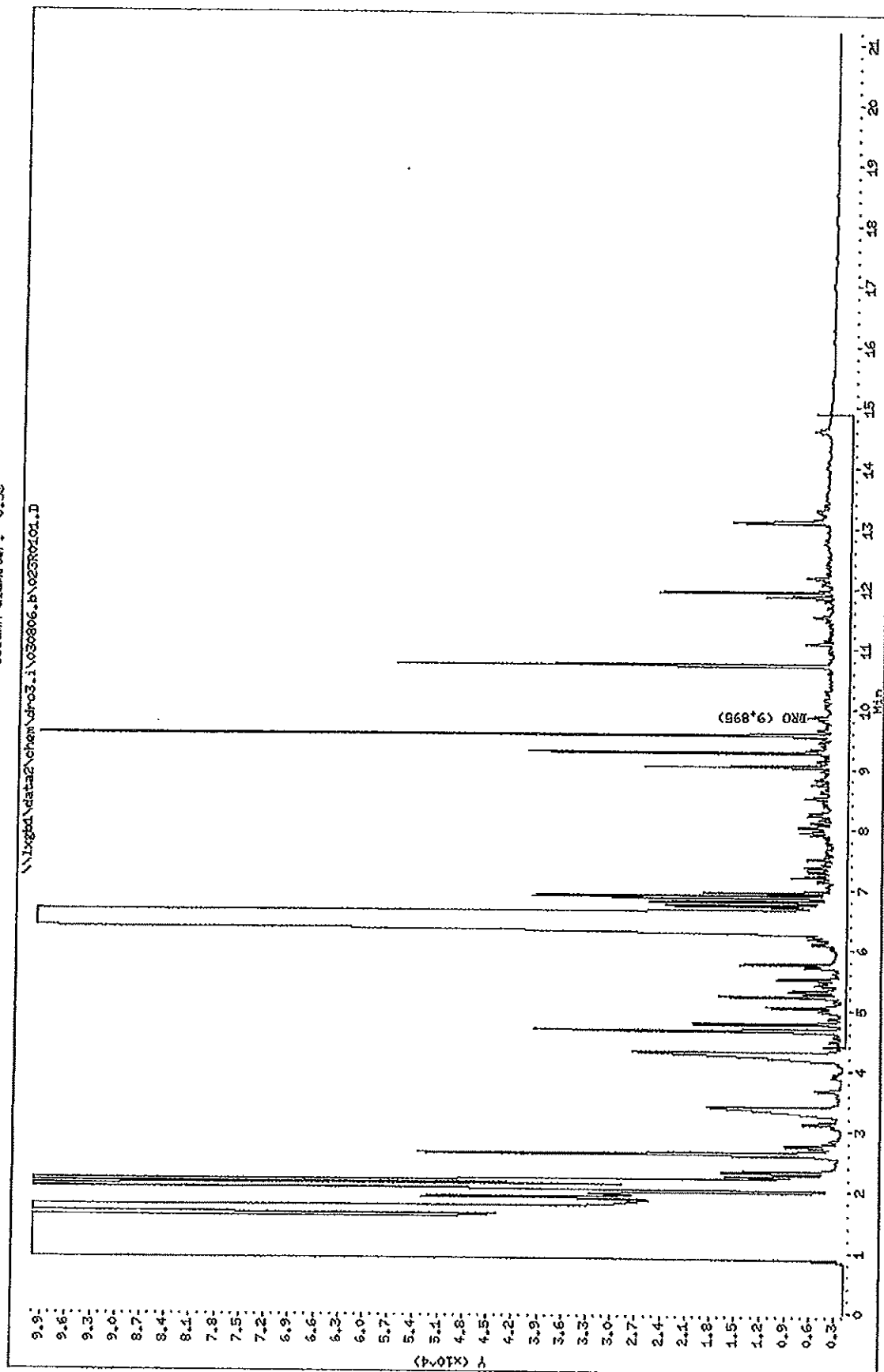
Operator: SVH
Column diameter: 0.53

Column phase: RTX-5/1.6.



Data File: \\log61\data2\chem\dro3.i\030806.b\023R0101.D
 Date: 08-MAR-2006 17:13
 Client ID: 869443-006
 Sample Info: 69443D006LJX2.5
 Purge Volume: 1000.0
 Column Phase: RTX-5/1.G.

Instrument: dro3.i
 Operator: SVM
 Column diameter: 0.53

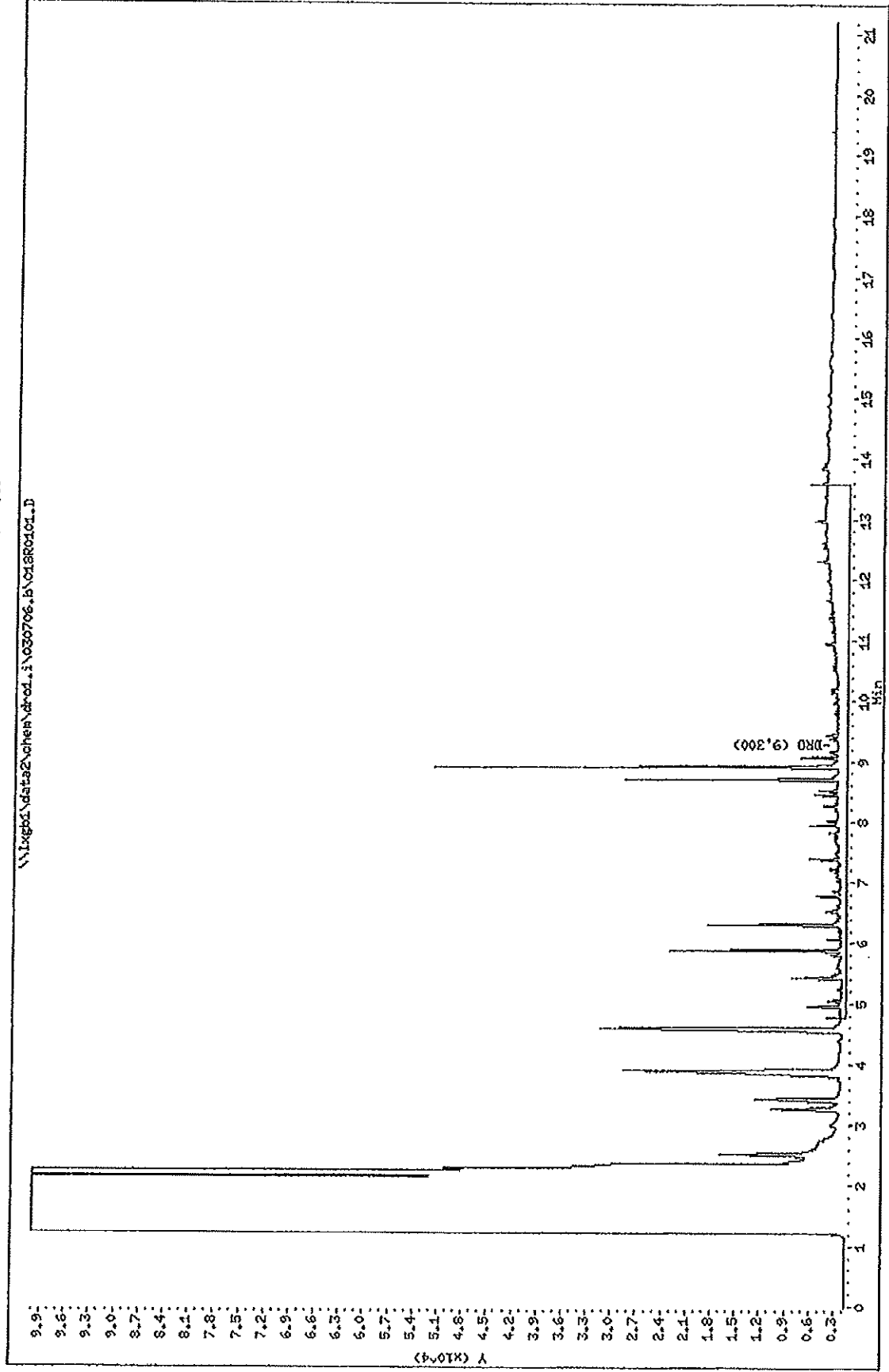


Data File: \\lxgb1\data2\chem\drod.i\030706.b\018R0101.D
Date : 07-MAR-2006 15:36
Client ID: 869443-007
Sample Info: 69443D007S0X1

Instrument: drod.i

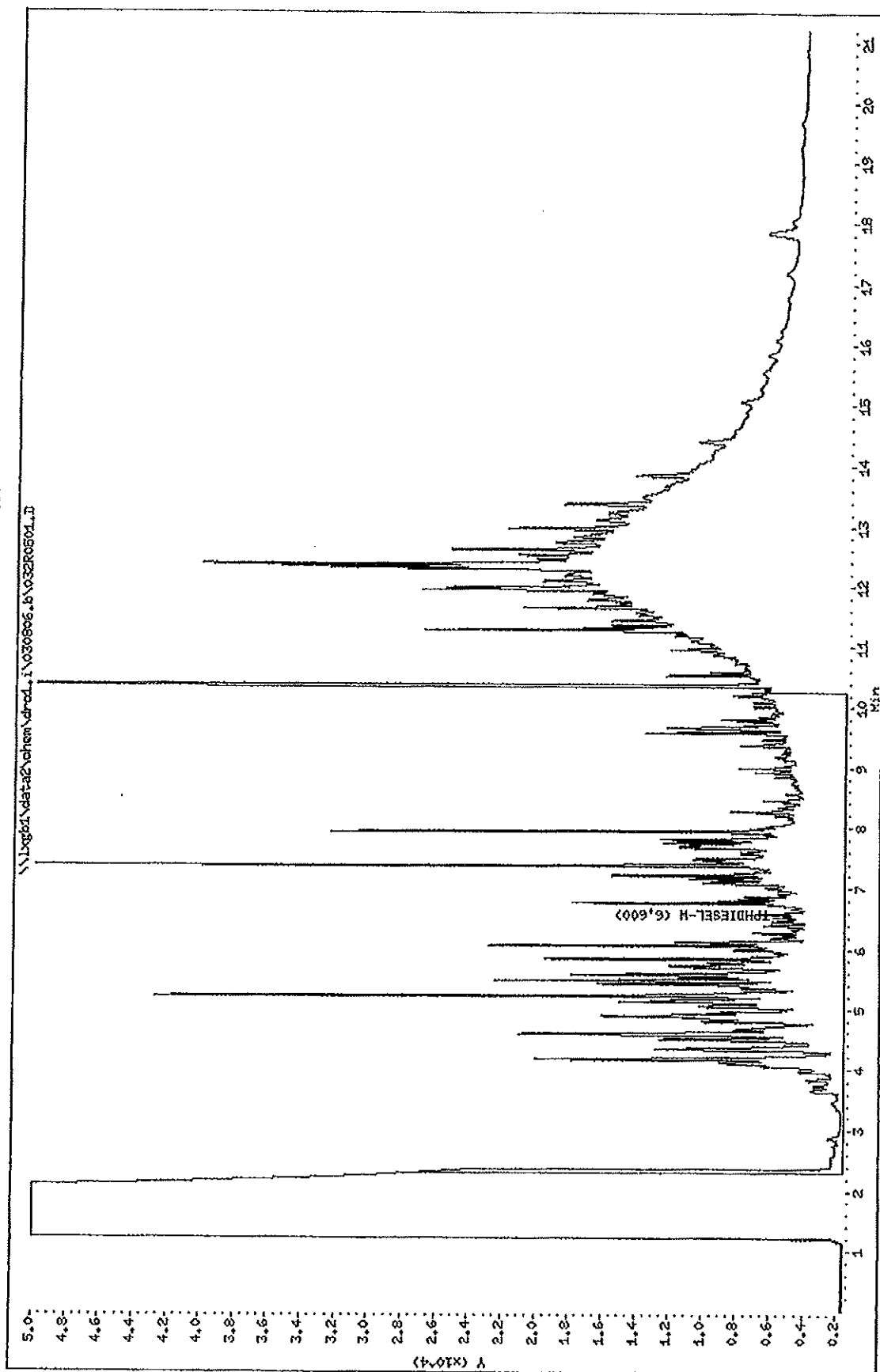
Operator: SVH
Column diameter: 0.53

Column phase: RTX-S/T.G.



Data File: \\lsgb1\data2\chem\dro4.i\030806.i\032R0501.D
 Date : 09-MAR-2006 07:57
 Client ID: 869443-001
 Sample Info: 89443T001URX1
 Volume Injected (uL): 2.0
 Column Phase: RTX-S/1.0.

Instrument: dro4.i
 Operator: SVM
 Column diameter: 0.53



Data File: \\ixg61\data2\chem\chrol.i\030806.b\029R0501.D

Date : 09-MAR-2006 08:37

Client ID: 889443-002

Sample Info: 69443T002URV4

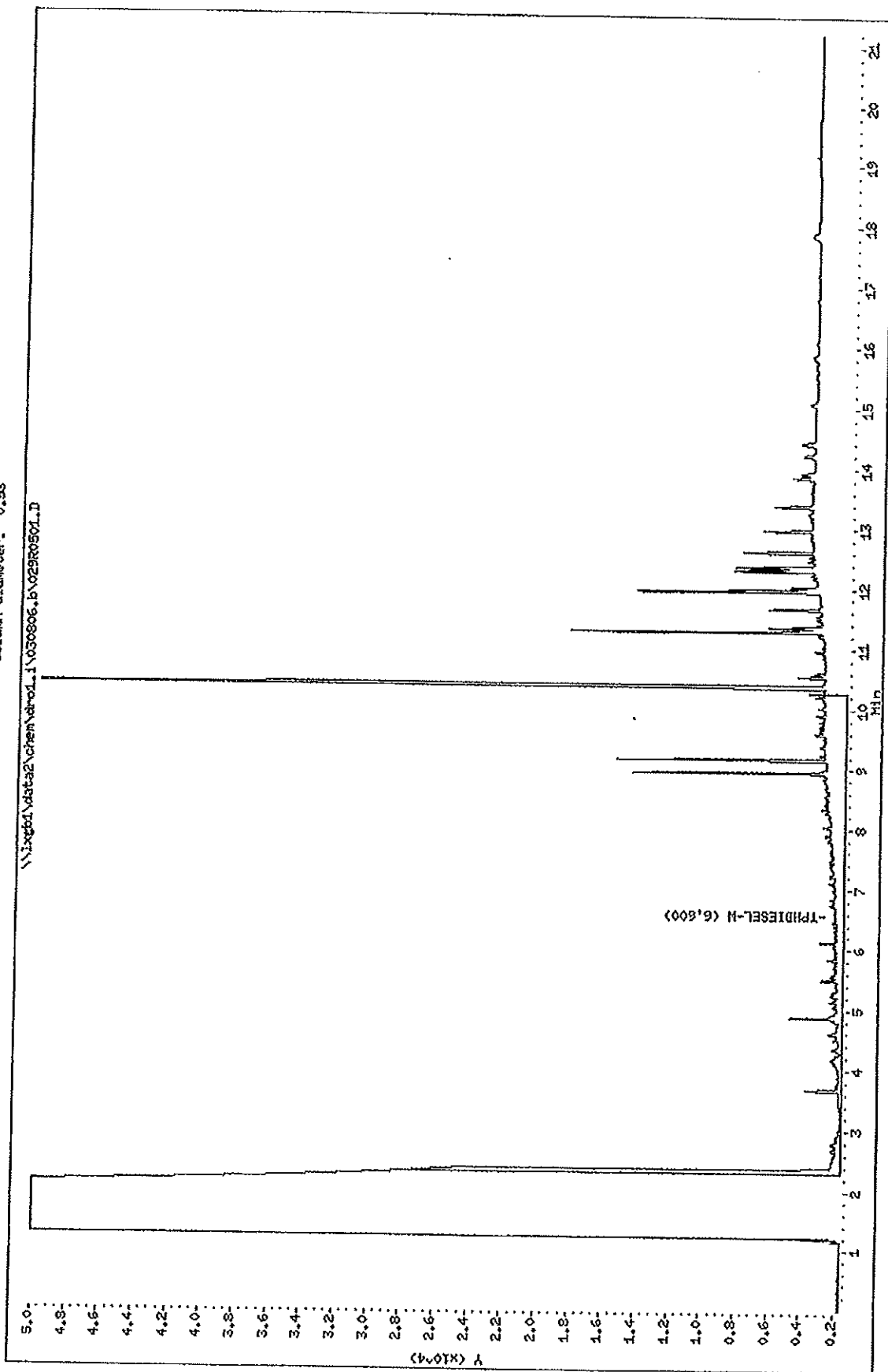
Volume Injected (uL): 2.0

Column phase: RTX-S/I.G.

Instrument: chrol.i

Operator: SVM

Column diameter: 0.93



Data File: \\lxgb1\data2\chem\chrd1.i\030806.b\03080501.D

Date : 09-MAR-2006 07:04

Client ID: 869443-003

Sample Inlet: 694437003MRXL

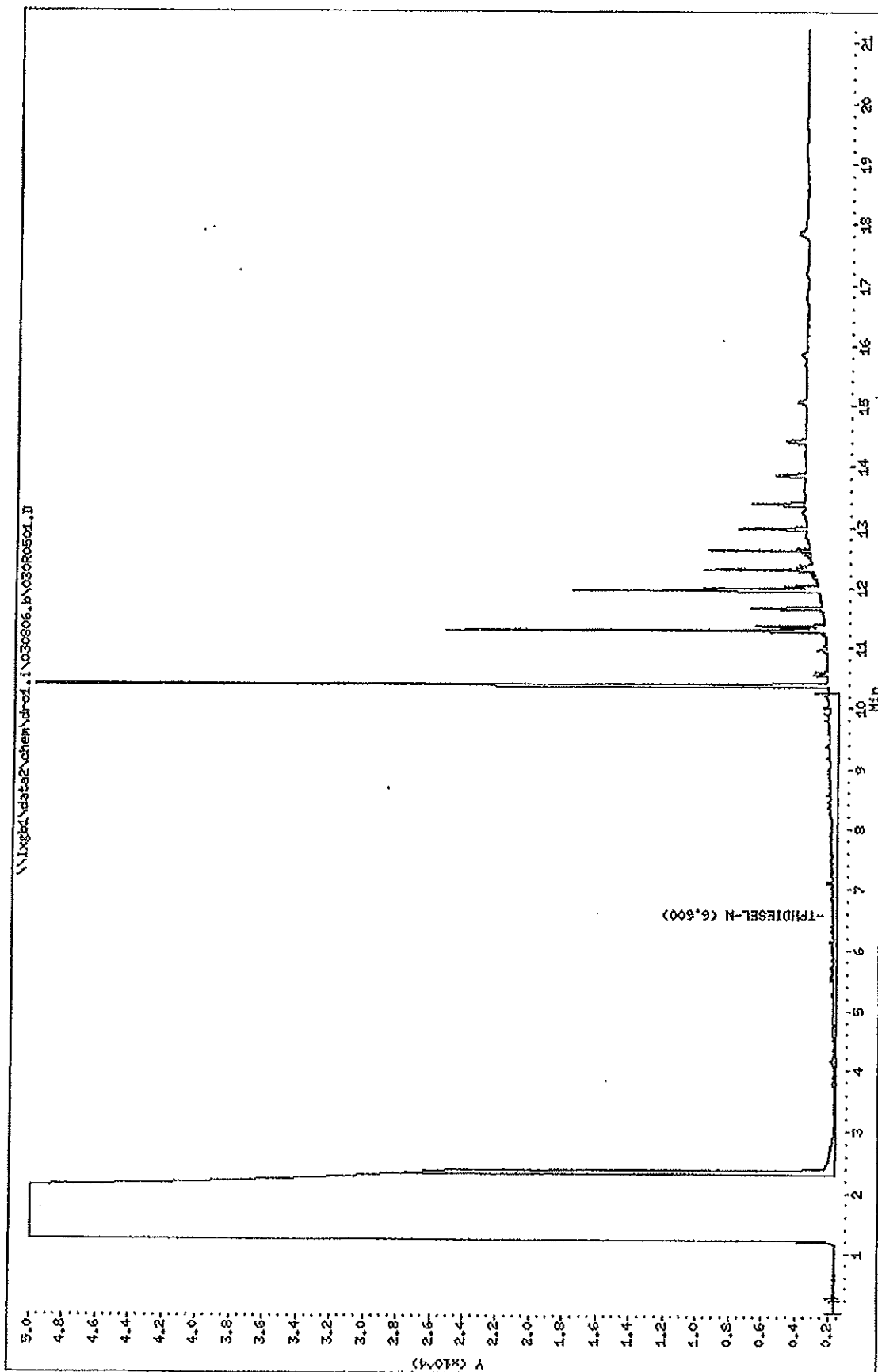
Volume Injected (uL): 2.0

Column phase: RTX-S/1.0.

Instrument: chrd1.i

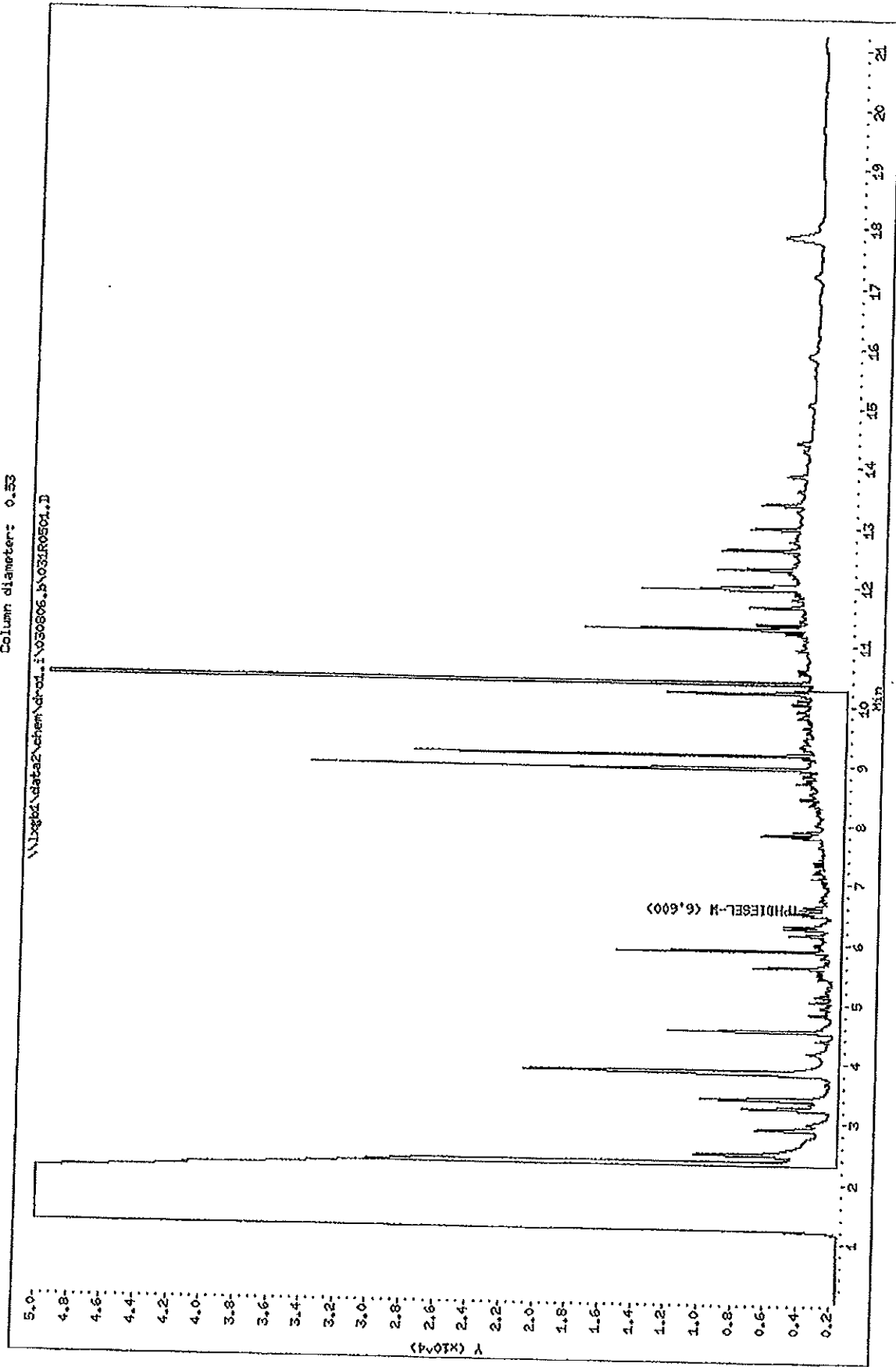
Operator: SMH

Column diameter: 0.53



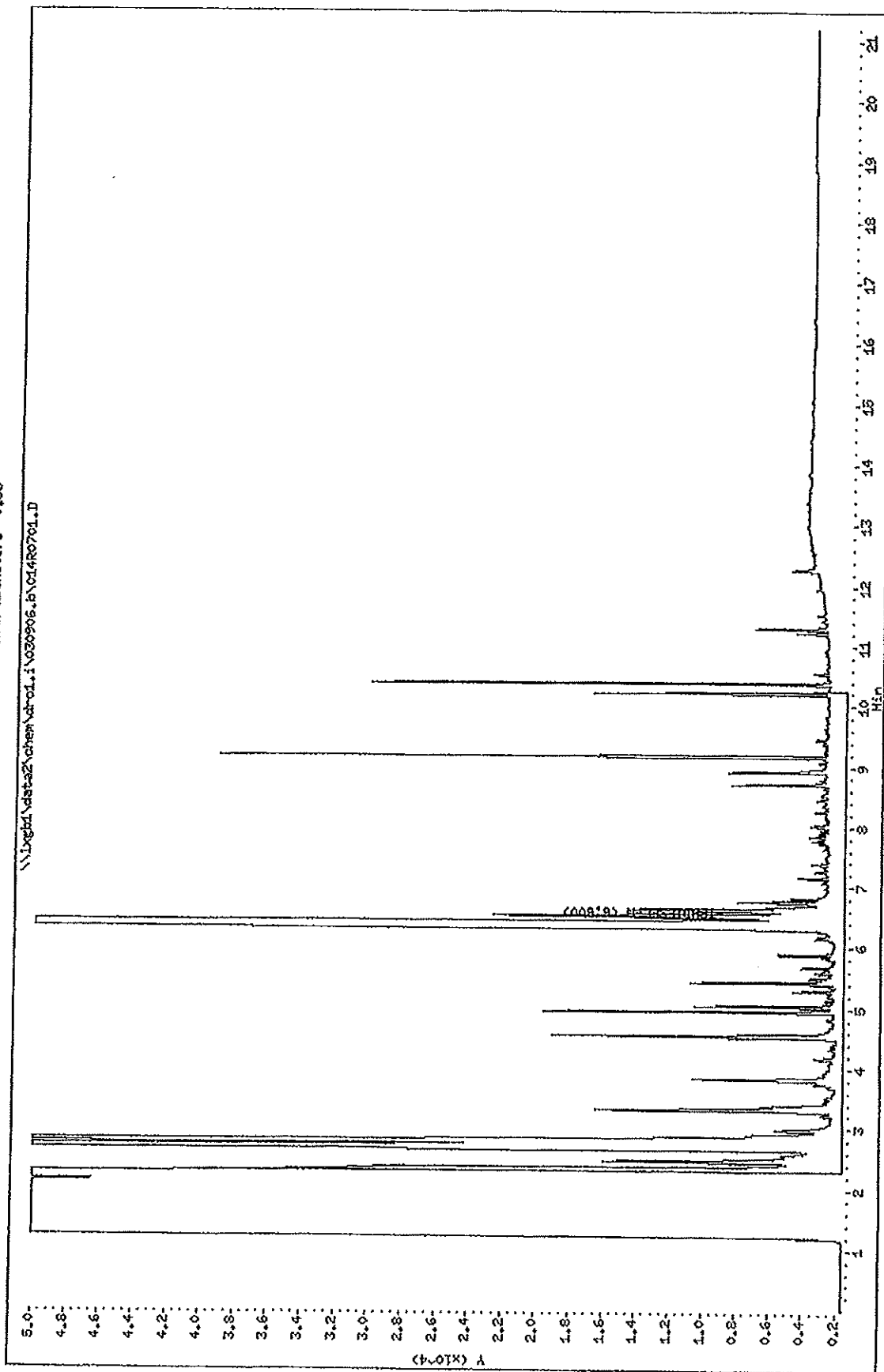
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Date : 09-Mar-2006 07:30
Client ID: 869443-004
Sample Info: 6943T004MEX1
Volume Injected (ul): 2.0
Column phase: RTX-5/I.G.

Instrument: dro1.i
Operator: SWH
Column diameter: 0.53



Data File: \\lvgb1\data2\chem\chrd1.i\030906.b\014R0701.D
 Date : 10-MAR-2006 04:36
 Client ID: 86943-006
 Sample Info: 89443T006HRRD16
 Volume Injected (uL): 2.0
 Column phase: RTX-5/I.G.

Instrument: chrd1.i
 Operator: SJH
 Column diameter: 0.53





Sample Condition Upon Receipt

Client Name: EPL Engineering Project # 8109443

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☒ Commercial ☐ Pace Other _____

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals Intact: ☐ yes ☐ no

Packing Material: ☒ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other _____

Thermometer Used JB

Type of Ice: Wet Blue None

☐ Samples on ice, cooling process has begun

Cooler Temperature 0.5°C

Biological Tissue Is Frozen: Yes No

Temp should be above freezing to 6°C

Date and Initials of person examining contents: 3-20-06 AB

Comments:

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>WTS</u>		
All containers needing preservation have been checked.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>AB</u>
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	<input type="checkbox"/> Yes <input type="checkbox"/> No	Initial when completed
Samples checked for dechlorination:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	15.
Trip Blank Present:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	16.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____

Field Data Required? Y / N

Comments/ Resolution: _____

Project Manager Review: _____

5/3/06

Date: _____

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: of	
0979007	
REGULATORY AGENCY	
<input type="checkbox"/> NPDES	<input checked="" type="checkbox"/> GROUND WATER
<input type="checkbox"/> UST	<input type="checkbox"/> RCRA
<input type="checkbox"/> DRINKING WATER	<input type="checkbox"/> Other
SITE LOCATION	
<input type="checkbox"/> GA	<input type="checkbox"/> IL
<input type="checkbox"/> IN	<input type="checkbox"/> MI
<input type="checkbox"/> OH	<input checked="" type="checkbox"/> NY
<input type="checkbox"/> SC	<input type="checkbox"/> WI
<input type="checkbox"/> OTHER	<input type="checkbox"/> NC

Section A		Section B		Section C	
Required Client Information:		Required Project Information:		Invoice Information:	
Company:	gpc Engineering & Testing	Report To:	Brian McLean	Attention:	B. McLean
Address:	539 Garfield Ave	Copy To:		Company Name:	gpc
	Duluth, MN 55802			Address:	539 Garfield Ave
Email To:	bmclean@epe.duluth.com	Purchase Order No.:		Price Quote Reference:	
Phone:	727-1239 (518) 727-1248	Project Name:	Fireport Ponds	Paco Project Manager:	
Requested Due Date/TAT:		Project Number:	06E0102	Paco Profile #:	

[illegible]

Additional Comments:

APPROVED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITION
D. E. York	9/10/04	9:55	M. L. H.	3/1/06	09:58	VAN YN YN
M. J. H.	3/1/06	11:00	P. M. H.	3/1/06	11:00	VAN YN YN
D. P. H.	3/2/06	08:55	G. M. H.	3/2/06	10:55	VAN YN YN
SAMPLER NAME AND SIGNATURE						
PRINT Name of SAMPLER: Brian McLean						
SIGNATURE OF SAMPLER: [Signature]						
<div style="float: right;"> DATE Signed: 3/1/06 NMN / DD / YY </div>						

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER

SIGNATURE: [Signature]

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Brian McLean

SEE REVERSE SIDE FOR INSTRUCTIONS

ORIGINAL

ASBESTOS INSPECTION REPORT

at

The Duluth International Airport

4701 Grinden Drive

Duluth, Minnesota

EMR Project #7124.001

Prepared for:

Reynolds, Smith and Hills, Inc.

900 Diehl Road – Suite 101

Naperville, IL 60563

Prepared by:

EMR, Inc.

11 East Superior Street, Suite #541

Duluth, Minnesota

JANUARY 11, 2006



ENVIRONMENTAL MANAGEMENT RESOURCES

Asbestos Inspection Report

at

The Duluth International Airport

4701 Grinden Drive
Duluth, Minnesota

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Figure 6. Third Floor Plan with Sample Locations and ACM Areas

APPENDICIES

Appendix A. Asbestos Inspector Certifications

Appendix B. Laboratory Reports

Appendix C. Homogenous Area Physical Assessment Forms

EXECUTIVE SUMMARY

EMR, Inc. (EMR) was retained by Reynolds, Smith and Hills, Inc. (RS&H) to conduct a pre-renovation asbestos inspection of the Duluth International Airport Terminal Building, located at 4701 Grinden Drive in Duluth, Minnesota. The inspection was conducted between November 7, 2005 and January 3, 2006 by Chuck Deye of EMR who possesses current Minnesota Department of Health asbestos inspection certifications.

During the inspection, bulk samples were collected from the building materials suspected to contain asbestos. These samples were submitted to an accredited laboratory for polarized light microscopy (PLM) analysis. Laboratory analysis of the bulk samples collected from the site has indicated building materials with asbestos concentrations above regulated levels including: floor tile and mastic; ceiling tile; pipe wrap and hard fitting insulation. Additional materials were sampled during the inspection and were determined to be non-detect for asbestos content. Listed below is a summary of the types of asbestos-containing materials (ACM) in the building.

- White 12" x 12" Floor Tile and Mastic
- White 2' x 2' Suspended Ceiling Tile
- White 2' x 4' Suspended Ceiling Tile
- White Thermal System Insulation on Pipe Elbows
- White/Beige/Tan TSI Wrap on Pipe Elbows

The Environmental Protection Agency's (EPA) National Emission Standard for Hazardous Air Pollutants (NESHAP) regulations require that all friable ACM, and Category II Non-Friable ACM be removed from the building prior to renovation/demolition activities. Minnesota Pollution Control Agency (MPCA) guidelines state that if building materials are to be recycled during demolition or renovation, all Category 1 Non-Friable ACM must be removed prior to demolition of renovation.

EMR understands that the building is scheduled for renovation. Destructive investigation methods were not employed on the interior of the building during the time of the inspection due to the facility being open and operational. Additionally, destructive methods were not employed in order to not damage the appearance and aesthetics of the building. Ceiling cavities were accessed above suspended ceilings and unfinished wall cavities were accessed above plaster and sheetrock where possible in an attempt to verify the location of all suspect materials. Suspect materials were noted on both the interior and exterior of the building. Vertical pipe runs between the basement and third floor

HVAC rooms were partially encased in wall cavities, therefore portions of these pipe runs were not accessible at the time of inspection.

1.0 INTRODUCTION

1.1 INTRODUCTION

EMR, Inc., (EMR) was contacted by Reynolds, Smith and Hills, Inc. (RS&H) to conduct an asbestos inspection at the Duluth International Airport Terminal Building, located at 4701 Grinden Drive in Duluth, Minnesota. The inspection was authorized by Mr. Mark Wilcer, senior aviation architect, for RS&H.

The inspection was conducted between November 7, 2005 and January 3, 2006 by Chuck Deye (MN Certification #AI9479) (Appendix A). The inspection was conducted prior to planned renovations, but destructive investigation techniques were not employed since the facility was inhabited by employees and the general public during the inspection.

The purpose of the inspection was to locate and sample suspect asbestos-containing materials (ACM) throughout the building. Suspect materials were sampled and analyzed following the Environmental Protection Agency (EPA) "Asbestos Hazard Emergency Response Act" (AHERA) sampling protocol. This inspection also included quantifying the suspect ACM.

The survey was conducted by an EPA-AHERA accredited and Minnesota Department of Health (MDH) licensed inspector (Appendix A). Samples were analyzed using Polarized Light Microscopy (PLM) procedures by EMSL Analytical, Inc (EMSL) in Minneapolis, Minnesota.

This report summarizes EMR's methods, results, and observations; and it provides recommendations regarding the management of the identified and assumed ACM to ensure compliance with local, state, and federal regulations. Table 1 contains a listing of all suspect materials inventoried and sampled. Table 2 contains a listing of the identified ACM, homogenous materials identified, quantities, asbestos types, location, and percentage present in each ACM. The locations of bulk samples and the extent of identified ACM are found in Figures 1 through 6.

1.2 BUILDING CONSTRUCTION

The Duluth International Airport Terminal Building (Terminal) is a three-story building with basement that is constructed with a combination of concrete block and poured concrete exterior walls and basement, engineered-stud construction interior walls, and steel roof supports. The Terminal was expanded to the west in the mid-1980s to include Customs and Immigrations offices, as well as a passenger lounge and gate for international flights (herein referred to as Customs Area). All levels feature concrete floors, concrete and plaster exterior walls and either un-insulated ceilings (in the original part of the Terminal) or fiberglass insulated ceilings (in the newer addition Customs

Area). The Terminal's main roof as well as the Customs Area roof is sheet metal and a white rubber membrane covers the parking aprons on the front side of the Terminal.

The Terminal features steam heat provided by boilers contained in the basement that are used in concert with a forced-air Heating, Ventilation and Air Conditioning (HVAC) system. The forced-air HVAC serves the second and third floors of the main terminal as well as the western Customs Area addition. Boiler-fed radiators were observed on the first floor. Multiple suspect materials were observed on HVAC system components. The boiler exhaust exits underground to an exhaust tower on the runway side of the Terminal. The underground portion of this exhaust line could not be inspected and was not sampled, however samples taken from the accessible portions of the boiler exhaust line did show regulated levels of asbestos.

2.0 METHODS

2.1 PROCEDURES

The asbestos inspection was conducted by Chuck Deye (AI9479) and who is EPA-certified and MDH-licensed asbestos inspector. The asbestos inspection included all wall and ceiling cavities of the Terminal that could be accessed through non-destructive techniques. Homogenous areas and suspect materials were identified during the inspection. Field drawings were prepared of the building to identify the homogenous areas and random sample collection sites. The field drawings have been reproduced and are presented in Figures 1 through 6.

Destructive investigation techniques were not employed since the facility was inhabited by employees and the general public during the inspection. Prior to conducting sampling, the area was thoroughly wetted using an airless sprayer and water. Material was then carefully removed with additional wetting being employed as necessary. All material removed was contained in the sample bag, ensuring that no sampling debris was created in the process.

2.2 SAMPLE COLLECTION

Bulk samples of suspect materials were collected randomly. Similar systems and materials were grouped into "homogenous (sample) areas."

Representative samples of suspect materials (thermal system insulation, surfacing materials, miscellaneous materials, etc.) were collected by carefully removing a small portion of the wetted suspect material and sealing it in a plastic bag. Friable material sample locations were sealed with a latex caulk to prevent post-sampling fiber releases. Samples were collected from inconspicuous or damaged locations whenever possible.

Each bulk sample was labeled with unique sample identifications such as DIAP-B-001. The sample name consists of "DIAP" for the Duluth International Airport, while the "B" designates which level the samples were collected (B -- Basement, 1 -- First Floor, 2 -- Second Floor, 3 -- Third Floor) and "001" the order in which designates the order in which the samples were collected.

2.3 BULK ASBESTOS ANALYSIS

The samples were analyzed by EMSL, a National Voluntary Laboratory Accreditation Program (NVLAP) certified laboratory using PLM procedures and EPA 600/R-93/116 method to verify the presence or absence of asbestos fibers and asbestos types including: actinolite, amosite, anthophyllite, chrysotile, crocidolite, and tremolite. All analyses were in compliance with the quality control procedures specified by the method. Complete laboratory reports and chain of custody forms are found in Appendix B.

3.0 RESULTS

3.1 INVENTORY OF SUSPECT ASBESTOS CONTAINING MATERIALS

The following suspect materials were identified and sampled in the Terminal and International Flight Area. (Table 1):

- White, Drywall with Joint Compound
 - White, Wall Plaster Surfacing
 - White/Tan, Spray-On Structural Fire Proofing
 - White, 12" x 12" Floor Tile with Black Mastic
 - White, 12" x 12" Floor Tile with Brown Mastic
 - White/Gray, Linoleum Floor Sheeting
 - Brown, Vinyl Baseboard with White Mastic
 - Brown, Vinyl Baseboard with Tan Mastic
 - Brown, Vinyl Baseboard with Brown Mastic
 - Black, Vinyl Baseboard with Brown Mastic
-
- Tan, Vinyl Baseboard with Tan Mastic
 - Red, Vinyl Baseboard with Tan Mastic
 - Gray, Vinyl Baseboard with Gray Mastic
 - Tan/White, Carpet Mastic and Underlayment
 - White, 2' x 4' Suspended Ceiling Tile
 - White, 2' x 2' Suspended Ceiling Tile
 - White, Interlocking 12" x 12" Ceiling Tile
 - Hard, White Thermal System Insulation (TSI) Elbows
 - Hard, White TSI Boiler Exhaust

- Hard, White TSI on Water Heat Converters
- Tan/Beige, Fabric Pipe Wrap on TSI Elbows
- White/Black, Roof Moisture Barrier

All suspect materials that were sampled are listed in Table 1, "Inventory of Suspect Materials". The Inventory of Suspect Materials provides a listing of the bulk sample numbers used throughout the report, for each sample and location collected. The location of all bulk samples are found on Figures 1 through 6.

3.2 SAMPLE RESULTS

Table 2 – "Inventory of Asbestos Containing Materials" summarizes the complete list of materials sampled that are classified as ACM. The following materials are considered ACM since they contain regulated amounts of asbestos (> 1% asbestos):

- White 12" x 12" Floor Tile and Mastic
- White 2' x 2' Suspended Ceiling Tile
- White 2' x 4' Suspended Ceiling Tile
- White Thermal System Insulation Elbows
- Beige/Tan TSI Wrap on Elbows
- Boiler Exhaust 24-inch diameter pipe wrap
- Tan TSI Wrap on Water Heat Converters

No ACM was identified in the first floor International Flight Area (Figure 3) or in the second floor Skyline Room (Figure 5).

The condition and quantity of each suspect material was noted during the inspection and recorded on a Homogenous Physical Assessment Form. In addition the suspect materials were classified as either Friable (able to be reduced to powder with hand pressure) or Non-Friable (not able to be reduced to powder with hand pressure). The condition of the identified ACM is discussed in Section 4.0 and the Homogenous Physical Assessment forms for the above-discussed ACM are found in Appendix C.

3.3 QUANTITY OF ASBESTOS-CONTAINING MATERIALS

The type and approximate quantity of friable and non-friable ACM identified during the inspection consist of the following (Table 2):

- White 12" x 12" Floor Tile and Mastic 7,800 ft²
- White 2' x 2' Suspended Ceiling Tile 385 ft²
- White 2' x 4' Suspended Ceiling Tile 90 ft²
- White Thermal System Insulation Elbows..... 102 fittings
- Beige/Tan TSI Wrap on Elbows..... 237 fittings
- Boiler Exhaust 24-inch diameter pipe wrap..... 40 feet
- Tan TSI Wrap on Water Heat Converters..... 20 ft²

Please note that the quantities of TSI and TSI Elbows include all observed, interior and exterior above-ground piping. The quantities do not account for any underground insulated piping that may be encountered during excavation or demolition.

4.0 DISCUSSION

Materials classified as asbestos containing were found at the Duluth International Airport Terminal and are categorized as follows:

Thermal System Insulation

- White/Tan Fabric TSI Pipe Wrap
- Hard White Pipe Elbow Insulation
- Boiler Exhaust 24-inch diameter pipe wrap
- Tan TSI Wrap on Water Heat Converters

Asbestos was detected in multiple TSI pipe wrap samples from pipe elbows and fittings throughout the Terminal. Analytical results indicate that only the fabric wrap on hard pipe fittings contains asbestos. The ACM elbow and fitting wrap was found on fiberglass insulated steam piping and boiler exhaust duct fittings and elbows in the basement, and first and second floors. In several areas the ACM wrapped fittings were mixed with plastic shelled, fiberglass insulated elbows and fitting that do not contain asbestos. All hard, woven-fabric covered elbows and fittings in the basement, and first and second floors are considered ACM. Figures 1, 2, 4, 5, and 6 show the areas that contain TSI elbows and fittings. The ACM pipe wrap is considered to be in damaged condition since <10% of the pipe wrap has distributed damage.

Asbestos was detected in TSI elbow/fittings samples collected in the third floor HVAC rooms (East and West), indicating that the hard, white elbow and fitting insulation and the associated White/Tan fabric wrap contained regulated levels of asbestos. All hard insulated (non-fiberglass), fabric wrapped elbows and fittings in the West and East HVAC rooms are considered ACM (Figure 6). The ACM pipe wrap and associated insulation is considered to be in damaged condition since <10% of the pipe wrap and insulation has distributed damage.

Asbestos was detected in TSI pipe wrap samples collected from the fabric wrap on the 24-inch diameter boiler exhaust runs. This ACM pipe wrap is considered to be in damaged condition since <10% of the pipe wrap has distributed damage.

Asbestos was detected in the TSI fabric wrap on the water heat converters in the basement boiler room. There are two cylindrical water heat converts present in the boiler room. This ACM fabric wrap is considered to be in good condition.

It is assumed that any elbows and fittings on the underground portion of the boiler exhaust piping are asbestos containing. Any such elbows or fittings that are encountered during demolition or subsequent construction should be treated as ACM.

No asbestos was detected in TSI samples collected in the Customs Area, which is west of the Terminal.

Miscellaneous Materials

- White 12" x 12" Vinyl Floor Tile and Mastic
- White 2' x 2' Suspended Ceiling Tile
- White 2' x 4' Suspended Ceiling Tile

Asbestos was detected in white 12" x 12" floor tile samples collected throughout the building (i.e. DIAP-B-001). The floor tile (Category I non-friable material) is considered damaged, since less than 10% was damaged and the observed damage was distributed.

Asbestos was detected in 2' x 2' suspended ceiling tiles located in the basement maintenance office's bathroom and hallway, and in North Country Aviation's bathrooms. This ceiling tile is categorized as friable and is considered to be in good condition.

Asbestos was detected in 2' x 4' suspended ceiling tiles located in the 3rd floor coffee room and bathroom near the reception area. This ceiling tile is categorized as friable is considered to be in good condition.

| Homogenous Area Physical Assessment Forms for the above-described ACM are found in Appendix D.

5.0 GENERAL RECOMMENDATIONS

The information and findings of EMR's asbestos building inspection have been used to prepare this report and may be used as part of a management development process to determine response actions necessary to protect human health and the environment. Proper handling procedures on identified or assumed ACM will prevent the release of asbestos fibers. These materials require special handling procedures by certified asbestos professionals.

The United States EPA's NESHAP regulation and MDH rules require that all friable ACM and non-friable (Category II) ACM that may become friable during renovation or demolition must be removed from structures prior to demolition or renovation activities. Examples of Category II, non-friable ACM are: plaster, sheetrock, transite board, etc. If building materials are to be recycled, MPCA guidelines state that all Category I ACM (roofing material, resilient floor covering, etc) is to be removed since the recycling process could result the non-friable Category I materials becoming friable. All ACM abatement should be conducted by a reputable and certified asbestos abatement contractor.

Friable TSI pipe wrap was observed on the boiler exhaust pipe elbows and fittings within the boiler room. This pipe run extended outside of the basement walls and continued below ground. Pre-demolition abatement should include all insulated exterior and underground piping hard, fabric covered elbows and fittings that will or may be disturbed during demolition and or subsequent construction.

6.0 STANDARD OF CARE

The data generated and conclusions provided are based upon the scope of work performed. All work was conducted in a manner consistent with customary principles in the fields of science and engineering. EMR is not responsible for the independent conclusions, opinions, or recommendations made by others based on the data presented in this report. No other warranty, expressed or implied, is made.

The results reported and any opinions reached by EMR are for the benefit of the client and unless agreed to by EMR in writing, are not to be disclosed to or relied upon by any third party. The results and opinions set forth by EMR in this report will be valid as of the date of the report. EMR assumes no obligation to advise you of any changes that may later be brought to our attention.

EMR, Inc., as environmental consultants, respectfully submits this report.

The preceding report was prepared and reviewed by the following EMR personnel.

Author:



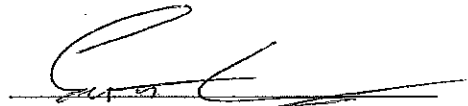
Chuck Deye

MDH Asbestos Inspector #AI9479

1/13/06

Date

Reviewed By:



Scott Carney

MDH Asbestos Inspector #AI3627

1/13/06

Date

TABLES

Table 1
Inventory of Suspect Materials
Duluth International Airport
4701 Grinden Drive - Duluth, Minnesota
EMR Project#7124.001

Sample Number	Unique Room ID	Material Type	Homogenous Area Description
DIAP-B-001	--	White 12"x12" F.T. with black mastic	Mech. Room F.T. 100 square feet
DIAP-B-002	--	4-inch dia. Pipe hard fitting	Mech. Room 1 fitting on 4-inch pipe
DIAP-B-003	--	3-inch dia. Pipe hard fitting	Mech. Room 2 fittings on 3-inch pipe
DIAP-B-004	--	Brown vinyl baseboard with white mastic	Mech. Room - 40 linear feet of baseboard
DIAP-B-005	--	White 2'x4' suspended ceiling tile	Mech. Room C.T. 100 square feet
DIAP-B-006	--	4-inch dia. Pipe hard fitting	Boiler Room 50 fittings on 4-inch pipe
DIAP-B-007	--	4-inch dia. Pipe hard fitting	Boiler Room 50 fittings on 4-inch pipe
DIAP-B-008	--	4-inch dia. Pipe hard fitting on out-of-service boiler	Boiler Room 50 fittings on 4-inch pipe
DIAP-B-009	--	6-inch dia. Pipe hard fitting	Boiler Room 3 fittings on 6-inch pipe
DIAP-B-010	--	6-inch dia. Pipe hard fitting	Boiler Room 3 fittings on 6-inch pipe
DIAP-B-011	--	Converter #2 hard insulation	Boiler Room water heat conv. #2 - 20 sq. ft.
DIAP-B-012	--	24-inch dia. In-Service Boiler exhaust	Boiler Room boiler exhst. 20 linear feet
DIAP-B-013	--	24-inch dia. Out-Of-Service Boiler exhaust	Boiler Room boiler exhst. 20 linear feet
DIAP-B-014	--	White 12"x12" F.T. with black mastic	Break Room F.T. 720 square feet
DIAP-B-015	--	Brown vinyl baseboard with tan mastic	Break Room - 150 linear feet of baseboard
DIAP-B-016	--	Drywall	Break Room drywall - 170 square feet
DIAP-B-017	--	White 2'x4' suspended ceiling tile	Break Room C.T. 600 square feet
DIAP-B-018	--	White 2'x2' suspended ceiling tile	Break Rm. Hallway/Bathroom 300 sq. ft.
DIAP-B-019	--	Brown vinyl baseboard with tan/clear mastic	Maint. Office - 80 linear feet
DIAP-B-020	--	6-inch dia. Water main inlet to bldg. Hard fitting	Maint. Office closet - 1 hard fitting
DIAP-B-021	--	4-inch dia. Pipe hard fitting	Break Room Bathroom - 4 hard fittings
DIAP-B-022	--	4-inch dia. Pipe hard fitting	East Garage - 15 hard fittings
DIAP-B-023	--	6-inch dia. Pipe hard fitting	East Garage - 10 hard fittings
DIAP-B-024	--	6-inch dia. Pipe hard fitting	East Garage - 10 hard fittings
DIAP-B-025	--	White/Tan Spray-on Fireproofing material	Basement/Parking Garage - 20,500 sq. ft.
DIAP-B-026	--	White/Tan Spray-on Fireproofing material	Basement/Parking Garage - 20,500 sq. ft.
DIAP-B-027	--	White/Tan Spray-on Fireproofing material	Basement/Parking Garage - 20,500 sq. ft.
DIAP-B-028	--	4-inch dia. Pipe hard fitting	West Garage - 15 hard fittings
DIAP-B-029	--	4-inch dia. Pipe hard fitting	West Garage - 15 hard fittings
DIAP-B-030	--	6-inch dia. Pipe hard fitting	West Garage - 10 hard fittings
DIAP-B-031	--	6-inch dia. Pipe hard fitting	West Garage - 10 hard fittings
DIAP-B-032	--	White/Tan Spray-on Fireproofing material	Basement/Parking Garage - 20,500 sq. ft.
DIAP-B-033	--	White/Tan Spray-on Fireproofing material	Basement/Parking Garage - 20,500 sq. ft.
DIAP-B-034	--	White speckled/wormy suspended 2'x4' ceiling tile	Telephone Room C.T. - 120 square feet
DIAP-B-035	--	4-inch dia. Pipe hard fitting	Loading Ramp 2 fittings on 4-inch pipe
DIAP-1-036	193, 196, 197, 198	White ribbed 2'x2' suspended ceiling tile	1st Floor Customs Ramp C.T. 1,500 sq. ft.
DIAP-1-037	193, 196, 197, 198	Brown vinyl baseboard	1st Floor Customs Ramp BB - 80 linear ft.
DIAP-1-038	186, 190	White/Gray Floor Linoleum	Customs Clearing bathrooms - 400 sq. ft.
DIAP-1-039	186, 190	Tan vinyl baseboard	Customs Clearing bathrooms - 150' linear
DIAP-1-040	174, 180	White speckled/wormy suspended 2'x4' ceiling tile	Customs Clearing area C.T. 2,300 sq. ft.
DIAP-1-041	174, 180	Red vinyl baseboard	Customs Clearing area BB - 500 linear ft.
DIAP-1-042	174, 180	Drywall	Customs Clearing area drywall - 60,000 sq. ft.
DIAP-1-043	174, 180	3-inch dia. Pipe hard fitting	Customs Clearing area fittings - 30 fittings
DIAP-1-044	181	Brown vinyl baseboard	Cust. Electrical Room BB - 80 linear feet
DIAP-1-045	169	3-inch dia. Pipe hard fitting	Cust. Search Rm. 1 fitting - 3 fittings
DIAP-1-046	171, 173	Carpet mastic/underlayment	Utility Room 171 - 600 sq. ft.
DIAP-1-047	171, 173	Gray vinyl baseboard	Utility Room 171 - 120 linear ft.
DIAP-1-048	171, 173	Drywall	Utility Room 171 - 9,000 sq. ft.
DIAP-1-049	160	White/Tan Spray-on Fireproofing material	W. Pass. Lounge - 20,500 sq. ft.
DIAP-1-050	136, 139	White 12"x12" F.T. with black mastic	N. Cntry area - 700 sq. ft.

Table 1
Inventory of Suspect Materials
Duluth International Airport
4701 Grinden Drive - Duluth, Minnesota
EMR Project#7124.001

Sample Number	Unique Room ID	Material Type	Homogenous Area Description
DIAP-1-051	136, 139	Brown vinyl baseboard with tan mastic	N. Cntry area - 200 linear feet
DIAP-1-052	136, 139	3-inch dia. Pipe hard fitting	N. Cntry area - 2 hard fittings
DIAP-1-053	136, 139	White wall plaster	N. Cntry area - 4,600 square feet
DIAP-1-054	142	Suspended Ceiling Tile	N. Cntry hallway ceiling tile - 300 sq. ft.
DIAP-1-055	146, 147	Suspended Ceiling Tile	N. Cntry bathrooms - 85 sq. ft.
DIAP-1-056	142	Brown vinyl baseboard with brown mastic	N. Cntry hallway - 150 linear feet
DIAP-1-057	135	3-inch dia. Pipe hard fitting	Weather One - 2 hard fittings
DIAP-1-058	135	White/Tan Spray-on Fireproofing material	Weather One - 20,500 sq. ft.
DIAP-1-059	138	Black vinyl baseboard with brown mastic	TSA office - 60 linear feet
DIAP-1-060	126, 130	2'x2' suspended ceiling tile	W. Pass. Area bathrooms - 800 sq. ft.
DIAP-1-061	101	Gray vinyl stair tread wrap	2 stair cases - 300 sq. ft.
DIAP-1-062	101	White wall plaster	W. Pass. Area plaster
DIAP-1-063	125	3-inch dia. Pipe hard fitting	E. Tug Tunnel (west end) - 1 hard fitting
DIAP-1-064	113-120	White 12"x12" Vinyl Floor Tile	NW Offices - 2,100 sq. ft.
DIAP-1-065	113-120	White speckled/wormy suspended 2'x4' ceiling tile	NW Offices - 2,100 sq. ft.
DIAP-1-066	113-120	Brown vinyl baseboard with tan mastic	NW Offices - 400 linear feet
DIAP-1-067	113-120	White wall plaster	NW Offices - 5,000 square feet
DIAP-1-068	104	4-inch dia. Pipe hard fitting	NW Cargo Area (104) - 21 hard fittings
DIAP-2-069	--	Brown vinyl baseboard with tan mastic	Skyline Lounge - 250 linear feet
DIAP-2-070	--	Drywall	Skyline Lounge - 60,000 sq. ft.
DIAP-2-071	--	12"x12" white speckled floor tile with tan mastic	Skyline Lounge - 1,000 sq. ft.
DIAP-2-072	202	Drywall	West Gate Lobby - 3,000 sq. ft.
DIAP-2-073	--	White wall plaster	West Conc. Obsrv. Lnge. - 1,500 sq. ft.
DIAP-2-074	208	12"x12" white speckled floor tile	West Conc. Janitor Closet - 30 sq. ft.
DIAP-2-075	208	3-inch dia. Pipe hard fitting	West Conc. Janitor Closet - 5 fittings
DIAP-2-076	208	White wall plaster	West Conc. Janitor Closet - 600 sq. ft.
DIAP-2-077	201	Black vinyl baseboard with brown mastic	West Conc. Bathroom area - 100 linear ft.
DIAP-2-078	--	12"x12" white vinyl floor tile	Bar Closet 1 - 25 sq. ft.
DIAP-2-079	--	White/Tan Spray-on Fireproofing material	Bar Closet 1 - 41,000 sq. ft.
DIAP-2-080	214	White (w/ gray paint) 12"x12" suspended ceiling tile	Bar - 2,000 square feet
DIAP-2-081	212	White 2'x4' suspended ceiling tile	Kitchen - 2,400 square feet
DIAP-3-082	M02	6-inch dia. Pipe hard fitting	West HVAC - 5 fittings
DIAP-3-083	M02	6-inch dia. Pipe hard fitting	West HVAC - 5 fittings
DIAP-3-084	M02	4-inch dia. Pipe hard fitting	West HVAC - 40 fittings
DIAP-3-085	M02	4-inch dia. Pipe hard fitting	West HVAC - 40 fittings
DIAP-3-086	M02	White wall plaster	West HVAC - 4,500 sq. ft.
DIAP-3-087	M05	White 2'x4' suspended ceiling tile	Reception Area coffee room - 90 sq. ft.
DIAP-3-088	M05	White 12"x12" Vinyl Floor Tile	Reception Area coffee room - 72 sq. ft.
DIAP-3-089	M05	Brown vinyl baseboard with tan mastic	Reception Area coffee room - 30 linear ft.
DIAP-3-090	--	Brown vinyl baseboard with tan mastic	Operations Center Office - 350 linear ft.
DIAP-3-091	--	2'x4' ribbed/speckled white suspended ceiling tile	Operations Center Office - 1,050 sq. ft.
DIAP-3-092	M09	6-inch dia. Pipe hard fitting	East HVAC - 17 fittings
DIAP-3-093	M09	6-inch dia. Pipe hard fitting	East HVAC - 17 fittings
DIAP-3-094	M09	4-inch dia. Pipe hard fitting	East HVAC - 40 fittings
DIAP-3-095	M09	4-inch dia. Pipe hard fitting	East HVAC - 40 fittings
DIAP-3-096	M09	White wall plaster	West HVAC - 4,500 sq. ft.
DIAP-3-097	M09	White/Tan Spray-on Fireproofing material	West HVAC - 6,000 sq. ft.
DIAP-R-098	101	White, speckled 12"x12" interlocking ceiling tile	Main Terminal C.T. - 26,000 sq. ft.
DIAP-R-099	--	White, speckled 12"x12" interlocking ceiling tile	Skyline Room C.T. - 12,000 sq. ft.
DIAP-R-100	--	Ceiling drywall	Skyline Room - 12,000 sq. ft.

Table 1
Inventory of Suspect Materials
Duluth International Airport
4701 Grinden Drive - Duluth, Minnesota
EMR Project#7124.001

Sample Number	Unique Room ID	Material Type	Homogenous Area Description
DIAP-1-101	--	3-inch dia. Pipe wrap and hard fitting	Customs Clearing area fittings - 30 fittings
DIAP-1-102	--	3-inch dia. Pipe wrap and hard fitting	Customs Clearing area fittings - 30 fittings

Table 2.
Inventory of Asbestos-Containing Materials
Duluth International Airport
4701 Grinden Drive - Duluth, Minnesota
EMR Project #7124.001

Sample #	Materials	Locations	Quantity	Asbestos Type and Percentage	Friable / Non-friable
DIAP-B-001 WHITE FLOOR TILE	White 12" x 12" Floor Tile	Basement Mechanical Room	100 ft ²	7% Chrysotile	Category I Non-friable
DIAP-B-001 BLACK MASTIC	Black Mastic on White 12" x 12" Floor Tile	Basement Mechanical Room	100 ft ²	10% Chrysotile	Category I Non-friable
DIAP-B-002 PIPE WRAP	White wrap on 4-inch hard fitting	Basement Mechanical Room	3 fittings	70% Chrysotile	Friable
DIAP-B-006 PIPE WRAP	White wrap on 4-inch hard fitting	Basement Boiler Room	50 fittings	60% Chrysotile	Friable
DIAP-B-009 PIPE WRAP	Tan wrap on 6-inch hard fitting	Basement Boiler Room	3 fittings	30% Chrysotile	Friable
DIAP-B-011 PIPE WRAP	Tan wrap on water heat converter #2	Basement Boiler Room	20 ft ²	30% Chrysotile	Friable
DIAP-B-012 PIPE WRAP	Tan wrap on In-Service boiler exhaust (24-inch dia)	Basement Boiler Room	20 feet	5% Chrysotile	Friable
DIAP-B-013 PIPE WRAP	White wrap on Out-of-Service boiler exhaust (24-inch dia.)	Basement Boiler Room	20 feet	5% Chrysotile	Friable
DIAP-B-018 WHITE CEILING TILE	White 2' x 2' Suspended Ceiling Tile	Basement Bathroom and Hallway	300 ft ²	3% Chrysotile	Friable
NOT SAMPLED FLOOR TILE	White 12" x 12" Floor Tile	Basement Maintenance Office	720 ft ²	Assumed ACM	Category I Non-friable
NOT SAMPLED MASTIC	Black Mastic on White 12" x 12" Floor Tile	Basement Maintenance Office	720 ft ²	Assumed ACM	Category I Non-friable
DIAP-B-020 PIPE WRAP	White wrap on 6-inch hard fitting - main water line inlet to terminal building	Maintenance Office Closet	1 fitting	70% Chrysotile	Friable
DIAP-B-022 PIPE WRAP	Tan wrap on 4-inch hard fitting	East Garage	15 fittings	70% Chrysotile	Friable

Table 2.
Inventory of Asbestos-Containing Materials
Duluth International Airport
4701 Grinden Drive - Duluth, Minnesota
EMR Project #7124.001

Sample #	Materials	Locations	Quantity	Asbestos Type and Percentage	Friable Non-friable
DIAP-B-023 PIPE WRAP	White wrap on 6-inch hard fitting	East Garage	10 fittings	70% Chrysotile	Friable
DIAP-B-029 PIPE WRAP	Tan wrap on 4-inch hard fitting	West Garage	15 fittings	70% Chrysotile	Friable
DIAP-B-030 PIPE WRAP	Tan wrap on 6-inch hard fitting	West Garage	10 fittings	70% Chrysotile	Friable
DIAP-B-035 PIPE WRAP	Cream-colored wrap on 4-inch hard fitting	Basement Loading Ramp	2 fittings	50% Chrysotile	Friable
DIAP-1-050 FLOOR TILE	White 12" x 12" Floor Tile	N. Country Area Lobby and Office	700 ft ²	3% Chrysotile	Category I Non-friable
DIAP-1-050 MASTIC	Black Mastic on White 12" x 12" Floor Tile	N. Country Area Lobby and Office	700 ft ²	10% Chrysotile	Category I Non-friable
NOT SAMPLED FLOOR TILE	White 12" x 12" Floor Tile	Weather One and TSA Offices	2,640 ft ²	Assumed ACM	Category I Non-friable
NOT SAMPLED MASTIC	Black Mastic on White 12" x 12" Floor Tile	Weather One and TSA Offices	2,640 ft ²	Assumed ACM	Category I Non-friable
DIAP-1-052 PIPE WRAP	White wrap on 3-inch hard fitting	N. Country Area Lobby and Office	2 fittings	50% Chrysotile	Friable
DIAP-1-055 CEILING TILE	Beige/white 2' x 2' suspended ceiling tile	N. Country Area Bathrooms	85 ft ²	3% Chrysotile	Friable
DIAP-1-057 PIPE WRAP	Beige wrap on 3-inch hard fitting	Weather One office	2 fittings	50% Chrysotile	Friable
DIAP-1-063 PIPE WRAP	White wrap on 3-inch hard fitting	East Tug Tunnel	1 fitting	70% Chrysotile	Friable
DIAP-1-064 FLOOR TILE	White 12" x 12" Floor Tile	Northwest Offices	2,100 ft ²	5% Chrysotile	Category I Non-friable

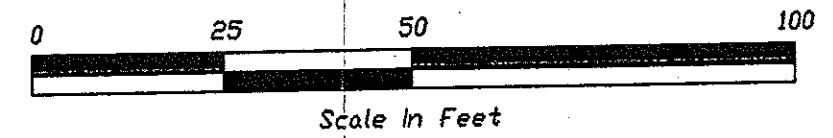
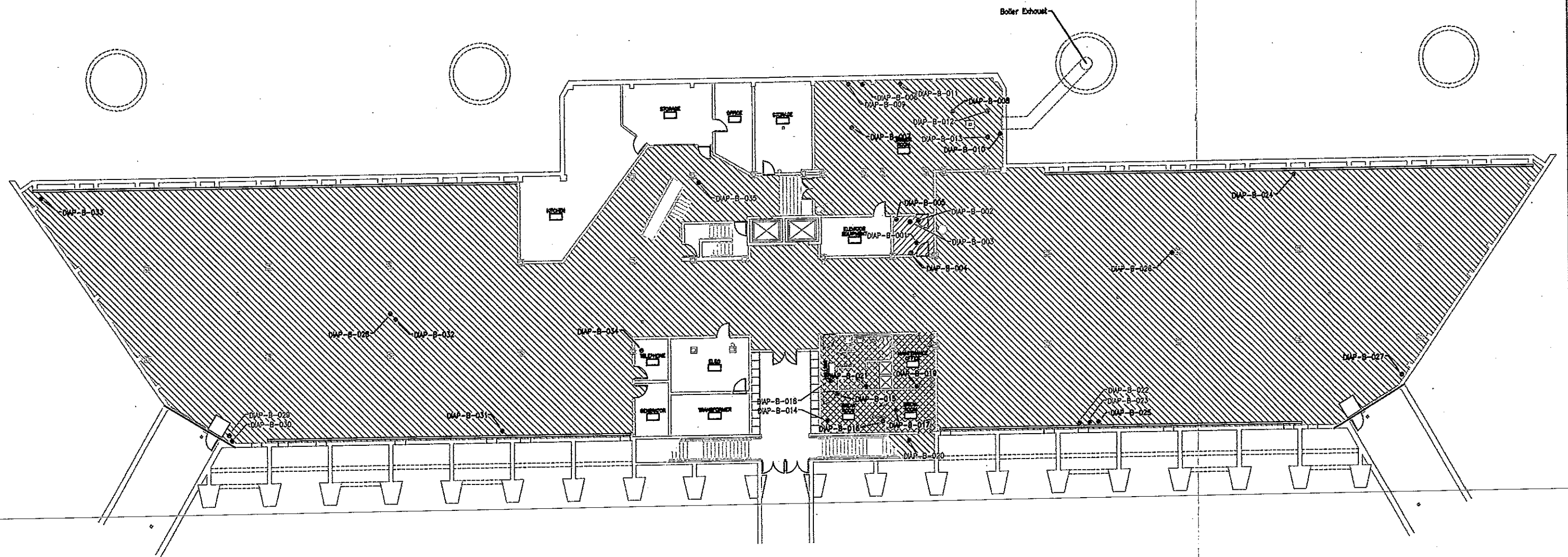
Table 2.
Inventory of Asbestos-Containing Materials
Duluth International Airport
4701 Grinden Drive - Duluth, Minnesota
EMR Project #7124.001

Sample #	Materials	Locations	Quantity	Asbestos Type and Percentage	Friable / Non-friable
DIAP-1-064 MASTIC	Black mastic on White 12" x 12" Floor Tile	Northwest Offices	2,100 ft ²	10% Chrysotile	Category I Non-friable
DIAP-1-068 PIPE WRAP	Tan wrap on 4-inch hard fitting	Northwest Cargo Area 104	21 fittings	45% Chrysotile	Friable
DIAP-2-074 FLOOR TILE	White 12" x 12" Floor Tile	West Concourse Bathroom and Janitor Closet	30 ft ²	4% Chrysotile	Category I Non-friable
DIAP-2-074 MASTIC	Black Mastic on White 12" x 12" Floor Tile	West Concourse Bathroom and Janitor Closet	30 ft ²	10% Chrysotile	Category I Non-friable
DIAP-2-078 MASTIC	Brown mastic on White 12" x 12" Floor Tile	Bar Area	1,500 ft ²	3% Chrysotile	Category I Non-friable
DIAP-3-082 PIPE WRAP	White wrap on 6-inch hard fitting	West HVAC Room	5 fittings	80% Chrysotile	Friable
DIAP-3-083 PIPE WRAP	White wrap on 6-inch hard fitting	West HVAC Room	5 fittings	70% Chrysotile	Friable
DIAP-3-084 HARD FITTING	4-inch diameter hard fitting	West HVAC Room	40 fittings	3% Chrysotile	Friable
DIAP-3-084 PIPE WRAP	White wrap on 4-inch hard fitting	West HVAC Room	40 fittings	70% Chrysotile	Friable
DIAP-3-085 HARD FITTING	4-inch diameter hard fitting	West HVAC Room	40 fittings	3% Chrysotile	Friable
DIAP-3-085 PIPE WRAP	Tan wrap on 4-inch hard fitting	West HVAC Room	40 fittings	70% Chrysotile	Friable
DIAP-3-087 CEILING TILE	White/Tan 2' x 4' Suspended Ceiling Tile	Reception Area Coffee Room	90 ft ²	3% Chrysotile	Friable
DIAP-3-088 FLOOR TILE	White 12" x 12" Floor Tile	Reception Area Coffee Room	72 ft ²	5% Chrysotile	Category I Non-friable

Table 2.
Inventory of Asbestos-Containing Materials
Duluth International Airport
4701 Grinden Drive - Duluth, Minnesota
EMR Project #7124.001

Sample #	Materials	Locations	Quantity	Asbestos Type and Percentage	Friable/Non-friable
DIAP-3-088 MASTIC	Brown mastic on White 12" x 12" Floor Tile	Reception Area Coffee Room	72 ft ²	10% Chrysotile	Category I Non-friable
DIAP-3-092 HARD FITTING	6-inch diameter hard fitting	East HVAC Room	17 fittings	3% Chrysotile	Friable
DIAP-3-092 PIPE WRAP	Tan wrap on 6-inch hard fitting	East HVAC Room	17 fittings	65% Chrysotile	Friable
DIAP-3-093 HARD FITTING	6-inch diameter hard fitting	East HVAC Room	17 fittings	3% Chrysotile	Friable
DIAP-3-093 PIPE WRAP	White wrap on 6-inch hard fitting	East HVAC Room	17 fittings	70% Chrysotile	Friable
DIAP-3-094 HARD FITTING	4-inch diameter hard fitting	East HVAC Room	40 fittings	3% Chrysotile	Friable
DIAP-3-094 PIPE WRAP	White wrap on 4-inch hard fitting	East HVAC Room	40 fittings	70% Chrysotile	Friable
DIAP-3-095 PIPE WRAP	White wrap on 4-inch hard fitting	East HVAC Room	40 fittings	70% Chrysotile	Friable

FIGURES



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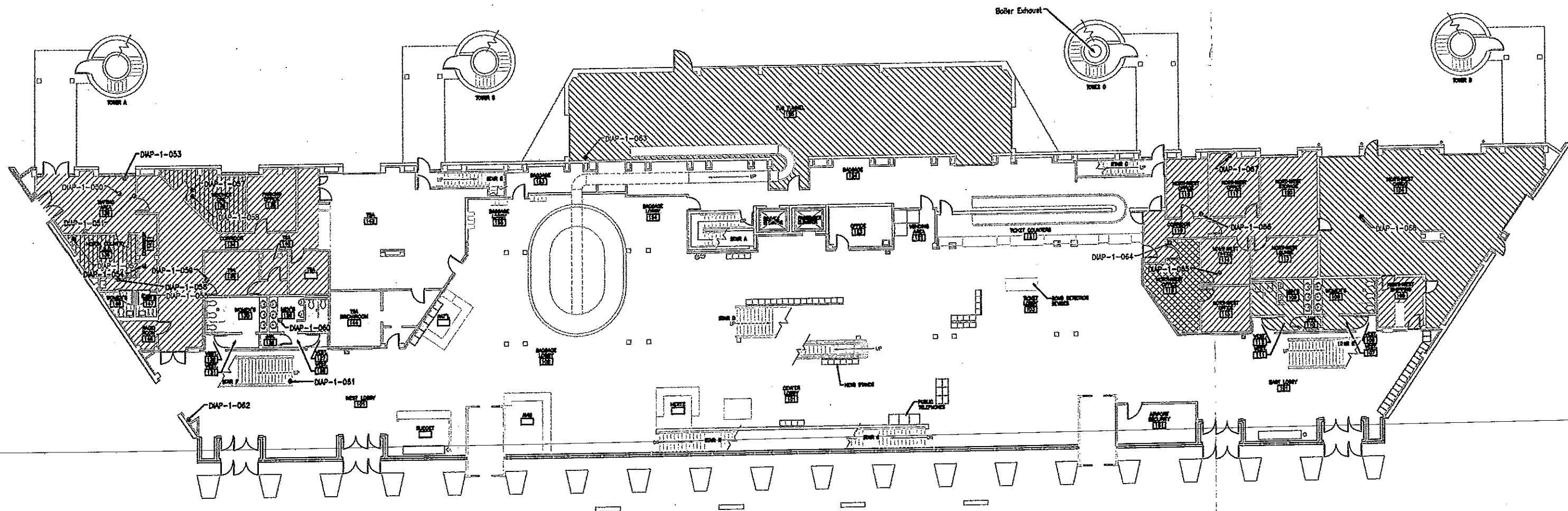
- ACM Sample Location
- Non-ACM Sample Location
- ▨ Extent of ACM White 12"x12" Floor Tile and Mastic
- ▨ Areas with ACM Pipe Fittings and Wrap
- ▨ Extent of ACM Ceiling Tile

Reynolds, Smith and Hills, Inc.
The Duluth International Airport
Main Terminal Building

Figure 1. Basement Floor Plan with Sample Locations and ACM Areas
Asbestos Inspection Report

DRAWN BY: CAD
CHECKED BY: SJC
PROJECT NO. 7124.001
REVISION NO. 1
DATE: January 10, 2006
REFERENCE: RS&H, 11/05





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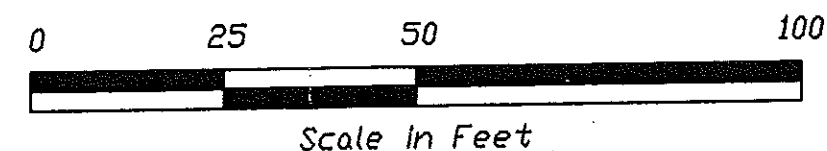
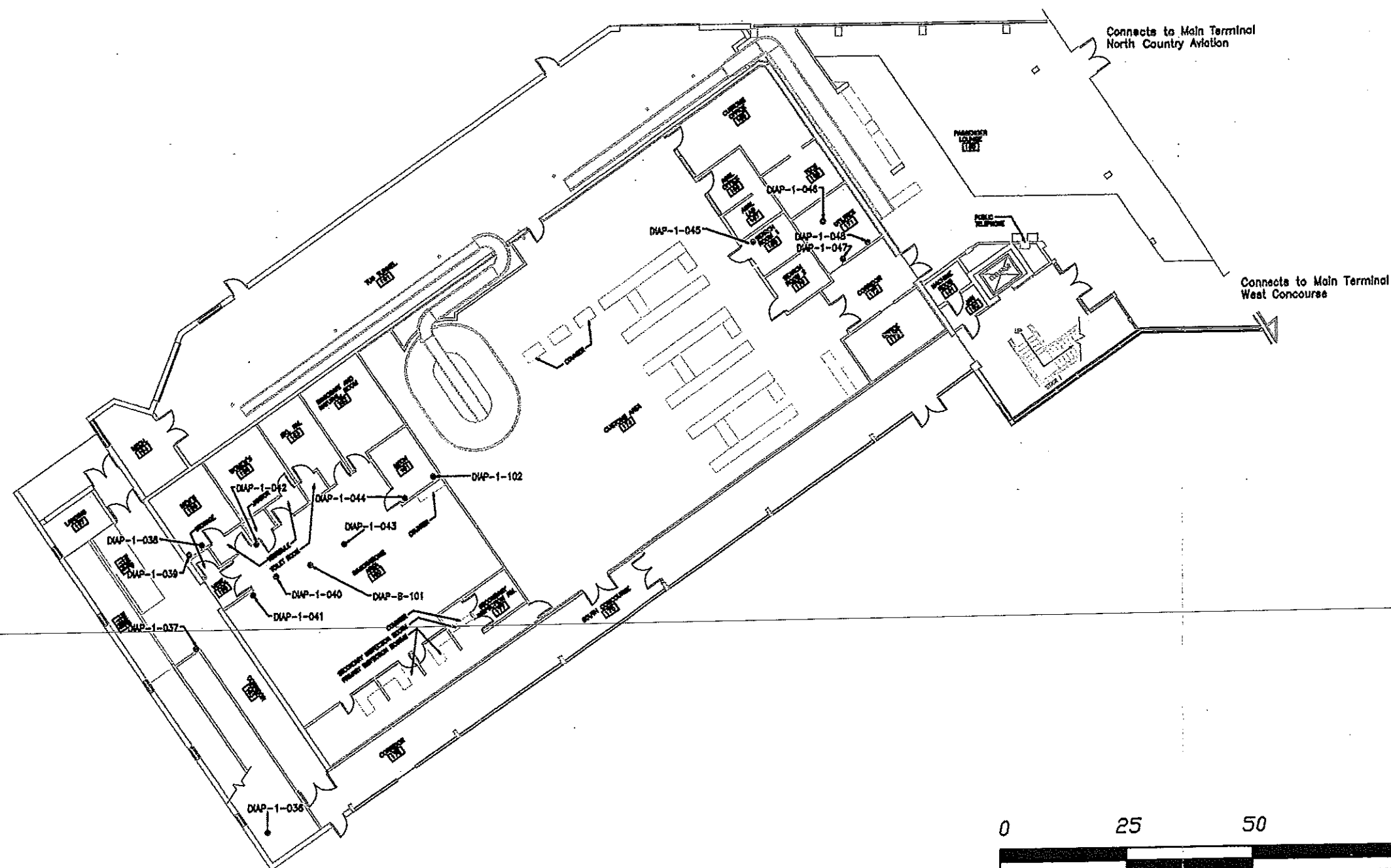
- ACM Sample Location
- Non-ACM Sample Location
- ▨ Extent of ACM White 12"x12" Floor Tile and Mastic
- ▨ Areas with ACM Pipe Fittings and Wrap
- ▨ Extent of ACM Ceiling Tile

Reynolds, Smith and Hills, Inc.
The Duluth International Airport
Main Terminal Building

Figure 2. First Floor Plan with Sample Locations and ACM Areas
Asbestos Inspection Report

DRAWN BY: CAD
CHECKED BY: SJC
PROJECT NO. 7124.001
REVISION NO. 1
DATE: January 10, 2006
REFERENCE: RS&H, 11/05





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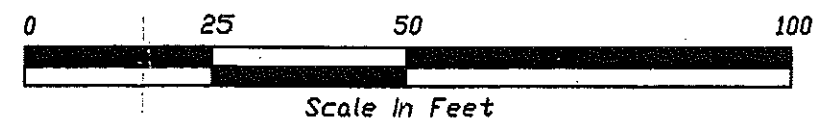
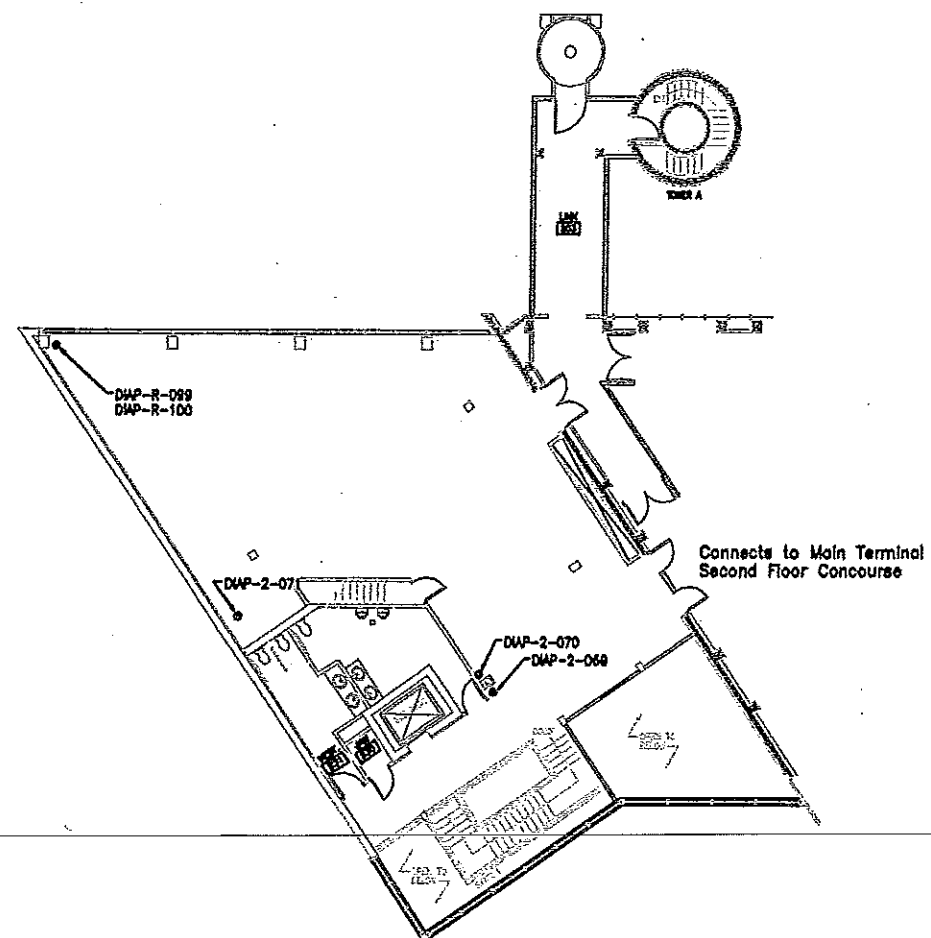
- Non-ACM Sample Location

Reynolds, Smith and Hills, Inc.
The Duluth International Airport
Main Terminal Building

Figure 3. First Floor Customs Area (West Addition) Plan with Sample Locations
Asbestos Inspection Report

DRAWN BY: CAD
CHECKED BY: SJC
PROJECT NO. 7124.001
REVISION NO. 1
DATE: January 10, 2006
REFERENCE: RS&H, 11/05





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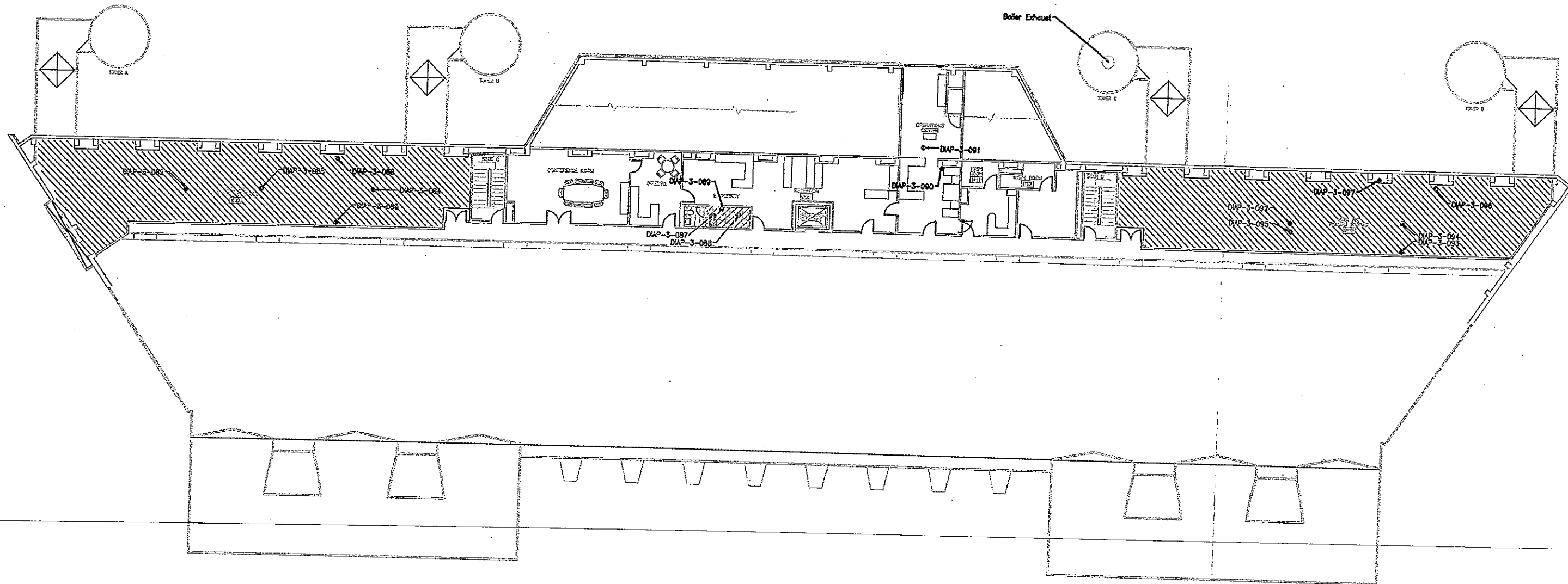
- Non-ACM Sample Location

Reynolds, Smith and Hills, Inc.
The Duluth International Airport
Main Terminal Building

Figure 5. Second Floor Skyline Room (West Addition) Plan with Sample Locations
Asbestos Inspection Report

DRAWN BY: CAD
CHECKED BY: SJC
PROJECT NO. 7124.001
REVISION NO. 1
DATE: January 10, 2006
REFERENCE: RS&H, 11/05





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- ACM Sample Location
- Non-ACM Sample Location
- ▨ Extent of ACM White 12'x12' Floor Tile and Mastic
- ▨ Areas with ACM Pipe Fittings and Wrap
- ▨ Extent of ACM Ceiling Tile

Reynolds, Smith and Hills, Inc.
The Duluth International Airport
Main Terminal Building

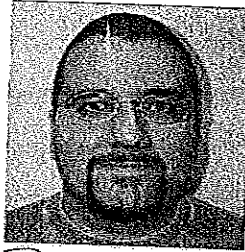
Figure 6. Second Floor Plan with Sample Locations and ACM Areas
Asbestos Inspection Report

DRAWN BY: CAD
CHECKED BY: SJC
PROJECT NO. 7124.001
REVISION NO. 1
DATE: January 10, 2006
REFERENCE: RS&H, 11/05

EMIR
INCORPORATED

APPENDIX A

ASBESTOS INSPECTOR CERTIFICATIONS



Robert A. Blongren
Director, Env. Health Div.



**ASBESTOS
INSPECTOR**

Certified by:
State of Minnesota
Department of Health

Expires: 12/14/2006

Charles A Deye
1401 N 55th St
Superior, WI 54880

No. AI9479 Issued: 12/23/2005

APPENDIX B

LABORATORY REPORTS

EMSL Analytical, Inc.

14375 23rd Avenue North, Minneapolis, Mn 55447

Phone: (763) 449-4922 Fax: (763) 449-4924 Email: minneapolislab@emsl.com**EMSL**

Attn: **Chuck Deye**
EMR Inc, (Envir Mgt Res., Inc)
11 E. Superior St.
Suite 541
Duluth, MN 55802

Customer ID: EMRI50
Customer PO:
Received: 11/21/05 9:15 AM
EMSL Order: 350505305

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: Duluth IAP Asbestos 7124.001

EMSL Proj:
Analysis Date: 12/13/05
Report Date: 12/13/05

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-B-001 FLOOR TILE 350505305-0001	Mechanical Room F.T. 12x12 white	White Non-Fibrous Layers: 2		93% Non-fibrous (other)	7% Chrysotile
DIAP-B-001 MASTIC 350505305-0026	Mechanical Room F.T. 12x12 white	Black Non-Fibrous Layers: 2		90% Non-fibrous (other)	10% Chrysotile
DIAP-B-002 350505305-0002	Mechanical Room 4-inch hard fitting	Cream Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	<1% Chrysotile
DIAP-B-003 INSULATION 350505305-0003	Mechanical Room 3-inch hard fitting	Cream Fibrous layers: 2	65% Min. Wool	35% Non-fibrous (other)	<1% Chrysotile
DIAP-B-003 WRAP 350505305-0031	Mechanical Room 3-inch hard fitting	White Fibrous layers: 2	50% Synthetic	<1% Non-fibrous (other)	50% Chrysotile
DIAP-B-004 BASEBOARD 350505305-0004	Mechanical Room brown vinyl Baseboard	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-B-004 MASTIC 350505305-0027	Mechanical Room brown vinyl Baseboard	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected

Analyst(s)

Erin Wittman (31)



or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.

Analysis performed by EMSL Minneapolis (NVLAP #200019-0)

EMSL Analytical, Inc.

14375 23rd Avenue North, Minneapolis, Mn 55447

Phone: (763) 449-4922 Fax: (763) 449-4924 Email: minneapolisiah@emsl.com

EMSL

Attn: **Chuck Deye**
EMR Inc, (Envir Mgt Res., Inc)
11 E. Superior St.
Suite 541
Duluth, MN 55802

Customer ID: EMR150
Customer PO:
Received: 11/21/05 9:15 AM
EMSL Order: 350505305

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: Duluth IAP Asbestos 7124.001

EMSL Proj:
Analysis Date: 12/13/05
Report Date: 12/13/05

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-B-005 350505305-0005	Mechanical Room C.T. white	Beige/White Fibrous Heterogeneous	40% Min. Wool 40% Cellulose	10% Perlite 10% Non-fibrous (other)	None Detected
DIAP-B-014 FLOOR TILE 350505305-0006	Break Room F.T.	White Non-Fibrous Layers: 2		93% Non-fibrous (other)	7% Chrysotile
DIAP-B-014 MASTIC 350505305-0028	Break Room F.T.	Black Non-Fibrous Layers: 2		90% Non-fibrous (other)	10% Chrysotile
DIAP-B-015 BASEBOARD 350505305-0007	Break Room Vinyl baseboard	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-B-015 MASTIC 350505305-0029	Break Room Vinyl baseboard	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-B-016 350505305-0008	Break Room drywall	Brown/White Fibrous Heterogeneous	5% Glass 10% Cellulose	85% Non-fibrous (other)	None Detected
DIAP-B-017 350505305-0009	Break Room 2x4 C.T.	Beige Fibrous Heterogeneous	40% Min. Wool 40% Cellulose	10% Perlite 10% Non-fibrous (other)	None Detected

Analyst(s)

Erin Wittman (34)



or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.

Analysis performed by EMSL Minneapolis (NVLAP #200019-0)

EMSL Analytical, Inc.

14375 23rd Avenue North, Minneapolis, Mn 55447

Phone: (763) 449-4922 Fax: (763) 449-4924 Email: minneapolislab@emsl.com

EMSL

SM

Attn: **Chuck Deye**
EMR Inc, (Envir Mgt Res., Inc)
11 E. Superior St.
Suite 541
Duluth, MN 55802

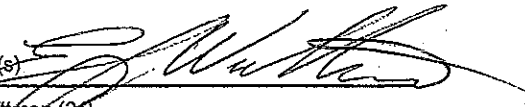
Customer ID: EMR150
Customer PO:
Received: 11/21/05 9:15 AM
EMSL Order: 350505305

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: Duluth IAP Asbestos 7124.001

EMSL Proj:
Analysis Date: 12/13/05
Report Date: 12/13/05

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-B-018 350505305-0010	Break Room hallway 2x2 C.T.	Beige Fibrous Heterogeneous	12% Synthetic 85% Min. Wool		3% Chrysotile
DIAP-B-019 BASEBOARD 350505305-0011	Maint. Office vinyl baseboard	Black Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-B-019 MASTIC 350505305-0030	Maint. Office vinyl baseboard	Cream Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-B-020 350505305-0012	Break Room water Main inlet hard fitting	Cream Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected
DIAP-B-021 350505305-0013	Break Room Bathroom 4-inch fitting	Cream Fibrous Layers: 2	65% Min. Wool	35% Non-fibrous (other)	None Detected
DIAP-B-022 350505305-0014	East Garage 4- inch fitting	Cream Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected
DIAP-B-023 350505305-0015	East Garage 6- inch fitting	Cream Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected

Analyst(s) 
Erin Wittman (21)



or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.

Analysis performed by EMSL Minneapolis (NVLAP #200019-0)

EMSL Analytical, Inc.

14375 23rd Avenue North, Minneapolis, Mn 55447

Phone: (763) 449-4922 Fax: (763) 449-4924 Email: minneapolislab@emsl.com

EMSL

Attn: **Chuck Deye**
EMR Inc, (Envir Mgt Res., Inc)
11 E. Superior St.
Suite 541
Duluth, MN 55802

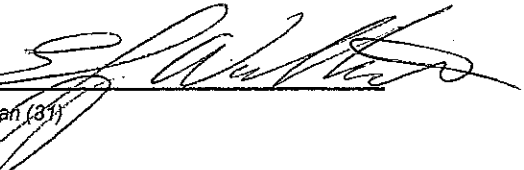
Customer ID: EMRI50
Customer PO:
Received: 11/21/05 9:15 AM
EMSL Order: 350505305

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: Duluth IAP Asbestos 7124.001

EMSL Proj:
Analysis Date: 12/13/05
Report Date: 12/13/05

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-B-024 350505305-0016	East Garage 6-inch fitting	Cream Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected
DIAP-B-025 350505305-0017	East Garage Fireproofing	Beige Fibrous Heterogeneous	15% Cellulose	60% Non-fibrous (other) 25% Mica	None Detected
D 3-026 350505305-0018	East Garage Fireproofing	Beige Fibrous Heterogeneous	15% Cellulose	60% Non-fibrous (other) 25% Mica	None Detected
DIAP-B-027 350505305-0019	East Garage Fireproofing	Beige Fibrous Heterogeneous	15% Cellulose	60% Non-fibrous (other) 25% Mica	None Detected
DIAP-B-028 350505305-0020	West Garage 4-inch fitting	Cream Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	<1% Chrysotile
DIAP-B-029 350505305-0021	West Garage 4-inch fitting	Cream Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	<1% Chrysotile
DIAP-B-030 350505305-0022	West Garage 6-inch fitting	Cream Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected

Analyst(s) 
Erin Wittman (31)



or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.

Analysis performed by EMSL Minneapolis (NVLAP #200019-0)

EMSL Analytical, Inc.

14375 23rd Avenue North, Minneapolis, Mn 55447

Phone: (763) 449-4922 Fax: (763) 449-4924 Email: minneapolislab@emsl.com

EMSL

Attn: **Chuck Deye**
EMR Inc, (Envir Mgt Res., Inc)
11 E. Superior St.
Suite 541
Duluth, MN 55802

Customer ID: EMR150
Customer PO:
Received: 11/21/05 9:15 AM
EMSL Order: 350505305

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: Duluth IAP Asbestos 7124.001

EMSL Proj:
Analysis Date: 12/13/05
Report Date: 12/13/05

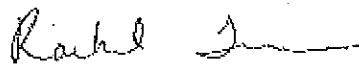
Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
DIAP-B-031 350505305-0023	West Garage 6-inch fitting	Cream Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected
DIAP-B-032 350505305-0024	West Garage Fireproofing	Beige Fibrous Heterogeneous	15% Cellulose	60% Non-fibrous (other) 25% Mica	None Detected
D-033 350505305-0025	West Garage Fireproofing	Beige Fibrous Heterogeneous	15% Cellulose	60% Non-fibrous (other) 25% Mica	None Detected

Results amended 12/13/05 to add a layer to #3 and change results on #29.

Analyst(s)

Erin Wittman (34)



or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.

Analysis performed by EMSL Minneapolis (NVLAP #200019-0)

250505305



Chain of Custody

Asbestos Lab Services

EMSL Analytical, Inc.
14375 23rd Avenue
North
Minneapolis,
MN 55447

Phone: (763) 449-4922
Fax: (763) 449-4924
<http://www.emsl.com>

Please print all information legibly.

Company: EMR Incorporated	Bill To: EMR Inc
Address 1: 11 E. Superior Street	Address 1: 11 E. Superior Street
Address 2: Suite 541	Address 2: Suite 541
City, State: Duluth, MN	City, State: Duluth, MN
Zip/Post Code: 55802	Zip/Post Code: 55802
Country: USA	Country: USA
Contact Name: Chuck Deye	Attn: Scott Carney
Phone: 2186252332	Phone: 2186252332
Fax: 2186252201	Fax: 2186252201
Email: cdeye@emr-inc.com	Email: cdeye@emr-inc.com
EMSL Rep:	P.O. Number: 7124.001
Project Name/Number: Duluth IAP Asbestos 7124.001	

MATRIX			TURNAROUND			
<input type="checkbox"/> Air	<input type="checkbox"/> Soil	<input type="checkbox"/> Micro-Vac	<input type="checkbox"/> 3 Hours	<input type="checkbox"/> 6 Hours	<input type="checkbox"/> Same Day or 12 Hours*	<input type="checkbox"/> 24 Hours (1 day)
<input checked="" type="checkbox"/> Bulk	<input type="checkbox"/> Drinking Water		<input type="checkbox"/> 48 Hours (2 days)	<input type="checkbox"/> 72 Hours (3 days)	<input type="checkbox"/> 96 Hours (4 days)	<input checked="" type="checkbox"/> 120 Hours (5 days)
<input type="checkbox"/> Wipe	<input type="checkbox"/> Wastewater		<input type="checkbox"/> 144+ hours (6-10 days)			

TEM AIR, 3 hours, 6 hours, Please call ahead to schedule. There is a premium charge for 3-hour lab, please call 1-800-220-3675 for price prior to sending samples. You will be asked to sign an authorization form for this service.

*12 hours (must arrive by 11:00a.m. Mon-Fri.). Please Refer to Price Quote

PCM - Air <input type="checkbox"/> NIOSH 7400(A) Issue 2: August 1994 <input type="checkbox"/> OSHA w/TWA <input type="checkbox"/> Other:	TEM Air <input type="checkbox"/> AHERA 40 CFR, Part 763 Subpart E <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II	TEM WATER <input type="checkbox"/> EPA 100.1 <input type="checkbox"/> EPA 100.2 <input type="checkbox"/> NYS 198.2
PLM - Bulk <input checked="" type="checkbox"/> EPA 600/R-93/116 <input type="checkbox"/> EPA Point Count <input type="checkbox"/> NY Stratified Point Count <input type="checkbox"/> PLM NOB (Gravimetric) NYS 198.1 <input type="checkbox"/> NIOSH 9002: <input type="checkbox"/> EMSL Standard Addition:	TEM BULK <input type="checkbox"/> Drop Mount (Qualitative) <input type="checkbox"/> Chatfield SOP - 1988-02 <input type="checkbox"/> TEM NOB (Gravimetric) NYS 198.4 <input type="checkbox"/> EMSL Standard Addition:	TEM Microvac/Wipe <input type="checkbox"/> ASTM D 5755-95 (quantitative method) <input type="checkbox"/> Wipe Qualitative
SEM Air or Bulk <input type="checkbox"/> Qualitative <input type="checkbox"/> Quantitative	PLM Soil <input type="checkbox"/> EPA Protocol Qualitative <input type="checkbox"/> EPA Protocol Quantitative <input type="checkbox"/> EMSL MSD 9000 Method (fibers/grain)	XRD <input type="checkbox"/> Asbestos <input type="checkbox"/> Silica: NIOSH 7500 OTHER <input type="checkbox"/>

5306



Chain of Custody

Asbestos Lab Services

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14375 23rd Avenue
North
Minneapolis,
MN 55447

Page 1 of 2

Phone: (763) 449-4922
Fax: (763) 449-4924
<http://www.emsl.com>

Please print all information legibly.

Client Sample # (s) DIAP-B-001 to DIAP-B-015 + DIAP-B-014 to DIAP-B-022 Total Samples #: _____

Relinquished: _____ Date: _____ Time: _____

Received: K. Beem Date: 11/2/05 Time: 9:15

Relinquished: _____ Date: _____ Time: _____

Received: _____ Date: _____ Time: _____

SAMPLE NUMBER	SAMPLE DESCRIPTION/LOCATION	VOLUME (if applicable)
DIAP-B-001	Mechanical Room F.T. 12x12 white	100 square feet
DIAP-B-002	Mechanical Room 4-inch hard fitting	
DIAP-B-003	Mechanical Room 3-inch hard fitting	
DIAP-B-004	Mechanical Room brown vinyl baseboard	
DIAP-B-005	Mechanical Room C.T. white	
DIAP-B-014	Brick Room F.T.	
DIAP-B-015	Brick Room vinyl baseboard	
DIAP-B-016	Brick Room drywall	
DIAP-B-017	Brick Room 2x4 C.T.	
DIAP-B-018	Brick Room hallway 2x2 C.T.	
DIAP-B-019	Maint. Office vinyl baseboard	
DIAP-B-020	Brick Room water main inlet hard fitting	1 fitting
DIAP-B-021	Brick Room Bathroom 4-inch fitting	
DIAP-B-022	East Garage 4-inch fitting	

5305



Chain of Custody

Asbestos Lab Services

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<http://www.emsl.com>

Page 2 of 2

Please print all information legibly.

Client Sample # (s) DIAP-B-023 - DIAP-B-033

Total Samples #: _____

Relinquished: _____ Date: _____

Time: _____

Received: _____ Date: _____

Time: _____

Relinquished: _____ Date: _____

Time: _____

Received: _____ Date: _____

Time: _____

SAMPLE NUMBER	SAMPLE DESCRIPTION/LOCATION	VOLUME (if applicable)
DIAP-B-023	East Garage 6-inch fitting	
DIAP-B-024	East Garage 6-inch fitting	
DIAP-B-025	East Garage Fireproofing	
DIAP-B-026	East Garage Fireproofing	
DIAP-B-027	East Garage Fireproofing	
DIAP-B-028	West Garage 4-inch fitting	
DIAP-B-029	West Garage 4-inch fitting	
DIAP-B-030	West Garage 6-inch fitting	
DIAP-B-031	West Garage 6-inch fitting	
DIAP-B-032	West Garage Fireproofing	
DIAP-B-033	West Garage Fireproofing	

EMSL Analytical, Inc.

14375 23rd Avenue North, Minneapolis, Mn 55447

Phone: (763) 449-4922 Fax: (763) 449-4924 Email: minneapolislab@emsl.com**EMSL**

5M

Attn: **Chuck Deye**
EMR Inc, (Environmental Management Resources, Inc)
11 E. Superior St.
Suite 541
Duluth, MN 55802

Customer ID: EMRI50
Customer PO: 7124.001
Received: 11/21/05 9:15 AM
EMSL Order: 350505292

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: Duluth IAP Asbestos 7124.001


EMSL Proj:
Analysis Date: 11/21/2005
Report Date: 11/22/2005

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-B-006 350505292-0001	Hard Fittings 4-inch pipe Boiler Room 50 fittings	Gray Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected
DIAP-B-007 350505292-0002	Hard Fittings 4-inch pipe Boiler Room 50 fittings	Gray Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected
DIAP-B-008 350505292-0003	Hard Fitting Out-of-Service Boiler 3 fittings	Tan Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected
DIAP-B-009 350505292-0004	Hard Fitting 6-inch pipe Boiler Room 3 fittings	White Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected
DIAP-B-010 350505292-0005	Hard Fitting 6-inch pipe Boiler Room 3 fittings	White Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected
DIAP-B-011 350505292-0006	Hot Water Heat Converter #2 Boiler Room 10 square	White Fibrous Heterogeneous	15% Synthetic 5% Glass	80% Non-fibrous (other)	None Detected
DIAP-B-012 350505292-0007	Boiler Exhaust - Boiler Room 20 feet - 24inch diam	Tan Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected

Analyst(s)

Erin Wittman (8)



or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.

Analysis performed by EMSL Minneapolis (NVLAP #200019-0)

EMSL Analytical, Inc.

14375 23rd Avenue North, Minneapolis, Mn 55447

Phone: (763) 449-4922 Fax: (763) 449-4924 Email: minneapolislab@emsl.com

EMSL

Attn: **Chuck Deye**
EMR Inc, (Environmental Management Resources, Inc)
11 E. Superior St.
Suite 541
Duluth, MN 55802

Customer ID: EMRI50
Customer PO: 7124.001
Received: 11/21/05 9:15 AM
EMSL Order: 350505292

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: Duluth IAP Asbestos 7124.001

EMSL Proj:
Analysis Date: 11/21/2005
Report Date: 11/22/2005

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-B-013 350505292-0008	Out-of-Service Boiler - Boiler Room 20 feet-24 Inc	Gray Fibrous Heterogeneous	65% Min. Wool	35% Non-fibrous (other)	None Detected

Analyst(s)

Erin Wittman (8)

Rachel

or other approved signatory

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Analysis performed by EMSL Minneapolis (NVLAP #200019-0)



Chain of Custody

Asbestos Lab Services

EMSL Analytical, Inc.
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North
Minneapolis,
MN 55447

Phone: (763) 449-4922

Fax: (763) 449-4924

<http://www.emsl.com>

Please print all information legibly.

Company: EMR Incorporated	Bill To: EMR Inc
Address1: 11 E. Superior Street	Address1: 11 E. Superior Street
Address2: Suite 541	Address2: Suite 541
City, State: Duluth, MN	City, State: Duluth, MN
Zip/Post Code: 55802	Zip/Post Code: 55802
Country: USA	Country: USA
Contact Name: Chuck Deye	Attn: Scott Carney
Phone: 2186252332	Phone: 2186252332
Fax: 2186252201	Fax: 2186252201
Email: cdeye@emr-inc.com	Email: cdeye@emr-inc.com
EMSL Rep:	P.O. Number: 7124.001
Project Name/Number: Duluth IAP Asbestos 7124.001	

MATRIX			TURNAROUND			
<input type="checkbox"/> Air	<input type="checkbox"/> Soil	<input type="checkbox"/> Micro-Vac	<input type="checkbox"/> 3 Hours	<input type="checkbox"/> 6 Hours	<input type="checkbox"/> Same Day or 12 Hours*	<input checked="" type="checkbox"/> 24 Hours (1 day)
<input checked="" type="checkbox"/> Bulk	<input type="checkbox"/> Drinking Water		<input type="checkbox"/> 48 Hours (2 days)	<input type="checkbox"/> 72 Hours (3 days)	<input type="checkbox"/> 96 Hours (4 days)	<input type="checkbox"/> 120 Hours (5 days)
<input type="checkbox"/> Wipe	<input type="checkbox"/> Wastewater		<input type="checkbox"/> 144+ hours (6-10 days)			

TEM AIR, 3 hours, 6 hours, Please call ahead to schedule, There is a premium charge for 3-hour tat, please call 1-800-220-3675 for price prior to sending samples. You will be asked to sign an authorization form for this service.

*12 hours (must arrive by 11:00a.m. Mon -Fri.), Please Refer to Price Quote

PCM - Air <input type="checkbox"/> NIOSH 7400(A) Issue 2: August 1994 <input type="checkbox"/> OSHA w/TWA <input type="checkbox"/> Other:	TEM Air <input type="checkbox"/> AHERA 40 CFR, Part 763 Subpart E <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II	TEM WATER <input type="checkbox"/> EPA 100.1 <input type="checkbox"/> EPA 100.2 <input type="checkbox"/> NYS 198.2
PLM - Bulk <input checked="" type="checkbox"/> EPA 600/R-93/116 <input type="checkbox"/> EPA Point Count <input type="checkbox"/> NY Stratified Point Count <input type="checkbox"/> PLM NOB (Gravimetric) NYS 198.1 <input type="checkbox"/> NIOSH 9002: <input type="checkbox"/> EMSL Standard Addition:	TEM BULK <input type="checkbox"/> Drop Mount (Qualitative) <input type="checkbox"/> Chatfield SOP - 1988-02 <input type="checkbox"/> TEM NOB (Gravimetric) NYS 198.4 <input type="checkbox"/> EMSL Standard Addition:	TEM Microvac/Wipe <input type="checkbox"/> ASTM D 5755-95 (quantative method) <input type="checkbox"/> Wipe Qualitative
SEM Air or Bulk <input type="checkbox"/> Qualitative <input type="checkbox"/> Quantitative	PLM Soil <input type="checkbox"/> EPA Protocol Qualitative <input type="checkbox"/> EPA Protocol Quantitative <input type="checkbox"/> EMSL MSD 9000 Method fibers/gram	XRD <input type="checkbox"/> Asbestos <input type="checkbox"/> Silica NIOSH 7500 OTHER <input type="checkbox"/>

24-HOUR TURNAROUND



Chain of Custody

Asbestos Lab Services

EMSL Analytical, Inc.
14375 23rd Avenue
North
Minneapolis,
MN 55447

350805292

Phone: (763) 449-4922
Fax: (763) 449-4924
<http://www.emsl.com>

Please print all information legibly.

Client Sample # (s) DIAP-B-006 - DIAP-B-013

Relinquished: Chet Pyle Date: 11/18/05

Received: W. Bean Date: 11/21/05

Relinquished: _____ Date: _____

Received: _____ Date: _____

Total Samples #: 8

Time: 1200

Time: 9:15

Time: _____

Time: _____

SAMPLE NUMBER	SAMPLE DESCRIPTION/LOCATION	VOLUME (if applicable)
DIAP-B-006	Hard Fittings 4-inch pipe Boiler Room	50 fittings
DIAP-B-007	Hard Fittings 4-inch pipe Boiler Room	50 fittings
DIAP-B-008	Hard Fitting Out-of-service Boiler	3 fittings
DIAP-B-009	Hard Fitting 6-inch pipe Boiler Room	3 fittings
DIAP-B-010	Hard Fitting 6-inch pipe Boiler Room	3 fittings
DIAP-B-011	Hot Water Heat Converter #2 Boiler Room	10 square feet
DIAP-B-012	Boiler Exhaust - Boiler Room	20 feet - 24 inch diameter
DIAP-B-013	Out-of-service Boiler - Boiler Room	20 feet - 24 inch diameter

EMSL Analytical, Inc.

14375 23rd Avenue North, Minneapolis, Mn 55447

Phone: (763) 449-4922 Fax: (763) 449-4924 Email: minneapolislab@emsl.com

EMSL

Attn: **Chuck Deye**
EMR Inc, (Envir Mgt Res., Inc)
11 E. Superior St.
Suite 541
Duluth, MN 55802

Customer ID: EMRI50
Customer PO: 7124.00
Received: 12/06/05 9:30 AM
EMSL Order: 350505472

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: 7124.001

EMSL Proj:
Analysis Date: 12/12/2005
Report Date: 12/12/2005

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
DIAP-B-034 350505472-0001	Telephone Room 2x4 C.T.	White/Beige Fibrous Heterogeneous	40% Min. Wool 40% Cellulose	10% Perlite 10% Non-fibrous (other)	None Detected
DIAP-B-035 INSULATION 3505472-0002	Loading Ramp 4- inch hard fitting	Beige Fibrous Layers: 2	35% Min. Wool 10% Cellulose	55% Non-fibrous (other)	None Detected
DIAP-B-035 WRAP 350505472-0068	Loading Ramp 4- inch hard fitting	Cream Fibrous Layers: 2	50% Synthetic		50% Chrysotile
DIAP-1-036 350505472-0003	White ribbed 2x2 C.T. West Ramp	White/Beige Fibrous Heterogeneous	30% Min. Wool 50% Cellulose	10% Perlite 10% Non-fibrous (other)	None Detected
DIAP-1-037 BASEBOARD 350505472-0004	Brown Vinyl Baseboard West Ramp	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-037 MASTIC 350505472-0069	Brown Vinyl Baseboard West Ramp	Cream Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-038 VINYL 350505472-0005	White/Gray Linoleum Cust. Clear Bath	White Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected

Analyst(s)

Erin Wittman (46)
Lynn Scott (20)

Rachel Travis (35)



or other approved signatory

Due to identification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.

Analysis performed by EMSL Minneapolis (NVLAP #200019-0)

EMSL Analytical, Inc.

14375 23rd Avenue North, Minneapolis, Mn 55447

Phone: (763) 449-4922 Fax: (763) 449-4924 Email: minneapolislab@emsl.com

EMSL

Attn: **Chuck Deye**
EMR Inc, (Envir Mgt Res., Inc)
11 E. Superior St.
Suite 541
Duluth, MN 55802

Customer ID: EMRI50
Customer PO: 7124.00
Received: 12/06/05 9:30 AM
EMSL Order: 350505472

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: 7124.001

EMSL Proj:
Analysis Date: 12/12/2005
Report Date: 12/12/2005

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
DIAP-1-038 MASTIC 350505472-0070	White/Gray Linoleum Cust. Clear Bath	Clear Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-039 BASEBOARD 350505472-0006	Tan Vinyl Baseboard cust. Clear Bath	Tan Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-039 MASTIC 350505472-0071	Tan Vinyl Baseboard cust. Clear Bath	Tan Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-040 350505472-0007	Speckled/Wormy 2x4 C.T.	Beige/White Fibrous Heterogeneous	40% Min. Wool 40% Cellulose	10% Perlite 10% Non-fibrous (other)	None Detected
DIAP-1-041 BASEBOARD 350505472-0008	Red Vinyl Baseboard	Red Non-Fibrous Layers: 3		100% Non-fibrous (other)	None Detected
DIAP-1-041 TAN MASTIC 350505472-0072	Red Vinyl Baseboard	Tan Non-Fibrous Layers: 3		100% Non-fibrous (other)	None Detected

Analyst(s)

Erin Wittman (46)

Lynn Scott (20)

Rachel Travis (35)



or other approved signatory

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Analysis performed by EMSL Minneapolis (NVLAP #200019-0)

EMSL Analytical, Inc.

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Phone: (763) 449-4922 Fax: (763) 449-4924 Email: minneapolislab@emsl.com**EMSL**

513

Attn: **Chuck Deye**
EMR Inc, (Envir Mgt Res., Inc)
11 E. Superior St.
Suite 541
Duluth, MN 55802

Customer ID: EMRI50
Customer PO: 7124.00
Received: 12/06/05 9:30 AM
EMSL Order: 350505472

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: 7124.001

EMSL Proj:
Analysis Date: 12/12/2005
Report Date: 12/12/2005

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
DIAP-1-041 BROWN MASTIC 350505472-0073	Red Vinyl Baseboard	Brown Non-Fibrous Layers: 3		100% Non-fibrous (other)	None Detected
DIAP-1-042 COMPOSITE 3505472-0009	Drywall Customs Cleaning Area	White/Brown Fibrous Layers: 2	10% Cellulose	90% Non-fibrous (other)	None Detected
DIAP-1-043 INSULATION 350505472-0010	3-inch Hard Fitting	Gray Fibrous Heterogeneous	35% Min. Wool 10% Cellulose	55% Non-fibrous (other)	None Detected
DIAP-1-043 WRAP 350505472-0074	3-inch Hard Fitting	Cream Fibrous Layers: 2	100% Cellulose		None Detected
DIAP-1-044 BASEBOARD 350505472-0011	Brown Vinyl Baseboard	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-044 MASTIC 350505472-0075	Brown Vinyl Baseboard	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-045 350505472-0012	3-inch Hard Fitting Search Room 1	Gray Fibrous Heterogeneous	35% Min. Wool 5% Cellulose	60% Non-fibrous (other)	None Detected

Analyst(s)

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Lynn Scott (20)

Rachel Travis (35)



or other approved signatory

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Analysis performed by EMSL Minneapolis (NVLAP #200019-0)

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Report Date: 12/12/2005

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-1-046 350505472-0013	Mastic and Underlayment 171	Tan/White Fibrous Heterogeneous	25% Synthetic	75% Non-fibrous (other)	None Detected
DIAP-1-047 BASEBOARD 350505472-0014	Gray Vinyl Baseboard 171	Gray Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-047 MASTIC 350505472-0078	Gray Vinyl Baseboard 171	Gray Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-048 350505472-0015	Drywall 171	Brown/White Fibrous Heterogeneous	5% Glass 10% Cellulose	85% Non-fibrous (other)	None Detected
DIAP-1-049 350505472-0016	Fireproofing Spray-on White	White Fibrous Heterogeneous	25% Cellulose	75% Non-fibrous (other)	None Detected
DIAP-1-050 FLOOR TILE 350505472-0017	12x12 Vinyl F.T. with black mastic	White Non-Fibrous Layers: 2		97% Non-fibrous (other)	3% Chrysotile
DIAP-1-050 MASTIC 350505472-0077	12x12 Vinyl F.T. with black mastic	Black Non-Fibrous Layers: 2		90% Non-fibrous (other)	10% Chrysotile

Analyst(s)

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Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-1-051 BASEBOARD 350505472-0018	Brown Vinyl Baseboard with Tan Mastic	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-051 MASTIC 350505472-0078	Brown Vinyl Baseboard with Tan Mastic	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-052 INSULATION 350505472-0019	3-inch Hard Fitting	Cream Fibrous Layers: 2	35% Min. Wool 10% Cellulose	55% Non-fibrous (other)	<1% Chrysotile
DIAP-1-052 WRAP 350505472-0079	3-inch Hard Fitting	White Fibrous Layers: 2	50% Synthetic		50% Chrysotile
DIAP-1-053 WHITE LAYER 350505472-0020	White Wall Plaster	White Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-053 GRAY LAYER 350505472-0080	White Wall Plaster	Gray Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-054 350505472-0021	N. Cntry. Hall Celling Tile	Belge/White Fibrous Heterogeneous	50% Min. Wool 30% Cellulose	10% Perlite 10% Non-fibrous (other)	None Detected

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Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-1-055 350505472-0022	N. Cntry Bath Ceiling Tile	Beige/White Fibrous Heterogeneous	85% Min. Wool	12% Non-fibrous (other)	3% Chrysotile
DIAP-1-056 BASEBOARD 350505472-0023	Brown Vinyl Baseboard with Brown Mastic	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-056 MASTIC 350505472-0081	Brown Vinyl Baseboard with Brown Mastic	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-058 350505472-0024	Fireproofing spray- on white	Beige Fibrous Heterogeneous	35% Cellulose	50% Non-fibrous (other) 15% Mica	None Detected
DIAP-1-058 INSULATION 350505472-0025	3-Inch Hard Fitting Weather One	Beige Fibrous Layers: 2	35% Min. Wool	65% Non-fibrous (other)	None Detected
DIAP-1-058 WRAP 350505472-0082	3-Inch Hard Fitting Weather One	Beige Fibrous Layers: 2	50% Synthetic	<1% Non-fibrous (other)	50% Chrysotile
DIAP-1-059 BASEBOARD 350505472-0026	Black Vinyl Baseboard with Brown Mastic	Black Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected

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Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
DIAP-1-059 MASTIC 350505472-0083	Black Vinyl Baseboard with Brown Mastic	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-060 350505472-0027	2x2 Ceiling Tile	White/Beige Fibrous Heterogeneous	40% Min. Wool 40% Cellulose	10% Perlite 10% Non-fibrous (other)	None Detected
DIAP-1-061 350505472-0028	Gray Vinyl Stair Tread Wrap	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
DIAP-1-062 350505472-0029	Wall Plaster	White Non-Fibrous Heterogeneous	<1% Cellulose	100% Non-fibrous (other)	None Detected
DIAP-1-063 350505472-0030	3-Inch Hard Fitting Tug Tunnel	Beige Fibrous Heterogeneous	35% Min. Wool <1% Cellulose	65% Non-fibrous (other)	<1% Chrysotile
DIAP-1-064 FLOOR TILE 350505472-0031	12x12 Floor Tile	White Non-Fibrous Layers: 2		95% Non-fibrous (other)	5% Chrysotile
DIAP-1-064 MASTIC 350505472-0084	12x12 Floor Tile	Black Non-Fibrous Layers: 2		90% Non-fibrous (other)	10% Chrysotile

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Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-1-065 350505472-0032	Speckled/Wormy 2x4 Ceiling Tile	Tan/White Fibrous Heterogeneous	30% Min. Wool 40% Cellulose	10% Perlite 20% Non-fibrous (other)	None Detected
DIAP-1-066 BASEBOARD 350505472-0033	Brown Vinyl Baseboard with Tan Mastic	Black Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-066 MASTIC 350505472-0085	Brown Vinyl Baseboard with Tan Mastic	Tan Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-067 WHITE LAYER 350505472-0034	Plaster 116	White Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-1-067 TAN LAYER 350505472-0086	Plaster 116	Tan Non-Fibrous Layers: 2	<1% Cellulose	100% Non-fibrous (other)	None Detected
DIAP-1-068 INSULATION 350505472-0035	4-inch Hard Fitting Cargo 104	Tan Fibrous Layers: 2	25% Cellulose	75% Non-fibrous (other)	<1% Chrysotile
DIAP-1-068 WRAP 350505472-0087	4-inch Hard Fitting Cargo 104	Tan Fibrous Layers: 2	40% Synthetic <1% Min. Wool	15% Non-fibrous (other)	45% Chrysotile

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Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-2-069 BASEBOARD 350505472-0036	Brown Vinyl Baseboard with Tan Mastic	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-2-069 MASTIC 350505472-0088	Brown Vinyl Baseboard with Tan Mastic	Cream Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-2-070 350505472-0037	Drywall and Mud- Skyline Lounge	Tan/White Fibrous Layers: 2	<1% Glass 10% Cellulose	90% Non-fibrous (other) <1% Mica	None Detected
DIAP-2-071 FLOOR TILE 350505472-0038	12x12 Vinyl Floor Tile with Tan Mastic	White Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-2-071 MASTIC 350505472-0089	12x12 Vinyl Floor Tile with Tan Mastic	Yellow Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-2-072 350505472-0039	Drywall - West Gate Lobby	Tan/White Fibrous Layers: 2	<1% Glass 10% Cellulose	90% Non-fibrous (other)	None Detected
DIAP-2-073 WHITE LAYER 350505472-0040	Wall Plaster - Observation Lounge	White Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected

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Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
DIAP-2-073 TAN LAYER 350505472-0090	Wall Plaster - Observation Lounge	Tan Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-2-074 FLOOR TILE 350505472-0041	12x12 White Vinyl Floor Tile	White Non-Fibrous Layers: 2		96% Non-fibrous (other)	4% Chrysotile
DIAP-2-074 MASTIC 350505472-0091	12x12 White Vinyl Floor Tile	Black Non-Fibrous Layers: 2		90% Non-fibrous (other)	10% Chrysotile
DIAP-2-075 350505472-0042	3-Inch Hard Fitting	Tan Fibrous Heterogeneous	25% Min. Wood <1% Cellulose	75% Non-fibrous (other)	None Detected
DIAP-2-076 WHITE LAYER 350505472-0043	Wall Plaster - Janitor Closet	White Non-Fibrous Layers: 2	<1% Fibrous (other)	100% Non-fibrous (other)	None Detected
DIAP-2-076 GRAY LAYER 350505472-0092	Wall Plaster - Janitor Closet	Gray Non-Fibrous Layers: 2	<1% Cellulose	100% Non-fibrous (other)	None Detected

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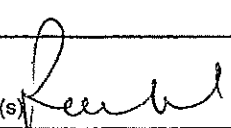
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Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-2-077 BASEBOARD 350505472-0044	Black Vinyl Baseboard with Brown Mastic	Black Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-2-077 MASTIC 350505472-0093	Black Vinyl Baseboard with Brown Mastic	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-2-078 FLOOR TILE 350505472-0045	12x12 Vinyl Floor Tile Bar Closet 1	White Non-Fibrous Layers: 3		100% Non-fibrous (other)	None Detected
DIAP-2-078 BROWN MASTIC 350505472-0094	12x12 Vinyl Floor Tile Bar Closet 1	Brown Non-Fibrous Layers: 3		97% Non-fibrous (other)	3% Chrysotile
DIAP-2-078 YELLOW MASTIC 350505472-0095	12x12 Vinyl Floor Tile Bar Closet 1	Yellow Non-Fibrous Layers: 3		100% Non-fibrous (other)	None Detected
DIAP-2-079 350505472-0046	Fireproofing Bar Closet 1	Tan Fibrous Homogeneous	10% Cellulose	65% Non-fibrous (other) 25% Mica	None Detected
DIAP-2-080 350505472-0047	12x12 Ceiling Tile Bar	Gray/Tan Fibrous Heterogeneous	80% Min. Wool	20% Non-fibrous (other)	None Detected

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Sample	Location	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
DIAP-2-081 350505472-0048	2x4 Ceiling Tile Kitchen	Tan/White Fibrous Heterogeneous	<1% Glass 10% Cellulose	90% Non-fibrous (other)	None Detected
DIAP-3-082 350505472-0049	6-Inch Hard Fitting	Tan Fibrous Homogeneous	20% Min. Wool	80% Non-fibrous (other)	None Detected
DIAP-3-083 350505472-0050	6-Inch Hard Fitting	Tan Fibrous Homogeneous	20% Min. Wool	80% Non-fibrous (other)	None Detected
DIAP-3-084 350505472-0051	4-Inch Hard Fitting	Tan Fibrous Homogeneous	2% Synthetic 15% Min. Wool	80% Non-fibrous (other)	3% Chrysotile
DIAP-3-085 350505472-0052	4-Inch Hard Fitting	Tan Fibrous Homogeneous	2% Synthetic 15% Min. Wool	80% Non-fibrous (other)	3% Chrysotile
DIAP-3-086 350505472-0053	Wall Plaster West HVAC	White Non-Fibrous Heterogeneous		100% Non-fibrous (other)	None Detected
DIAP-3-087 350505472-0054	2x4 Ceiling Tile	Tan Fibrous Heterogeneous	77% Min. Wool 5% Cellulose	15% Non-fibrous (other)	3% Chrysotile

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Sample	Location	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
DIAP-3-088 FLOOR TILE 350505472-0055	12x12 White Vinyl Floor Tile	Beige Non-Fibrous Layers: 2		95% Non-fibrous (other)	5% Chrysotile
DIAP-3-088 MASTIC 3505472-0096	12x12 White Vinyl Floor Tile	Black Non-Fibrous Layers: 2		90% Non-fibrous (other)	10% Chrysotile
DIAP-3-089 BASEBOARD 350505472-0056	Brown Vinyl Baseboard with Tan Mastic	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-3-089 MASTIC 350505472-0097	Brown Vinyl Baseboard with Tan Mastic	Tan Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-3-090 BASEBOARD 350505472-0057	Brown vinyl Baseboard with Tan Mastic	Brown Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected
DIAP-3-090 MASTIC 350505472-0098	Brown vinyl Baseboard with Tan Mastic	Yellow Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected

Analyst(s)

Erin Wittman (46)

Rachel Travis (35)

Lynn Scott (20)

or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.

Analysis performed by EMSL Minneapolis (NVLAP #200019-0)

EMSL Analytical, Inc.

14375 23rd Avenue North, Minneapolis, Mn 55447

Phone: (763) 449-4922 Fax: (763) 449-4924 Email: minneapolislab@emsl.com**EMSL**

Attn: **Chuck Deye**
EMR Inc, (Envir Mgt Res., Inc)
11 E. Superior St.
Suite 541
Duluth, MN 55802

Customer ID: EMRI50
Customer PO: 7124.00
Received: 12/06/05 9:30 AM
EMSL Order: 350505472

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: 7124.001

EMSL Proj:
Analysis Date: 12/12/2005
Report Date: 12/12/2005

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	% Type	
DIAP-3-091 350505472-0058	Ribbed/Speckled 3x4 Ceiling Tile	Tan/White Fibrous Heterogeneous	40% Glass 40% Cellulose	10% Perlite 10% Non-fibrous (other)	None Detected	
DIAP-3-092 350505472-0059	6-inch Hard Fitting	Tan Fibrous Homogeneous	2% Synthetic 15% Min. Wool	80% Non-fibrous (other)	3% Chrysotile	
DIAP-3-093 350505472-0060	6-inch Hard Fitting	Tan Fibrous Homogeneous	<1% Synthetic 15% Min. Wool	82% Non-fibrous (other)	3% Chrysotile	
DIAP-3-094 350505472-0061	4-Inch Hard Fitting	Tan Fibrous Homogeneous	2% Synthetic 15% Min. Wool	80% Non-fibrous (other)	3% Chrysotile	
DIAP-3-095 350505472-0062	4-inch Hard Fitting	Tan Fibrous Homogeneous	15% Min. Wool	85% Non-fibrous (other)	<1% Chrysotile	
DIAP-3-096 WHITE LAYER 350505472-0063	Wall Plaster East HVAC	White Non-Fibrous Layers: 2	<1% Fibrous (other)	100% Non-fibrous (other)	None Detected	
DIAP-3-096 GRAY LAYER 350505472-0099	Wall Plaster East HVAC	Gray Non-Fibrous Layers: 2		100% Non-fibrous (other)	None Detected	

Analyst(s)

Erin Wittman (46)

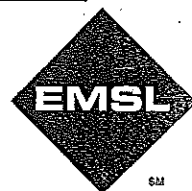
Rachel Travis (35)

Lynn Scott (20)

or other approved signatory

Disclaimers: Significant limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.

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**EMSL Analytical, Inc.**

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Attn: **Chuck Deye**
EMR Inc, (Envir Mgt Res., Inc)
11 E. Superior St.
Suite 541
Duluth, MN 55802

Customer ID: EMRI50
Customer PO: 7124.00
Received: 12/08/05 9:30 AM
EMSL Order: 350505472

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: 7124.001

EMSL Proj:
Analysis Date: 12/12/05
Report Date: 12/13/05

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-3-097 350505472-0064	Fireproofing East HVAC	Tan Fibrous Homogeneous	15% Cellulose	60% Non-fibrous (other) 25% Mica	None Detected
DIAP-R-098 350505472-0065	Main Terminal 12x12 Ceiling Tile	Grayish Fibrous Homogeneous	80% Min. Wool	20% Non-fibrous (other)	None Detected
DIAP-R-099 350505472-0066	Skyline Room 12x12 Ceiling Tile	Grayish/Tan Fibrous Heterogeneous	80% Min. Wool	20% Non-fibrous (other)	None Detected
DIAP-R-100 350505472-0067	Skyline Room 12x12 Ceiling Tile	Tan/White Fibrous Heterogeneous	<1% Glass 10% Cellulose	90% Non-fibrous (other)	None Detected
DIAP-R-100 WHITE LAYER 350505472-0100	Roof Membrane	White Fibrous Layers: 2	15% Synthetic Not listed on COC.	85% Non-fibrous (other)	None Detected
DIAP-R-100 TAN LAYER 350505472-0101	Roof Membrane	Tan Fibrous Layers: 2	15% Synthetic Not listed on COC.	85% Non-fibrous (other)	None Detected

Report amended 12/13/05 to switch descriptions on samples #57 & #58.

Analyst(s)

Erin Wittman (46)

Rachel Travis (35)

Lynn Scott (20)

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Analysis performed by EMSL Minneapolis (NVLAP #200019-0)



Chain of Custody

Asbestos Lab Services

EMSL Analytical, Inc.
14375 23rd Avenue
North
Minneapolis,
MN 55447

Phone: (763) 449-4922
Fax: (763) 449-4924
<http://www.emsl.com>

Please print all information legibly.

Company:	Environmental Management Resources Inc. (EMR)	Bill To:	Environmental Management Resources Inc. (EMR)
Address1:	11 E. Superior St.	Address1:	11 E. Superior St.
Address2:	Suite 541	Address2:	Suite 541
City, State:	Duluth, MN	City, State:	Duluth, MN
Zip/Post Code:	55802	Zip/Post Code:	55802
Country:	USA	Country:	USA
Contact Name:	Chuck Deye	Attn:	Chuck Deye
Phone:	218-625-2332	Phone:	218-625-2332
Fax:	218-625-2201	Fax:	218-625-2201
Email:	cdeye@emr-inc.com	Email:	cdeye@emr-inc.com
EMSL Rep:		P.O. Number:	7124.001
Project Name/Number: 7124.001			

MATRIX			TURNAROUND			
<input type="checkbox"/> Air	<input type="checkbox"/> Soil	<input type="checkbox"/> Micro-Vac	<input type="checkbox"/> 3 Hours	<input type="checkbox"/> 6 Hours	<input type="checkbox"/> Same Day or 12 Hours*	<input type="checkbox"/> 24 Hours (1 day)
<input checked="" type="checkbox"/> Bulk	<input type="checkbox"/> Drinking Water		<input type="checkbox"/> 48 Hours (2 days)	<input type="checkbox"/> 72 Hours (3 days)	<input type="checkbox"/> 96 Hours (4 days)	<input checked="" type="checkbox"/> 120 Hours (5 days)
<input type="checkbox"/> Wipe	<input type="checkbox"/> Wastewater		<input type="checkbox"/> 144+ hours (6-10 days)			

TEM AIR, 3 hours, 6 hours, Please call ahead to schedule. There is a premium charge for 3-hour tat, please call 1-800-220-3675 for price prior to sending samples. You will be asked to sign an authorization form for this service.

*12 hours (must arrive by 11:00a.m. Mon -Fri.), Please Refer to Price Quote

PCM - Air <input type="checkbox"/> NIOSH 7400(A) Issue 2: August 1994 <input type="checkbox"/> OSHA w/TWA <input type="checkbox"/> Other:	TEM Air <input type="checkbox"/> AHERA 40 CFR, Part 763 Subpart E <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II	TEM WATER <input type="checkbox"/> EPA 100.1 <input type="checkbox"/> EPA 100.2 <input type="checkbox"/> NYS 198.2
PLM - Bulk <input checked="" type="checkbox"/> EPA 600/R-93/116 <input type="checkbox"/> EPA Point Count <input type="checkbox"/> NY Stratified Point Count <input type="checkbox"/> PLM NOB (Gravimetric) NYS 198.1 <input type="checkbox"/> NIOSH 9002: <input type="checkbox"/> EMSL Standard Addition:	TEM BULK <input type="checkbox"/> Drop Mount (Qualitative) <input type="checkbox"/> Chatfield SOP - 1988-02 <input type="checkbox"/> TEM NOB (Gravimetric) NYS 198.4 <input type="checkbox"/> EMSL Standard Addition:	TEM Microvac/Wipe <input type="checkbox"/> ASTM D 5755-95 (quantative method) <input type="checkbox"/> Wipe Qualitative
SEM Air or Bulk <input type="checkbox"/> Qualitative <input type="checkbox"/> Quantitative	PLM Soil <input type="checkbox"/> EPA Protocol Qualitative <input type="checkbox"/> EPA Protocol Quantitative <input type="checkbox"/> EMSL MSD 9000 Method fibers/gram	XRD <input type="checkbox"/> Asbestos <input type="checkbox"/> Silica NIOSH 7500 OTHER <input type="checkbox"/>

5472



Chain of Custody

Asbestos Lab Services

EMSL Analytical, Inc.
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MN 55447

Phone: (763) 449-4922
Fax: (763) 449-4924
<http://www.emsl.com>

Please print all information legibly.

Client Sample # (s) 048 - 061

Total Samples #: 14

Relinquished: Chadley Date: 12/2/05

Time: 1600 hrs

Received: _____ Date: _____

Time: _____

Relinquished: _____ Date: _____

Time: _____

Received: _____ Date: _____

Time: _____

SAMPLE NUMBER	SAMPLE DESCRIPTION/LOCATION	VOLUME (if applicable)
DIAP-1-048	Drywall 171	
DIAP-1-049	Fireproofing Spray-on White	
DIAP-1-050	12x12 Vinyl F.T. with black mastic	
DIAP-1-051	Brown Vinyl Baseboard with Tan Mastic	
DIAP-1-052	3-inch Hard Fitting	
DIAP-1-053	White Wall Plaster	
DIAP-1-054	N. Entry. Hall Ceiling Tile	
DIAP-1-055	N. Entry Bath Ceiling Tile	
DIAP-1-056	Brown Vinyl Baseboard with Brown Mastic	
DIAP-1-057	3-inch Hard Fitting Weather One	
DIAP-1-058	Fireproofing spray-on white	
DIAP-1-059	Black Vinyl Baseboard with Brown Mastic	
DIAP-1-060	2x2 Ceiling Tile	
DIAP-1-061	Gray Vinyl Stair Tread Wrap	

Switch descriptions
per Chadley
12/13/05
EML

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Chain of Custody

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<http://www.emsl.com>

Please print all information legibly.

Client Sample # (s) 062 - 075

Total Samples #: 14

Relinquished: Chuck Hays Date: 12/2/05

Time: 1600 hrs

Received: _____ Date: _____

Time: _____

Relinquished: _____ Date: _____

Time: _____

Received: _____ Date: _____

Time: _____

SAMPLE NUMBER	SAMPLE DESCRIPTION/LOCATION	VOLUME (if applicable)
DIAP-1-062	Wall Plaster	
DIAP-1-063	3-inch Hard Fitting Tug Tunnel	
DIAP-1-064	12x12 Floor Tile	
DIAP-1-065	Speckled / Wormy 2x4 Ceiling Tile	
DIAP-1-066	Brown Vinyl Baseboard with Tan Mastic	
DIAP-1-067	Plaster 116	
DIAP-1-068	4-inch Hard Fitting Cargo 104	
DIAP-2-069	Brown Vinyl Baseboard with Tan Mastic	
DIAP-2-070	Drywall and Mud - Skylight Lounge	
DIAP-2-071	12x12 Vinyl Floor Tile with Tan Mastic	
DIAP-2-072	Drywall - West Gate Lobby	
DIAP-2-073	Wall Plaster - Observation Lounge	
DIAP-2-074	12x12 White Vinyl Floor Tile	
DIAP-2-075	3-inch Hard Fitting	



Chain of Custody
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<http://www.emsl.com>

Please print all information legibly.

Client Sample # (s) 034 - 047

Total Samples #: 14

Relinquished: Chadley Date: 12/2/05

Time: 1600 hrs

Received: Beam FG Date: 12/5/05

Time: 9:30 am

Relinquished: _____ Date: _____

Time: _____

Received: _____ Date: _____

Time: _____

SAMPLE NUMBER	SAMPLE DESCRIPTION/LOCATION	VOLUME (if applicable)
DIAP-B-034	Telephone Room 2x4 C.T.	
DIAP-B-035	Loading Ramp 4-inch hard fittings	
DIAP-1-036	White ribbed 2x2 C.T. West Ramp	
DIAP-1-037	Brown Vinyl Baseboard West Ramp	
DIAP-1-038	White/Gray Linoleum Cust. Clear Bath	
DIAP-1-039	Tan Vinyl Baseboard Cust. Clear Bath	
DIAP-1-040	Speckled / Wormy 2x4 C.T.	
DIAP-1-041	Red Vinyl Baseboard	
DIAP-1-042	Drywall :: Customs Cleaning Area	
DIAP-1-043	3-inch Hard Fitting	
DIAP-1-044	Brown Vinyl Baseboard	
DIAP-1-045	3-inch Hard Fitting Search Room 1	
DIAP-1-046	Mastic and Underlayment 171	
DIAP-1-047	Gray Vinyl Baseboard 171	

5472



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Please print all information legibly.

Client Sample # (s) 076 - 089

Total Samples #: 14

Relinquished: Chubb Date: 12/2/05

Time: 1600 hrs

Received: _____ Date: _____

Time: _____

Relinquished: _____ Date: _____

Time: _____

Received: _____ Date: _____

Time: _____

SAMPLE NUMBER	SAMPLE DESCRIPTION/LOCATION	VOLUME (if applicable)
DIAP-2-076	Wall Plaster - Janitor Closet	
DIAP-2-077	Black Vinyl Baseboard with Brown Mastix	
DIAP-2-078	12x12 Vinyl Floor Tile Bar Closet 1	
DIAP-2-079	Fireproofing Bar Closet 1	
DIAP-2-080	12x12 Ceiling Tile Bar	
DIAP-2-081	2x4 Ceiling Tile Kitchen	
DIAP-3-082	6-inch Hard Fitting	
DIAP-3-083	6-inch Hard Fitting	
DIAP-3-084	4-inch Hard Fitting	
DIAP-3-085	4-inch Hard Fitting	
DIAP-3-086	Wall Plaster West HVAC	
DIAP-3-087	2x4 Ceiling Tile	
DIAP-3-088	12x12 White Vinyl Floor Tile	
DIAP-3-089	Brown Vinyl Baseboard with Tan Mastix	

5472



Chain of Custody

Asbestos Lab Services

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MN 55447

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<http://www.emsl.com>

Please print all information legibly.

Client Sample # (s) 090 - 100

Total Samples #: 11

Relinquished: Chad Dye Date: 12/2/05

Time: 1600 hrs

Received: _____ Date: _____

Time: _____

Relinquished: _____ Date: _____

Time: _____

Received: _____ Date: _____

Time: _____

SAMPLE NUMBER	SAMPLE DESCRIPTION/LOCATION	VOLUME (if applicable)
DIAP-3-090	Brown vinyl Baseboard with Tan Mastic	
DIAP-3-091	Ribbed / Speckled 2x4 Ceiling Tile	
DIAP-3-092	6-inch Hard Fitting	
DIAP-3-093	6-inch Hard Fitting	
DIAP-3-094	4-inch Hard Fitting	
DIAP-3-095	4-inch Hard Fitting	
DIAP-3-096	Wall Plaster East HVAC	
DIAP-3-097	Fireproofing East HVAC	
DIAP-R-098	Main Terminal 12x12 Ceiling Tile	
DIAP-R-099	Skyline Room 12x12 Ceiling Tile	
DIAP-R-100	Skyline Room Ceiling Drywall	

EMSL Analytical, Inc.

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Attn: **Chuck Deye**
EMR Inc, (Environmental Management Resources, Inc)
11 East Superior Street
Suite 541
Duluth, MN 55802

Customer ID: EMR150
Customer PO:
Received: 01/04/06 9:30 AM
EMSL Order: 350600024

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: DIAP Asbestos 7124.001

EMSL Proj:
Analysis Date: 1/9/2006
Report Date: 1/9/2006

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-B-002 350600024-0001	4-inch pipe wrap	White Fibrous Homogeneous	10% Synthetic 5% Glass	15% Non-fibrous (other)	70% Chrysotile
DIAP-B-006 350600024-0002	4-inch pipe wrap	White Fibrous Heterogeneous	15% Synthetic 5% Glass	20% Non-fibrous (other)	60% Chrysotile
DIAP-B-009 350600024-0003	6-inch pipe wrap	Tan Fibrous Heterogeneous	10% Synthetic 5% Glass	55% Non-fibrous (other)	30% Chrysotile
DIAP-B-011 350600024-0004	Converter #2 Wrap	Tan Fibrous Heterogeneous	20% Synthetic 5% Glass	35% Non-fibrous (other) 10% Mica	30% Chrysotile
DIAP-B-012 INSULATION 350600024-0005	In-Service Boiler Exhaust Wrap	Tan Fibrous Layers: 2	5% Wollastonite 5% Min. Wool 20% Cellulose	60% Non-fibrous (other) 10% Mica	None Detected
DIAP-B-012 WRAP 350600024-0025	In-Service Boiler Exhaust Wrap	White Fibrous Layers: 2	10% Glass	85% Non-fibrous (other)	5% Chrysotile
DIAP-B-013 INSULATION 350600024-0006	Out-of-service Boiler Exhaust Wrap	Tan Fibrous Layers: 2	5% Wollastonite 5% Min. Wool 20% Cellulose	60% Non-fibrous (other) 10% Mica	None Detected

Analyst(s)

Rachel Travis (29)



or other approved signatory

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11 East Superior Street
Suite 541
Duluth, MN 55802

Customer ID: EMRI50
Customer PO:
Received: 01/04/06 9:30 AM
EMSL Order: 350600024

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: DIAP Asbestos 7124.001

EMSL Proj:
Analysis Date: 1/9/2006
Report Date: 1/9/2006

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-B-013 WRAP 350600024-0026	Out-of-service Boiler Exhaust Wrap	White Fibrous Layers: 2	10% Glass	85% Non-fibrous (other)	5% Chrysotile
DIAP-B-020 350600024-0007	6-inch Water Main Pipe Wrap	White Fibrous Homogeneous	5% Glass	25% Non-fibrous (other)	70% Chrysotile
DIAP-B-022 350600024-0008	4-inch pipe wrap	Tan Fibrous Homogeneous	10% Synthetic 5% Glass	15% Non-fibrous (other)	70% Chrysotile
DIAP-B-023 350600024-0009	6-inch pipe wrap	White Fibrous Homogeneous	10% Synthetic 5% Glass	15% Non-fibrous (other)	70% Chrysotile
DIAP-B-029 350600024-0010	4-inch pipe wrap	Tan Fibrous Homogeneous	10% Synthetic 5% Glass	15% Non-fibrous (other)	70% Chrysotile
DIAP-B-030 INSULATION 350600024-0011	6-inch pipe wrap	Tan Fibrous Layers: 2	20% Glass	80% Non-fibrous (other)	None Detected
DIAP-B-030 WRAP 350600024-0027	6-inch pipe wrap	Tan Fibrous Layers: 2	10% Synthetic 5% Glass	15% Non-fibrous (other)	70% Chrysotile

Analyst(s)

Rachel Travis (29)



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11 East Superior Street
Suite 541
Duluth, MN 55802

Customer ID: EMRI50
Customer PO:
Received: 01/04/06 9:30 AM
EMSL Order: 350600024

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: DIAP Asbestos 7124.001

EMSL Proj:
Analysis Date: 1/9/2006
Report Date: 1/9/2006

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-1-045 350600024-0012	3-inch pipe wrap	Tan Fibrous Homogeneous	85% Cellulose	15% Non-fibrous (other)	None Detected
DIAP-1-063 350600024-0013	3-inch pipe wrap	White Fibrous Homogeneous	10% Glass	20% Non-fibrous (other)	70% Chrysotile
DIAP-2-075 350600024-0014	3-inch pipe wrap	Tan Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (other)	None Detected
DIAP-3-082 350600024-0015	6-inch pipe wrap	White Fibrous Heterogeneous	10% Synthetic	10% Non-fibrous (other)	80% Chrysotile
DIAP-3-083 350600024-0016	6-inch pipe wrap	White Fibrous Heterogeneous	10% Synthetic 5% Glass	15% Non-fibrous (other)	70% Chrysotile
DIAP-3-084 350600024-0017	4-inch pipe wrap	White Fibrous Heterogeneous	10% Synthetic 5% Glass	15% Non-fibrous (other)	70% Chrysotile
DIAP-3-085 350600024-0018	4-inch pipe wrap	Tan Fibrous Heterogeneous	10% Synthetic 5% Glass	15% Non-fibrous (other)	70% Chrysotile

Analyst(s)

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11 East Superior Street
Suite 541
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Customer ID: EMRI50
Customer PO:
Received: 01/04/06 9:30 AM
EMSL Order: 350600024

Fax: (218) 625-2201 Phone: (218) 625-2332
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EMSL Proj:
Analysis Date: 1/9/2006
Report Date: 1/9/2006

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
DIAP-3-092 350600024-0019	6-inch pipe wrap	Tan Fibrous Heterogeneous	10% Synthetic 5% Glass	20% Non-fibrous (other)	65% Chrysotile
DIAP-3-093 350600024-0020	6-inch pipe wrap	White Fibrous Heterogeneous	10% Synthetic 5% Glass	15% Non-fibrous (other)	70% Chrysotile
DIAP-3-094 350600024-0021	4-inch pipe wrap	White Fibrous Heterogeneous	10% Synthetic 5% Glass	15% Non-fibrous (other)	70% Chrysotile
DIAP-3-095 350600024-0022	4-inch pipe wrap	White Fibrous Heterogeneous	10% Synthetic 5% Glass	15% Non-fibrous (other)	70% Chrysotile
DIAP-1-101 WRAP 350600024-0023	3-inch pipe wrap and insulation	White Fibrous Layers: 2	90% Cellulose	10% Non-fibrous (other)	None Detected
DIAP-1-101 INSULATION 350600024-0028	3-inch pipe wrap and insulation	Tan Fibrous Layers: 2	20% Min. Wool	80% Non-fibrous (other)	None Detected
DIAP-1-102 WRAP 350600024-0024	3-inch pipe wrap and insulation	White Fibrous Layers: 2	90% Cellulose	10% Non-fibrous (other)	None Detected

Analyst(s)

Rachel Travis (29)



or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client.

Analysis performed by EMSL Minneapolis (NVLAP #200019-0)

EMSL Analytical, Inc.

14375 23rd Avenue North, Minneapolis, Mn 55447

Phone: (763) 449-4922 Fax: (763) 449-4924 Email: minneapolislab@emsl.com

Attn: **Chuck Deye**
EMR Inc, (Environmental Management Resources, Inc)
11 East Superior Street
Suite 541
Duluth, MN 55802

Customer ID: EMRI50
Customer PO:
Received: 01/04/06 9:30 AM
EMSL Order: 350600024

Fax: (218) 625-2201 Phone: (218) 625-2332
Project: DIAP Asbestos 7124.001

EMSL Proj:
Analysis Date: 1/9/2006
Report Date: 1/9/2006

Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Location	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
DIAP-1-102 INSULATION 350600024-0029	3-inch pipe wrap and insulation	Tan Fibrous Layers: 2	20% Min. Wool	80% Non-fibrous (other)	None Detected

***Amended 1/9/06 corrected sample numbers per COC.

Analyst(s)

Rachel Travis (29)



or other approved signatory

Due to magnification limitations inherent in PLM, asbestos fibers in dimensions below the resolution capability of PLM may not be detected. Samples reported as <1% or none detected may require additional testing by TEM to confirm asbestos quantities. The above test report relates only to the items tested and may not be reproduced in any form without the express written approval of EMSL Analytical, Inc. EMSL's liability is limited to the cost of analysis. EMSL bears no responsibility for sample collection activities or analytical method variations. Interpretation and use of test results are the responsibility of the client.
Analysis performed by EMSL Minneapolis (NVLAP #200019-0)



Chain of Custody

Asbestos Lab Services

EMSL Analytical, Inc.
14375 23rd Avenue
North
Minneapolis,
MN 55447

Phone: (763) 449-4922
Fax: (763) 449-4924
<http://www.emsl.com>

Please print all information legibly.

Company:	EMR Incorporated	Bill To:	EMR Incorporated
Address1:	11 E. Superior Street	Address1:	11 E. Superior Street
Address2:	Suite 541	Address2:	Suite 541
City, State:	Duluth, MN	City, State:	Duluth, MN
Zip/Post Code:	55802	Zip/Post Code:	55802
Country:	USA	Country:	USA
Contact Name:	Chuck Deye	Attn:	Chuck Deye
Phone:	2186252332	Phone:	2186252332
Fax:	2186252201	Fax:	2186252201
Email:	cdeye@emr-inc.com	Email:	cdeye@emr-inc.com
EMSL Rep:		P.O. Number:	7124.001
Project Name/Number: DIAP Asbestos 7124.001			

MATRIX			TURNAROUND			
<input type="checkbox"/> Air	<input type="checkbox"/> Soil	<input type="checkbox"/> Micro-Vac	<input type="checkbox"/> 3 Hours	<input type="checkbox"/> 6 Hours	<input type="checkbox"/> Same Day or 12 Hours*	<input type="checkbox"/> 24 Hours (1 day)
<input checked="" type="checkbox"/> Bulk	<input type="checkbox"/> Drinking Water		<input type="checkbox"/> 48 Hours (2 days)	<input checked="" type="checkbox"/> 72 Hours (3 days)	<input type="checkbox"/> 96 Hours (4 days)	<input type="checkbox"/> 120 Hours (5 days)
<input type="checkbox"/> Wipe	<input type="checkbox"/> Wastewater		<input type="checkbox"/> 144+ hours (6-10 days)			

TEM AIR, 3 hours, 6 hours, Please call ahead to schedule. There is a premium charge for 3-hour lab, please call 1-800-220-3678 for price prior to sending samples. You will be asked to sign an authorization form for this service.

*12 hours (must arrive by 11:00a.m. Mon-Fri.), Please Refer to Price Quote

PCM - Air <input type="checkbox"/> NIOSH 7400(A) Issue 2: August 1994 <input type="checkbox"/> OSHA w/TWA <input type="checkbox"/> Other:	TEM Air <input type="checkbox"/> AHERA 40 CFR, Part 763 Subpart E <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II	TEM WATER <input type="checkbox"/> EPA 100.1 <input type="checkbox"/> EPA 100.2 <input type="checkbox"/> NYS 198.2
PLM - Bulk <input checked="" type="checkbox"/> EPA 600/R-93/116 <input type="checkbox"/> EPA Point Count <input type="checkbox"/> NY Stratified Point Count <input type="checkbox"/> PLM NOB (Gravimetric) NYS 198.1 <input type="checkbox"/> NIOSH 9002: <input type="checkbox"/> EMSL Standard Addition:	TEM BULK <input type="checkbox"/> Drop Mount (Qualitative) <input type="checkbox"/> Chatfield SOP - 1988-02 <input type="checkbox"/> TEM NOB (Gravimetric) NYS 198.4 <input type="checkbox"/> EMSL Standard Addition:	TEM Microvac/Wipe <input type="checkbox"/> ASTM D 5755-95 (quantitative method) <input type="checkbox"/> Wipe Qualitative
SEM Air or Bulk <input type="checkbox"/> Qualitative <input type="checkbox"/> Quantitative	PLM Soil <input type="checkbox"/> EPA Protocol Qualitative <input type="checkbox"/> EPA Protocol Quantitative <input type="checkbox"/> EMSL MSD 9000 Method fibers/gram	XRD <input type="checkbox"/> Asbestos <input type="checkbox"/> Silica NIOSH 7500 OTHER <input type="checkbox"/>

350600024



Chain of Custody

Asbestos Lab Services

EMSL Analytical, Inc.
14375 23rd Avenue
North
Minneapolis,
MN 55447

Phone: (763) 449-4922
Fax: (763) 449-4924
<http://www.emsl.com>

Please print all information legibly.

Client Sample # (s) DIAP-B-002 - DIAP-Z-075

Total Samples #: 14

Relinquished: Chaffey Date: 1/3/06

Time: 1500

Received: K Beam FG Date: 1/4/06

Time: 9:30 am

Relinquished: _____ Date: _____

Time: _____

Received: _____ Date: _____

Time: _____

SAMPLE NUMBER	SAMPLE DESCRIPTION/LOCATION	VOLUME (if applicable)
DIAP-B-002	4-inch pipe wrap	
DIAP-B-006	4-inch pipe wrap	
DIAP-B-009	6-inch pipe wrap	
DIAP-B-011	Converter #2 Wrap	
DIAP-B-012	In-Service Boiler Exhaust Wrap	
DIAP-B-013	Out-of-Service Boiler Exhaust Wrap	
DIAP-B-020	6-inch Water Main Pipe Wrap	
DIAP-B-022	4-inch pipe wrap	
DIAP-B-023	6-inch pipe wrap	
DIAP-B-029	4-inch pipe wrap	
DIAP-B-030	6-inch wrap	
DIAP-1-045	3-inch pipe wrap	
DIAP-1-063	3-inch pipe wrap	
DIAP-2-075	3-inch pipe wrap	

350600024



Chain of Custody

Asbestos Lab Services

EMSL Analytical, Inc.
14375 23rd Avenue
North
Minneapolis,
MN 55447

Phone: (763) 449-4922
Fax: (763) 449-4924
<http://www.emsl.com>

Please print all information legibly.

Client Sample # (s) DIAP-3-082 - DIAP-1-102

Total Samples #: 10

Relinquished: Chris Page Date: 1/3/06

Time: 1500

Received: JBear FE Date: 1/4/06

Time: 9:30

Relinquished: _____ Date: _____

Time: _____

Received: _____ Date: _____

Time: _____

SAMPLE NUMBER	SAMPLE DESCRIPTION/LOCATION	VOLUME (if applicable)
DIAP-3-082	6-inch pipe wrap	
DIAP-3-083	6-inch pipe wrap	
DIAP-3-084	4-inch pipe wrap	
DIAP-3-085	4-inch pipe wrap	
DIAP-3-092	6-inch pipe wrap	
DIAP-3-093	6-inch pipe wrap	
DIAP-3-094	4-inch pipe wrap	
DIAP-3-095	4-inch pipe wrap	
DIAP-1-101	3-inch pipe wrap and insulation	
DIAP-1-102	3-inch pipe wrap and insulation	

APPENDIX C

HOMOGENEOUS AREA PHYSICAL ASSESSMENT FORMS

HOMOGENEOUS AREA PHYSICAL ASSESSMENT FORM

Prepared By: Chuck Deye :: EMR Incorporated Street Address: 11 E. Superior St. Ste. 541
 Building Name: Duluth International Airport Terminal Building City, State: Duluth, MN

Sample No: 001, 050, 064, 074, 088 Date: 1/10/2006 Color: White
 Material Type: 12" x 12" Vinyl Floor Tile and Mastic
 Gen'l. Area: Multiple areas on all floors

Amount: 7,800 S.F. ☐ L.F. ☐ M.J.
 Status: ☒ In-Place ☐ Removed ☐ Removed-Partial
 Category: TSI ☐ Surfacing ☐ Misc. ☒
 Class: Friable ☐ NF Category I ☒ NF Category II ☐

Percent of Damage Deterioration
 0% ☐ None ☐
 <0-10% ☒ Light ☒
 10-25% ☐ Moderate ☐
 >25% ☐ Heavy ☐

Extent of Damage Vibration
 Localized ☐ None ☐
 Distributed ☒ Light ☒
 Moderate ☐
 Heavy ☐
 Physical Damage
 None ☐
 Light ☒
 Moderate ☐
 Heavy ☐

Condition Assessment
 Good ☐
 Damaged ☒
 Significantly Damaged ☐

H2O Damage
 None ☒
 Light ☐
 Moderate ☐
 Heavy ☐

Visible Mech. Vent.
 None ☐ No ☒
 <10% ☐ Intake ☐
 >10% ☒ Exhaust ☐

Accessibility Air Erosion
 Accessible ☒ Yes ☐
 Difficult ☐ No ☒
 None ☐ Potential ☐

Barriers Exposure Factor
 No ☒ None ☐
 Permanent ☐ Low ☒
 Temporary ☐ Moderate ☐
 High ☐

Activity
 None ☐
 Light ☐
 Moderate ☐
 Heavy ☒

HOMOGENEOUS AREA F SICAL ASSESSMENT FORM

Prepared By: Chuck Deye :: EMR Incorporated Street Address: 11 E. Superior St. Ste. 541

City, State: Duluth, MN

Building Name: Duluth International Airport Terminal Building

Sample No: 018, 055 Date: 1/10/2006 Color: White

Material Type: 2' x 2' Suspended Ceiling Tile

Gen'l. Area: Basement Bathroom/Hallway and North Country Bathrooms

Category: TSI ☐
Surfacing ☐
Misc. ☒

Amount: ### 385 ■ S.F. ☐ L.F. ☐ M.J. ☐

Status: ☒ In-Place
☐ Removed
☐ Removed-Partial

Class: Friable ☒
NF Category I ☐
NF Category II ☐

Percent of Damage
0% ☐
<0-10% ☒
10-25% ☐
>25% ☐

Visible
None ☐
<10% ☐
>10% ☒

Mech. Vent.
No ☒
Intake ☐
Exhaust ☐

Extent of Damage
Localized ☐
Distributed ☒

Vibration
None ☐
Light ☒
Moderate ☐
Heavy ☐

Accessibility
Accessible ☒
Difficult ☐
None ☐

Air Erosion
Yes ☐
No ☒
Potential ☐

Physical Damage
None ☐
Light ☒
Moderate ☐
Heavy ☐

Barriers
No ☒
Permanent ☐
Temporary ☐

Exposure Factor
None ☐
Low ☒
Moderate ☐
High ☐

Condition Assessment
Good ☐
Damaged ☒
Significantly Damaged ☐

H2O Damage
None ☒
Light ☐
Moderate ☐
Heavy ☐

Activity
None ☐
Light ☒
Moderate ☐
Heavy ☐

HOMOGENEOUS AREA PHYSICAL ASSESSMENT FORM

Prepared By: Chuck Deye :: EMR Incorporated Street Address: 11 E. Superior St. Ste. 541

Building Name: Duluth International Airport Terminal Building City, State: Duluth, MN

Sample No: DIAP-3-087 Date: 1/10/2006 Color: White

Material Type: 2' x 4' Suspended Ceiling Tile

Gen'l. Area: 3rd Floor Reception Area Coffee Room

Amount: 90 S.F. L.F. M.J.

Status: ☒ In-Place ☐ Removed ☐ Removed-Partial

Class: ☒ Friable ☐ NF Category I ☐ NF Category II

Category: TSI ☐ Surfacing ☐ Misc. ☒

Percent of Damage

0% ☒ ☐ ☐ ☐ ☐

<0-10% ☐ ☐ ☐ ☐ ☐

10-25% ☐ ☐ ☐ ☐ ☐

>25% ☐ ☐ ☐ ☐ ☐

Deterioration

None ☒ ☐ ☐ ☐ ☐

Light ☐ ☐ ☐ ☐ ☐

Moderate ☐ ☐ ☐ ☐ ☐

Heavy ☐ ☐ ☐ ☐ ☐

Visible

None ☐ ☐ ☐ ☐ ☐

<10% ☐ ☐ ☐ ☐ ☐

>10% ☒ ☐ ☐ ☐ ☐

Mech. Vent.

No ☒ ☐ ☐ ☐ ☐

Intake ☐ ☐ ☐ ☐ ☐

Exhaust ☐ ☐ ☐ ☐ ☐

Extent of Damage

Localized ☐ ☐ ☐ ☐ ☐

Distributed ☐ ☐ ☐ ☐ ☐

Physical Damage

None ☒ ☐ ☐ ☐ ☐

Light ☐ ☐ ☐ ☐ ☐

Moderate ☐ ☐ ☐ ☐ ☐

Heavy ☐ ☐ ☐ ☐ ☐

Condition Assessment

Good ☒ ☐ ☐ ☐ ☐

Damaged ☐ ☐ ☐ ☐ ☐

Significantly Damaged ☐ ☐ ☐ ☐ ☐

Accessibility

Accessible ☒ ☐ ☐ ☐ ☐

Difficult ☐ ☐ ☐ ☐ ☐

None ☐ ☐ ☐ ☐ ☐

Air Erosion

Yes ☐ ☐ ☐ ☐ ☐

No ☒ ☐ ☐ ☐ ☐

Potential ☐ ☐ ☐ ☐ ☐

Barriers

No ☒ ☐ ☐ ☐ ☐

Permanent ☐ ☐ ☐ ☐ ☐

Temporary ☐ ☐ ☐ ☐ ☐

Activity

None ☐ ☐ ☐ ☐ ☐

Light ☒ ☐ ☐ ☐ ☐

Moderate ☐ ☐ ☐ ☐ ☐

Heavy ☐ ☐ ☐ ☐ ☐

Exposure Factor

None ☐ ☐ ☐ ☐ ☐

Low ☒ ☐ ☐ ☐ ☐

Moderate ☐ ☐ ☐ ☐ ☐

High ☐ ☐ ☐ ☐ ☐

H2O Damage

None ☒ ☐ ☐ ☐ ☐

Light ☐ ☐ ☐ ☐ ☐

Moderate ☐ ☐ ☐ ☐ ☐

Heavy ☐ ☐ ☐ ☐ ☐

HOMOGENEOUS AREA PHYSICAL ASSESSMENT FORM

Prepared By: Chuck Deye :: EMR Incorporated

Street Address: 11 E. Superior St. Ste. 541

Building Name: Duluth International Airport Terminal Building

City, State: Duluth, MN

Sample No: 02, 06, 09, 11, 12, 13, 20, 22, 23, 29, 30, 35, 52, 57, 63, 68

Date: 1/10/2006

Color: White/Tan

Material Type: Fabric pipe wrap on TSI elbows

Gen'l. Area: Main Terminal Building (excluding customs additon) Floors B-2

Category:

TSI ☒
Surfacing ☐
Misc. ☐

Amount: 237 fittings ☐ S.F. ☐ L.F. ☒ M.J.

Status: ☒ In-Place
☐ Removed
☐ Removed-Partial

Class: ☒ Friable
NF Category I ☐
NF Category II ☐

Percent of Damage
0% ☐
<0-10% ☒
10-25% ☐
>25% ☐

Deterioration
None ☐
Light ☒
Moderate ☐
Heavy ☐

Visible
None ☐
<10% ☐
>10% ☒

Mech. Vent.
No ☒
Intake ☐
Exhaust ☐

Extent of Damage
Localized ☐
Distributed ☒

Vibration
None ☐
Light ☒
Moderate ☐
Heavy ☐

Accessibility
Accessible ☒
Difficult ☐
None ☐

Air Erosion
Yes ☐
No ☒
Potential ☐

Physical Damage
None ☐
Light ☒
Moderate ☐
Heavy ☐

Condition Assessment
Good ☐
Damaged ☒
Significantly Damaged ☐

Barriers
No ☒
Permanent ☐
Temporary ☐

Exposure Factor
None ☐
Low ☒
Moderate ☐
High ☐

H2O Damage
None ☐
Light ☒
Moderate ☐
Heavy ☐

Activity
None ☐
Light ☒
Moderate ☐
Heavy ☐

HOMOGENEOUS AREA PHYSICAL ASSESSMENT FORM

Prepared By: Chuck Deye :: EMR Incorporated

Street Address: 11 E. Superior St. Ste. 541

Building Name: Duluth International Airport Terminal Building

City, State: Duluth, MN

Sample No: 82, 83, 84, 85, 92, 93, 94, 95

Date: 1/10/2006

Color: White/Tan

Material Type: Fabric pipe wrap and insulation on TSI elbows

Gen'l. Area: Third Floor East and West HVAC Rooms

Category:

TSI ☒
Surfacing ☐
Misc. ☐

Amount: 102 Fittings ☐ S.F. ☐ L.F. ☒ M.J.

Status: ☒ In-Place

☐ Removed

☐ Removed-Partial

Class:

Friable ☒
NF Category I ☐
NF Category II ☐

Percent of Damage

0% ☐

<0-10% ☒

10-25% ☐

>25% ☐

Deterioration

None ☐

Light ☒

Moderate ☐

Heavy ☐

Extent of Damage

Localized ☐

Distributed ☒

Vibration

None ☐

Light ☒

Moderate ☐

Heavy ☐

Physical Damage

None ☐

Light ☒

Moderate ☐

Heavy ☐

Condition Assessment

Good ☐

Damaged ☒

Significantly Damaged ☐

H2O Damage

None ☐

Light ☒

Moderate ☐

Heavy ☐

Visible

None ☐

<10% ☐

>10% ☒

Mech. Vent.

No ☒

Intake ☐

Exhaust ☐

Accessibility

Accessible ☒

Difficult ☐

None ☐

Air Erosion

Yes ☐

No ☒

Potential ☐

Barriers

No ☒

Permanent ☐

Temporary ☐

Exposure Factor

None ☐

Low ☒

Moderate ☐

High ☐

Activity

None ☐

Light ☒

Moderate ☐

Heavy ☐

HOMOGENEOUS AREA PHYSICAL ASSESSMENT FORM

Prepared By: Chuck Deye :: EMR Incorporated Street Address: 11 E. Superior St. Ste. 541

City, State: Duluth, MN

Building Name: Duluth International Airport Terminal Building

Sample No: 012 and 013 Date: 1/10/2006 Color: White/Tan

Material Type: Fabric pipe wrap on boiler exhaust runs

Gen'l. Area: Basement boiler room

Category: TSI
☒ Surfacing
☐ Misc.

Amount: 40 ☐ S.F. ☒ L.F. ☐ M.J.

Status: ☒ In-Place
☐ Removed
☐ Removed-Partial

Class: ☒ Friable
☐ NF Category I
☐ NF Category II

Percent of Damage
 0% ☐
 <0-10% ☒
 10-25% ☐
 >25% ☐
 Deterioration
 None ☐
 Light ☒
 Moderate ☐
 Heavy ☐

Visible
 None ☐
 <10% ☐
 >10% ☒
 Mech. Vent.
 No ☒
 Intake ☐
 Exhaust ☐

Extent of Damage
 Localized ☐
 Distributed ☒
 Physical Damage
 None ☐
 Light ☒
 Moderate ☐
 Heavy ☐
 Vibration
 None ☐
 Light ☒
 Moderate ☐
 Heavy ☐

Accessibility
 Accessible ☒
 Difficult ☐
 None ☐
 Air Erosion
 Yes ☐
 No ☒
 Potential ☐

Condition Assessment
 Good ☐
 Damaged ☒
 Significantly Damaged ☐

Barriers
 No ☒
 Permanent ☐
 Temporary ☐
 Exposure Factor
 None ☐
 Low ☒
 Moderate ☐
 High ☐

H2O Damage
 None ☒
 Light ☐
 Moderate ☐
 Heavy ☐

Activity
 None ☐
 Light ☒
 Moderate ☐
 Heavy ☐

HOMOGENEOUS AREA PHYSICAL ASSESSMENT FORM

Prepared By: Chuck Deye :: EMR Incorporated Street Address: 11 E. Superior St. Ste. 541
 Building Name: Duluth International Airport Terminal Building City, State: Duluth, MN

Sample No: DIAP-B-011 Date: 1/10/2006 Color: White/Tan
 Material Type: Fabric pipe wrap on water heat converter
 Gen'l. Area: Basement boiler room

Amount: 20 ☒ S.F. ☐ L.F. ☐ M.J.
 Status: ☒ In-Place ☐ Removed ☐ Removed-Partial
 Category: ☒ TSI ☐ Surfacing ☐ Misc.
 Class: ☒ Friable ☐ NF Category I ☐ NF Category II

Percent of Damage ☒ 0% ☐ <0-10% ☐ 10-25% ☐ >25%
 Deterioration ☒ None ☐ Light ☐ Moderate ☐ Heavy
 Visible ☐ None ☐ <10% ☒ >10%
 Mech. Vent. ☒ No ☐ Intake ☐ Exhaust

Extent of Damage ☐ Localized ☐ Distributed
 Vibration ☐ None ☒ Light ☐ Moderate ☐ Heavy
 Accessibility ☒ Accessible ☐ Difficult ☐ None
 Air Erosion ☐ Yes ☒ No ☐ Potential
 Physical Damage ☒ None ☐ Light ☐ Moderate ☐ Heavy

Condition Assessment ☒ Good ☐ Damaged ☐ Significantly Damaged
 Barriers ☒ No ☐ Permanent ☐ Temporary
 Activity ☐ None ☒ Light ☐ Moderate ☐ Heavy
 Exposure Factor ☐ None ☒ Low ☐ Moderate ☐ High
 H2O Damage ☒ None ☐ Light ☐ Moderate ☐ Heavy

