

T:\P\2141882-077 NORTH DEVELOPMENT\CAD\C003.dwg, 8/18/2009 5:36:27 AM

1.

THE CONTRACTOR SHALL ACQUAINT HIS SUPERVISORS AND EMPLOYEES OF THE AIRPORT ACTIVITY AND OPERATIONS THAT ARE INHERENT TO THIS ACTIVE AIR CARRIER AIRPORT AND SHALL CONDUCT THE CONSTRUCTION ACTIVITIES TO CONFORM TO ALL ROUTINE AND EMERGENCY AIR TRAFFIC REQUIREMENTS AND GUIDELINES ON SAFETY AS SPECIFIED IN PARAGRAPH NO. 11 BELOW.

2.

ALL CONTRACTOR VEHICLES THAT ARE AUTHORIZED TO OPERATE ON THE AIRPORT IN THE ACTIVE AIRCRAFT OPERATIONS AREA (AOA) SHALL DISPLAY IN FULL VIEW A FLASHING AMBER (YELLOW) DOME-TYPE LIGHT DURING HOURS OF DARKNESS OR A 3'x3" CONSTRUCTION SAFETY FLAG ABOVE VEHICLE, ORANGE AND WHITE CHECKERBOARD FLAG, SEE CONSTRUCTION SAFETY FLAG DETAIL, SHEET C005. ANY VEHICLE OPERATING IN THE ACTIVE AOA DURING THE HOURS OF DARKNESS SHALL BE EQUIPPED WITH A FLASHING AMBER (YELLOW) DOME LIGHT, MOUNTED ON TOP OF THE VEHICLE AND OF SUCH INTENSITY TO CONFORM TO LOCAL CODES FOR MAINTENANCE AND EMERGENCY VEHICLES.

3.

ALL NON-RADIO EQUIPPED CONTRACTOR VEHICLES THAT ARE REQUIRED TO OPERATE ON OR ACROSS ACTIVE RUNWAYS, TAXIWAYS, APRONS AND RUNWAY APPROACH AND PROTECTION ZONES SHALL DO SO UNDER THE DIRECT CONTROL OF A RADIO EQUIPPED ESCORT VEHICLE. ESCORT VEHICLES, OPERATORS, AND RADIO EQUIPMENT SHALL BE APPROVED BY THE DULUTH INTERNATIONAL AIRPORT. ESCORT VEHICLES SHALL BE MARKED AND LIGHTED AS DESCRIBED IN PARAGRAPH NO. 2 ABOVE AND SHALL BE EQUIPPED WITH AN APPROVED AVIATION BAND. RADIO EQUIPPED VEHICLES SHALL CONTINUOUSLY MONITOR GROUND CONTROL FREQUENCY 121.9 MHZ. ALL AIRCRAFT TRAFFIC ON RUNWAYS, TAXIWAYS AND APRONS SHALL HAVE PRIORITY OVER CONTRACTOR'S TRAFFIC.

4.

NO RUNWAY, TAXIWAY, APRON OR AIRPORT ROADWAY SHALL BE CLOSED WITHOUT WRITTEN APPROVAL OF AIRPORT OPERATIONS. TO ENABLE NECESSARY "NOTICES TO AIRMEN" (NOTAM) OR ADVISORIES TO AIRPORT SERVICES OR TENANTS, A MINIMUM OF 48 HOURS WRITTEN NOTICE REQUESTING CLOSING SHALL BE DIRECTED TO THE RESIDENT PROJECT REPRESENTATIVE (RPR) AND/OR ENGINEER WHO WILL COORDINATE THE REQUEST WITH AIRPORT OPERATIONS.

5.

ANY CONSTRUCTION ACTIVITY WITHIN 200 FEET OF AN ACTIVE RUNWAY EDGE OR 75 FEET FROM AN ACTIVE TAXIWAY EDGE OR OPEN EXCAVATIONS IN EXCESS OF THREE INCHES DEEP WITHIN THE ABOVE AREAS, WILL REQUIRE CLOSURE OF THE AFFECTED RUNWAY OR TAXIWAY, UNLESS OTHERWISE APPROVED BY AIRPORT OPERATIONS. CLOSURE REQUIRES THE SAME PROVISIONS AS PARAGRAPH NO. 4 ABOVE.

6.

OPEN FLAME WELDING OR TORCH CUTTING OPERATIONS ARE PROHIBITED UNLESS ADEQUATE FIRE AND SAFETY PRECAUTIONS HAVE BEEN TAKEN AND THE PROCEDURE APPROVED BY THE RPR AND/OR AIRPORT OPERATIONS.

7.

STOCKPILED MATERIAL SHALL BE CONSTRAINED IN A MANNER TO PREVENT MOVEMENT RESULTING FROM AIRCRAFT JET BLAST OR WIND CONDITIONS IN EXCESS OF TEN KNOTS. STOCKPILE HEIGHT SHALL BE LESS THAN 20 FEET, AND OUTSIDE THE RUNWAY AND TAXIWAY OBJECT FREE AREAS. IN ADDITION, STOCKPILED MATERIAL SHALL HAVE SILT FENCE LOCATED AROUND THE MATERIAL TO PREVENT FOD FROM MOVING ONTO THE AIRFIELD PAVEMENTS.

8.

OPEN TRENCHES, EXCAVATIONS AND STOCKPILED MATERIAL LOCATED IN THE AOA SHALL BE PROMINENTLY MARKED WITH FLAGS AND LIGHTED BY APPROVED LIGHT UNITS DURING HOURS OF RESTRICTED VISIBILITY AND DARKNESS.

9.

DEBRIS, WASTE AND LOOSE MATERIAL CAPABLE OF CAUSING DAMAGE TO AIRCRAFT LANDING GEARS, PROPELLERS OR BEING INGESTED IN JET ENGINES SHALL NOT BE ALLOWED ON ACTIVE AIRCRAFT MOVEMENT AREAS. IF THESE MATERIALS ARE OBSERVED TO BE ON ACTIVE AIRCRAFT MOVEMENT AREAS, THEY WILL BE REMOVED IMMEDIATELY AND/OR CONTINUOUSLY DURING CONSTRUCTION.

10.

THE ENGINEER WILL ARRANGE WITH AIRPORT OPERATIONS FOR INSPECTION PRIOR TO OPENING FOR AIRCRAFT USE ANY RUNWAY OR TAXIWAY 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.

11.

THE CONTRACTOR IS DIRECTED TO COMPLY WITH AND ACQUAINT HIS/HER EMPLOYEES WITH THE FOLLOWING SAFETY GUIDELINES, RELATED MATERIALS AND FAA ADVISORY CIRCULARS:

150/5200-18C "AIRPORT SAFETY-SELF INSPECTION"

150/5210-5B "PAINTING, MARKING & LIGHTING OF VEHICLES USED ON AIRPORTS"

150/5370-2E "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION"

150/5370-13 "OFFPEAK CONSTRUCTION OF AIRPORT PAVEMENTS USING "HOT-MIX ASPHALT"
- COPIES OF THESE DOCUMENTS ARE PROVIDED IN THE CONTRACT SPECIFICATIONS.
12.

CONSTRUCTION DURING THE PROJECT MAY BE HALTED AT ANY TIME BY RPR, ENGINEER, AND/OR AIRPORT OPERATIONS IF IT IS DETERMINED TO BE IN THE BEST INTEREST OF AIRPORT OPERATIONS OR SAFETY. THE CONTRACTOR MAY BE DIRECTED TO REMOVE EQUIPMENT AND/OR EVACUATE THE SITE IN ORDER TO ENABLE AIRCRAFT OPERATIONS. NECESSARY EXTENSIONS IN CONTRACT TIME WILL BE GRANTED OR A STOP WORK ORDER WILL BE ISSUED DUE TO THESE DELAYS, HOWEVER, THERE WILL BE NO ADJUSTMENTS IN CONTRACT PRICE DUE TO THESE DELAYS.
- IN ADDITION TO THE ABOVE, THE FOLLOWING SPECIAL REQUIREMENTS WILL APPLY FOR NIGHT CONSTRUCTION:
- A.

A DAILY SAFETY AND PROGRESS MEETING SHALL BE HELD BETWEEN THE ENGINEER AND THE CONTRACTOR'S SUPERINTENDENT TO DISCUSS REQUIREMENTS FOR THE NEXT NIGHTTIME WORK PERIOD.

B.

THE CONTRACTOR SHALL PREPARE A SAFETY PLAN SPECIFIC TO NIGHTTIME CONSTRUCTION OPERATIONS, AS WELL AS A CONTINGENCY PLAN TO ADDRESS CASES OF ABNORMAL FAILURES OR UNEXPECTED DISASTERS USING APPENDIX 3 OF AC 150/5370-2E AS A GUIDE.

C.

TRUCK HAUL ROUTES ON THE AIRFIELD SHALL BE DELINEATED WITH LIGHTED BARRICADES. OTHER MEANS TO CLEARLY MARK THE ROUTES TO THE WORK SITE MAY BE APPROVED BY THE RPR, ENGINEER, AND/OR AIRPORT OPERATIONS.
13.

ALL COMMUNICATION WITH THE AIR TRAFFIC CONTROL TOWER OR OTHER ELEMENTS OF THE AIRPORT SHALL BE THROUGH THE RPR, ENGINEER AND/OR AIRPORT OPERATIONS.

14.

THE CONTRACTOR SHALL INSTALL ALL REQUIRED BARRICADES AT DESIGNATED PLAN LOCATIONS, HAVE ALL ACCESS GATES GUARDED AND LOCKABLE, HAVE ALL EQUIPMENT EITHER FLAGGED AND/OR FITTED WITH FLASHING YELLOW DOME-TYPE LIGHTS ON TOP OF THE VEHICLES. ALL THESE ITEMS SHALL CONSIST OF THE SAFETY AND SECURITY SYSTEM. THE CONTRACTOR SHALL INSTALL THE COMPONENTS OF THE SYSTEM AT THE APPROPRIATE TIMES AS SPECIFIED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL INSPECT EVERY ASPECT OF THE SAFETY AND SECURITY SYSTEM ON A DAILY BASIS AND ENSURE ALL COMPONENTS ARE FUNCTIONING PROPERLY. THE RESIDENT PROJECT REPRESENTATIVE (RPR) SHALL ALSO DAILY INSPECT THE SYSTEM AND IF ANY DEFICIENCIES ARE NOTED, THE CONTRACTOR SHALL HAVE THAT DAY'S PRORATED SAFETY AND SECURITY COST DEDUCTED FROM THE CONTRACTOR'S EARNINGS. THE SYSTEM ELEMENTS TO BE INSPECTED AND DEFICIENCIES NOTED ARE AS FOLLOWS:
- *BARRICADES SET PROPERLY AND ALL FLASHING WARNING LIGHTS OPERATING PROPERLY.

*ALL CONTRACTOR PERSONNEL AND EQUIPMENT ACCESS GATES MANNED AND SECURITY PROCEDURES IN PLACE.

*ALL EQUIPMENT FLAGGED OR OUTFITTED WITH FLASHING YELLOW DOME-TYPE LIGHTS.

*CONTRACTOR USE OF UNAUTHORIZED AIRPORT ACCESS GATES CHECKED.
- ANY OF THE ABOVE SAFETY AND SECURITY ITEMS FOUND TO BE DEFICIENT AT THE BEGINNING OF THE DAY BY THE RPR AND/OR AIRPORT OPERATIONS STAFF WILL RESULT IN THAT DAY'S PRORATED SAFETY AND SECURITY BID ITEM LOST AND BEING DEDUCTED PERMANENTLY FROM THE CONTRACTOR'S EARNINGS. THE CONTRACTOR SHALL MAKE A CONCENTED EFFORT TO ENSURE ALL SAFETY AND SECURITY ITEMS ARE IN PROPER WORKING ORDER EACH DAY DUE TO THE HEIGHTENED SECURITY STATUS OF THE AIRPORT AND THE CONSIDERABLE LIABILITY ASSOCIATED WITH THE SAFETY AND SECURITY WORK.
15.

HE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO ENSURE THE SAFETY OF OPERATING AIRCRAFT AS WELL AS HIS OWN EQUIPMENT AND PERSONNEL. SPECIAL CONSIDERATIONS SHOULD BE GIVEN TO FLIGHT SCHEDULES AND MISCELLANEOUS AIRCRAFT OPERATIONS. THE CONTRACTOR SHALL OBEY ALL INSTRUCTIONS AS TO ROUTES TO BE TAKEN BY EQUIPMENT TRAVELING WITHIN THE AIRPORT AREA AND KEEP SUCH VEHICLES AND EQUIPMENT MARKED WITH THE SPECIFIED AIRPORT SAFETY FLAGS. THE CONTRACTOR SHALL MAKE HIS OWN ESTIMATE OF ALL DIFFICULTIES TO BE ENCOUNTERED. EQUIPMENT NOT ACTUALLY IN OPERATION SHALL BE KEPT CLEAR OF LANDING AREAS. PERSONNEL SHALL NOT ENTER AREAS OF THE AIRPORT WHERE AIRCRAFT ARE OPERATING WITHOUT SPECIFIC PERMISSION.
- ## AIRPORT'S SAFETY AND SECURITY REQUIREMENTS
16.

THE CONTRACTOR SHALL TAKE ALL STEPS TO PROTECT THE EXISTING RUNWAY AND TAXIWAY LIGHTS, UNDERGROUND CABLES AND UTILITIES DURING CONSTRUCTION TO ASSURE CONTINUOUS OPERATION OF LIGHTS AND NAVIGATIONAL AIDS WHEN NEEDED.

17.

MATERIALS STORED OR STOCKPILED ON THE AIRPORT SHALL BE SO PLACED AND THE WORK SHALL, AT ALL TIMES, BE SO CONDUCTED AS TO CAUSE NO GREATER OBSTRUCTION TO THE AIR AND GROUND TRAFFIC THAN IS CONSIDERED NECESSARY BY THE ENGINEER.

18.

THE CONTRACTOR SHALL PROVIDE, ERECT AND MAINTAIN ALL NECESSARY BARRICADES, SIGNS, DANGER SIGNALS AND LIGHTS FOR THE PROTECTION OF THE WORK AND THE SAFETY OF THE PUBLIC FOR BOTH LAND AND AIR TRAFFIC IN ACCORDANCE WITH THE SPECIFICATIONS (AC 150/5370-2E).

19.

CLOSED RUNWAYS OR TAXIWAYS SHALL BE BARRICADED OFF AT ALL INTERSECTIONS WITH ACTIVE RUNWAYS OF TAXIWAYS. THE CONTRACTOR SHALL HAVE PERSONNEL ON CALL 24 HOURS PER DAY FOR EMERGENCY MAINTENANCE OF AIRPORT HAZARD LIGHTING AND BARRICADES.

20.

THE AIRPORT DIRECTOR, WORKING THROUGH THE ENGINEER, SHALL, AT ALL TIMES, HAVE COMPLETE JURISDICTION OVER THE SAFETY OF ALL AIRCRAFT OPERATIONS DURING THE WORK. WHEREVER THE SAFETY OF AIR TRAFFIC IS CONCERNED, THE DECISIONS OF THE AIRPORT DIRECTOR OR HIS DESIGNATED REPRESENTATIVE, SHALL BE FINAL AS TO METHODS, PROCEDURES AND MEASURES USED.

21.

FOR ANY RESTRICTIONS TO AIRCRAFT OPERATIONS, THE AIRPORT OPERATORS SHALL GIVE PROPER NOTICE TO THE NEAREST FAA FLIGHT SERVICE STATION PRIOR TO THE START OF WORK, AND FOR ANY SUBSEQUENT CHANGES NEEDED IN THE NOTAM WHICH MAY BE ISSUED DURING THE PERIOD OF WORK.

22.

THE CONTRACTOR SHALL CONTACT THE MINNESOTA AIRWAY FACILITIES SECTOR (ANDY GOMEZ 218-722-2826) TO PROVIDE LOCATIONS OF EXISTING FACILITY CABLES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HAND DIGGING TO LOCATE FACILITY CABLING, AND PROTECTION OF THOSE CABLES THROUGHOUT THE PROJECT.

23.

ANY MOVEMENT OF THE CONTRACTOR'S VEHICLES AND EQUIPMENT ON OR ACROSS MOVEMENT AREAS SHALL ONLY BE AT CROSSING POINTS APPROVED BY THE ENGINEER, AND AT TIMES THE ENGINEER DIRECTS. THE ACTUAL CROSSINGS SHALL ONLY BE MADE AFTER THE CONTRACTOR'S REPRESENTATIVE GETS APPROVAL FOR EACH CROSSING BY USE OF RADIO CONTACT WITH THE AIR TRAFFIC CONTROL TOWER TO GET PERMISSION FOR MOVEMENT.

24.

THE CONTRACTOR SHALL CONFINE HIS PERSONNEL, EQUIPMENT, OPERATIONS AND TRAVEL TO THE AREA WITHIN THE DEFINED WORK LIMITS SHOWN ON THE PLANS.

25.

THE CONTRACTOR SHALL INFORM ALL CONSTRUCTION PERSONNEL AS TO THE PROPER ROUTES, SPEEDS AND PROCEDURES FOR TRANSPORTING EQUIPMENT AND MATERIALS TO THE CONSTRUCTION SITE; AND ALL RESTRICTIONS TO MOVEMENT OF EQUIPMENT OR PERSONNEL WITHIN THE AIR OPERATIONS AREA. ON A DAILY BASIS AND MORE OFTEN IF NECESSARY ALL PERSONNEL SHALL BE ADVISED OF ANY CHANGES IN AIRPORT OPERATIONS THAT MAY FURTHER RESTRICT HIS MOVEMENT.

26.

ACCESS OR HAUL ROUTES SHALL BE EXISTING ROADWAYS TO THE EXTENT THAT THEY ARE AVAILABLE. THE CONTRACTOR SHALL CORRECT ANY DAMAGE TO THE ROADS USED AND SHALL RESTORE THOSE ROADS TO THE SAME OR BETTER CONDITION AS THEY EXISTED PRIOR TO THE START OF WORK. THE CONTRACTOR MAY ESTABLISH ADDITIONAL HAUL OR ACCESS ROUTES AT HIS OWN EXPENSE AND RESPONSIBILITY IF APPROVED BY THE SPONSOR. UPON COMPLETION OF THE WORK, ANY ADDITIONAL ROADS SHALL EITHER BE LEFT OR GRADED AS DIRECTED SO THAT THEY DO NOT IMPEDE THE EXISTING DRAINAGE OR ACCESS ROUTES.

27.

MEASURES SHALL BE ADOPTED TO PREVENT POTENTIAL POLLUTANTS FROM ENTERING ANY DRAINAGE SYSTEM OR WATERWAY. MATERIALS AND DEBRIS SHALL NOT BE STORED IN THE WORK AREA IN A MANNER THAT WOULD ALLOW THEM TO ENTER THE DRAINAGE SYSTEM AS A RESULT OF SPILLAGE, NATURAL RUNOFF OR FLOODING. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO IMMEDIATELY NOTIFY THE SPONSOR SHOULD THERE BE A SPILLAGE OF MATERIAL WHICH MIGHT CONTAMINATE THE DRAINAGE SYSTEM. IT SHALL ALSO BE THE CONTRACTOR'S REASONABILITY TO REMOVE AND CLEAR UP SUCH SPILLAGE IN A MANNER ACCEPTABLE TO THE SPONSOR. MATERIAL SHALL BE SECURED SO THAT IT WILL NOT BE BLOWN BY THE WIND ONTO THE AIRFIELD SURFACES.

28.

SPECIAL ATTENTION TO DUST CONTROL WILL BE REQUIRED WHEN EARTHWORK OR HAULING OPERATIONS ARE IN PROGRESS OR WHEN WIND AND WEATHER CONDITIONS CAUSE EXCESSIVE BLOWING OF DUST. IN THIS REGARD THE CONTRACTOR SHALL APPLY WATER OR CALCIUM CHLORIDE SOLUTION TO THE AFFECTED SITES AS DIRECTED.

29.

AT THE END OF EACH DAY, ANY RUNWAY, TAXIWAY OR APRON WHICH IS NOT CLOSED TO AIRCRAFT AND WHICH HAS BEEN USED BY THE CONTRACTOR, SHALL BE CLEANED BY BROOMING OR OTHER ACCEPTABLE METHODS APPROVED BY THE CONTRACTING OFFICER. ALL EQUIPMENT SHALL BE STORED OR MOVED SO THAT IT IS NO CLOSER THAN 500 FEET FROM THE EDGE OF AN ACTIVE RUNWAY OR 100 FEET FROM THE EDGE OF AN ACTIVE TAXIWAY OR APRON.

30.

VEHICLES WITHIN THE SECURITY FENCE SHALL BE VISIBLY IDENTIFIABLE AS CONTRACTOR VEHICLES WHICH HAVE BEEN PROPERLY CLEARED FOR ENTRY (LOGO AND FLAGS ON AUTHORIZED EQUIPMENT AND VEHICLES WOULD BE ACCEPTABLE.)

31.

CONSTRUCTION EQUIPMENT SHALL HAVE A MAXIMUM HEIGHT OF TWENTY FIVE (25) FEET, EXCEPT AS AUTHORIZED BY THE ENGINEER.

32.

IT WILL BE NECESSARY THROUGHOUT THE COURSE OF THIS PROJECT FOR CONSTRUCTION ACTIVITIES TO PENETRATE THE SAFETY AREA OF CONNECTING TAXIWAYS. SUCH CONSTRUCTION ACTIVITIES, INCLUDING EXCAVATIONS AND OPEN TRENCHES, WILL BE PERMITTED ONLY ON A CASE-BY-CASE BASIS WITH THE APPROVAL OF THE ENGINEER, DAA, FAA AND THE USERS IN ACCORDANCE WITH THE PROVISIONS OF AN APPROVED CONSTRUCTION SAFETY PLAN.
- ## SECURITY REQUIREMENTS
1.

GENERAL INTENT: IT IS INTENDED THAT THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF THE AIRPORT SECURITY PLAN AND WITH THE SECURITY REQUIREMENTS SPECIFIED HEREIN BY AIRPORT OPERATIONS. THE CONTRACTOR SHALL DESIGNATE TO THE ENGINEER AND AIRPORT OPERATIONS, IN WRITING, THE NAME OF HIS "CONTRACTOR SECURITY AND SAFETY OFFICER (CSSO)." THE CSSO SHALL REPRESENT THE CONTRACTOR ON THE SECURITY REQUIREMENTS FOR THE CONTRACT.

2.

CONTRACTOR PERSONNEL SECURITY ORIENTATION: THE CSSO SHALL BE RESPONSIBLE FOR BRIEFING ALL CONTRACTOR PERSONNEL ON SECURITY REQUIREMENTS. ALL NEW CONTRACTOR EMPLOYEES SHALL BE BRIEFED ON SECURITY REQUIREMENTS PRIOR TO WORKING IN THE CONSTRUCTION AREA. THE AIRPORT SHALL BRIEF AND/OR TRAIN CONSTRUCTION RELATED VEHICLE EQUIPMENT DRIVERS ON OPERATIONS WITHIN AN AIRPORT/AIRCRAFT ENVIRONMENT. AIRPORT MANAGEMENT SHOULD PROVIDE PRINTED MATERIAL TO EACH VEHICLE OPERATOR THAT DEPICTS HAUL ROUTES, PROHIBITED MOVEMENT AREAS, AND DESCRIBES THE CONSEQUENCES FOR NON-COMPLIANCE WITH ESTABLISHED PROCEDURES. THE AIRPORT HAS IMPLEMENTED A ZERO TOLERANCE APPROACH TO DRIVING VIOLATIONS.

3.

ACCESS TO THE SITE: CONTRACTOR'S ACCESS TO THE SITE SHALL BE AS SHOWN ON THE PLANS. NO OTHER ACCESS POINTS SHALL BE ALLOWED UNLESS APPROVED BY AIRPORT OPERATIONS. 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 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 OPERATIONS 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 AIRPORT OPERATIONS.

4.

MATERIALS DELIVERY TO THE SITE: ALL CONTRACTOR'S MATERIAL ORDERS FOR DELIVERY TO THE WORK SITE WILL USE AS A DELIVERY ADDRESS, THE STREET NAME ASSIGNED TO THE ACCESS POINT AT THE CONTRACTOR'S STAGING SITE AT THE AIRPORT. THE NAME "DULUTH INTERNATIONAL AIRPORT" SHALL NOT BE USED IN THE DELIVERY ADDRESS AT ANY TIME. THIS WILL PRECLUDE DELIVERY TRUCKS FROM ENTERING INTO THE TERMINAL COMPLEX, OR TAKING SHORT CUTS THROUGH THE PERIMETER GATES AND ENTERING INTO AIRCRAFT OPERATIONS AREAS INAPPROPRIATELY.
5.

CONSTRUCTION AREA LIMITS: THE LIMITS OF CONSTRUCTION, MATERIAL STORAGE AREAS, PLANT SITE, EQUIPMENT STORAGE AREA, PARKING AREA AND OTHER AREAS DEFINED AS REQUIRED FOR THE CONTRACTOR'S EXCLUSIVE USE DURING CONSTRUCTION SHALL BE MARKED BY THE CONTRACTOR. THE CONTRACTOR SHALL ERECT AND MAINTAIN AROUND THE PERIMETER OF THESE AREAS SUITABLE FENCING, MARKING AND/OR WARNING DEVICES VISIBLE FOR DAY/NIGHT USE. TEMPORARY BARRICADES, FLAGGING AND FLASHING WARNING LIGHTS WILL BE REQUIRED AT CRITICAL ACCESS POINTS. TYPE OF MARKING AND WARNING DEVICES SHALL BE APPROVED BY AIRPORT OPERATIONS.

6.

IDENTIFICATION--PERSONNEL: ALL EMPLOYEES, AGENTS, VENDORS, INVITEES, ETC. OF THE CONTRACTOR OR SUBCONTRACTORS REQUIRING ACCESS TO THE CONSTRUCTION SITE SHALL, IN ACCORDANCE WITH THE AIRPORT OPERATIONS SECURITY PROGRAM, BE REQUIRED TO DISPLAY AIRPORT ISSUED IDENTIFICATION OR BE UNDER ESCORT BY PROPERLY BADGED PERSONNEL. THESE BADGES WILL BE IDENTIFIED NUMERICALLY AND ISSUED TO INDIVIDUAL EMPLOYEES WITH A PERMANENT RECORD MAINTAINED ON EACH INDIVIDUAL TO WHOM A BADGE IS ISSUED. AT THE COMPLETION OF THE CONTRACT ALL BADGES WILL BE RETURNED TO THE AIRPORT AND A CHARGE OF \$50 PER BADGE WILL BE ASSESSED FOR ALL BADGES NOT RETURNED/LOST. IN ADDITION, A \$25.00 NON-REFUNDABLE PROCESSING FEE WILL BE REQUIRED FOR EACH BADGE. THIS FEE WILL BE PAID BEFORE BADGE IS ISSUED. NO BADGE WILL BE ISSUED TO ANY PERSON UNTIL A REVIEW OF REQUIRED PAPERWORK BY AIRPORT SECURITY AND ALL REQUIREMENTS ARE MET. PAPERWORK SHALL BE SUBMITTED A MINIMUM OF 24 HOURS BEFORE ISSUANCE OF BADGE. IDENTIFIABLE HARD HATS OR OTHER IDENTIFICATION SHALL ALSO BE WORN AT ALL TIMES IF REQUIRED BY AIRPORT OPERATIONS. THE CONTRACTOR AND ITS STAFF IS RESPONSIBLE FOR ATTENDING TRAINING AND COMPLETING SECURITY BADGE APPLICATIONS, WHICH WILL INCLUDE AIR/GROUND RADIO, TAXIWAY AND AIRPORT FAMILIARIZATION. ESTIMATED TIME FOR COMPLETION IS 2 HOURS.

7.

IDENTIFICATION--VEHICLES: THE CONTRACTOR, THROUGH THE CSSO, SHALL ESTABLISH AND MAINTAIN A LIST OF CONTRACTOR AND SUBCONTRACTOR VEHICLES AUTHORIZED TO OPERATE ON THE SITE AND SHALL ISSUE A PERMIT TO EACH VEHICLE TO BE MADE AVAILABLE UPON DEMAND BY AIRPORT OPERATIONS THE RPR OR ANY AIRPORT REPRESENTATIVES. A BLOCK OF VEHICLE PERMITS SHALL BE ISSUED BY AIRPORT OPERATIONS TO THE CONTRACTOR AND AT THE COMPLETION OF THE CONTRACT ALL PERMITS WILL BE RETURNED TO THE AIRPORT AND A CHARGE OF \$25 PER PERMIT WILL BE ASSESSED FOR ALL PERMITS NOT RETURNED. CONTRACTOR EMPLOYEE VEHICLES SHALL BE RESTRICTED TO THE CONTRACTOR'S EMPLOYEE PARKING AREA AND ARE NOT ALLOWED ON THE AOA AT ANY TIME.

8.

FINES: PAYMENT OF ALL FINES ASSESSED TO DULUTH INTERNATIONAL AIRPORT DUE TO VIOLATIONS BY THE CONTRACTOR OF FAA/TSA SECURITY OR SAFETY REQUIREMENTS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- A. IF THE RESTRICTED AREA GATE IS FOUND TO BE OPEN OR UNLOCKED AND UNATTENDED, AIRPORT SECURITY POLICE AND/OR TSA MAY ISSUE THE CONTRACTOR A CITATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COURT COSTS IMPOSED FINES. IN ADDITION, A UP TO \$10,000.00 CHARGE MAY BE LEVIED BY THE DULUTH AIRPORT AUTHORITY AND/OR TSA FOR EACH VIOLATION SO DOCUMENTED AND UPON FINAL PAYMENT THE TOTAL OF ANY SUCH CHARGES WILL BE DEDUCTED FROM MONEYS DUE THE CONTRACTOR.
- B. THE EVENT THE CONTRACTOR DEVIATES FROM THE IDENTIFIED CONSTRUCTION LIMITS AND/OR DESIGNATED HAUL ROUTES ONTO AN ACTIVE RUNWAY OR TAXIWAY THE CONTRACTOR WILL BE FINED\$1,000 PER OCCURRENCE WHICH WILL BE DEDUCTED FROM THE FINAL CONTRACT AMOUNT DUE THE CONTRACTOR.
- A MINIMUM OF 48 HOURS IN ADVANCE OF ANY EXCAVATION OR BORINGS, THE CONTRACTOR SHALL CONTACT THE FOLLOWING LOCAL CABLE OWNERS TO VERIFY ALL UNDERGROUND CABLE LOCATIONS IN THE VICINITY OF THE PROPOSED WORK:
- | <u>CABLE OWNER</u> | <u>CONTACT PERSON</u> | <u>PHONE NUMBER</u> |
|---------------------------------|-----------------------|---------------------|
| FEDERAL AVIATION ADMINISTRATION | ANDY GOMEZ | 218-722-2826 |
| DULUTH AIRPORT AUTHORITY | TOM WERNER | 218-727-6522 |
| OTHERS | GOPHER STATE ONE-CALL | 800-252-1166 |
| ANG | WORK CONTROL | 218-788-7292 |
- ## FAA COORDINATION NOTES:
1.

THE ATCT MANAGER OR HER REPRESENTATIVE SHALL BE COORDINATED WITH, INVITED TO ALL MEETINGS, AND ANY/ALL CONCERNS ADDRESSED/RESOLVED, PERTAINING TO THE PROPOSED CONSTRUCTION.

2.

THE AIRWAYS FACILITIES POINT OF CONTACT (POC) FOR THE NORTHERN MINNESOTA SSC, DULUTH INTERNATIONAL AIRPORT, IS MR. ANDY GOMEZ WHO CAN BE REACHED AT (218) 722-4861. THE SPONSOR/CONTRACTOR SHALL MEET WITH THE AIRWAY FACILITY POC PRIOR TO PROJECT STARTUP.

3.

THE SPONSOR SHALL NOTIFY THE MINNESOTA AIRWAY FACILITY (AF) SYSTEM MANAGEMENT OFFICE (SMO), MANGER FOR TECHNICAL SUPPORT (MTS) AT (952)-997-9261, AT LEAST 72 HOURS PRIOR TO A PRECONSTRUCTION MEETING AND/OR CONSTRUCTION START. THE SPONSOR SHALL REQUEST TO HAVE AN AF REPRESENTATIVE ATTEND THIS MEETING FOR THE PURPOSE OF IDENTIFYING ALL FAA FACILITIES, THEIR ASSOCIATED CRITICAL AREAS, THEIR ASSOCIATED CABLES (POWER AND CONTROL) AND SCHEDULE SHUTDOWN OF THESE FACILITIES, IF RUNWAYS ARE TO BE SHUT DOWN AS A RESULT OF THE PROPOSED WORK.

4.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING UTILITY LINES AND HAND DIGGING TO LOCATE FAA CABLING AND SHALL PROVIDE ADEQUATE PROVISIONS TO PROTECT ALL FAA CABLES EXPOSED DURING THE PROPOSED WORK. THE SPONSOR/CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE AIRWAY FACILITY SMO AT THE PROJECT PRECONSTRUCTION MEETING SHOULD CABLE RELOCATION BE NECESSARY.

5.

ANY DAMAGE TO FAA CABLES, ACCESS ROADS, OR TO FAA FACILITIES DURING THE CONSTRUCTION WILL REQUIRE THE CONTRACTOR TO REPLACE THE DAMAGED CABLES, ACCESS ROAD, OR FAA FACILITIES TO THE AF SMO'S REQUIREMENTS, AND AT THE CONTRACTORS' EXPENSE.

6.

IF ANY FAA POWER, CONTROL, OR SIGNAL CABLES ARE DAMAGED, THE SPONSOR/CONTRACTOR SHALL REPLACE THE CABLE IN ITS ENTIRETY. THE SPLICING OF CABLES IS NOT AN ACCEPTABLE FORM OF REPAIR.
- ### REQUIREMENTS FOR CLOSING TAXIWAYS
- WHEN CONSTRUCTION MEN OR EQUIPMENT ARE WITHIN 0.5(1.2 x WINGSPAN + 20) OF THE LARGEST PREDOMINANT AIRCRAFT FROM OPEN TAXIWAY CENTERLINES OR CLOSED RUNWAYS USED AS TAXIWAYS, THOSE AREAS WILL BE CLOSED TO ALL AIRCRAFT OPERATIONS.
- DURING THE TIME ANY TAXIWAY OR PORTION THEREOF IS CLOSED, ITS ASSOCIATED LIGHTS SHALL BE TURNED OFF.
- THE ENTRANCES TO CLOSED TAXIWAYS SHALL BE BARRICADED TO PREVENT AIRCRAFT FROM ENTERING UNUSABLE OR HAZARDOUS OPERATIONAL AREAS.
- ### RESPONSIBILITY FOR TEMPORARY LIGHTING AND MARKING
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ULTIMATE RESTORATION OF THE RUNWAY PAINT MARKINGS AND TEMPORARY LIGHTING IN THE CLOSED AREAS.
- THE CONTRACTOR WILL ALSO BE RESPONSIBLE FOR FURNISHING AND MAINTAINING THE NECESSARY BARRICADES AND HAZARD LIGHTING AS REQUIRED BY THE SPECIFICATIONS TO MARK CONSTRUCTION AREAS, HAZARDS, ETC. REFLECTORIZED ORANGE PLASTIC BARRELS WITH ATTACHED FLASHING RED LIGHTS FOR NIGHT USE ARE THE PREFERRED TYPE OF BARRICADE FOR USE ON THE AIRPORT.
- ### CONSTRUCTION ACTIVITY IN THE VICINITY OF NAVIGATIONAL AIDS
- 48 HOURS PRIOR TO THE PRE CONSTRUCTION CONFERENCE AND/OR CONSTRUCTION START, THE CONTRACTOR SHALL CONTACT THE LOCAL AIRWAY FACILITIES MANAGER AT (218) 727-2826. HE OR HIS REPRESENTATIVE WILL MEET WITH THE CONTRACTOR TO IDENTIFY FAA FACILITIES AND FAA CABLES.
- THE INSTRUMENT LANDING SYSTEM (ILS) SHALL BE REMOVED FROM SERVICE BY FAA WHEN CONSTRUCTION EQUIPMENT OR CONSTRUCTION MATERIAL ARE WITHIN THE ILS CRITICAL AREA. (48 HOURS ADVANCED NOTIFICATION AND NOTAM REQUIRED FOR ILS COORDINATED SHUTDOWN DURING ILS CRITICAL AREA VIOLATION.)
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Duluth, Minnesota 55811
218-722-1227 FAX 218-722-1052
www.rsandh.com
-
- ## NORTH BUSINESS DEVELOPMENT AREA
- 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 Professional Engineer under the laws of the State of Minnesota.
- Signature *Darren K. Christopher*
Typed Name DARREN K. CHRISTOPHER
- Date 08/18/2009 Reg. No. 45052
- ## REVISIONS
- | NO. | DESCRIPTION | DATE |
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- DATE ISSUED: 08-18-2009**
- REVIEWED BY, MLS**
- DRAWN BY, JKE**
- DESIGNED BY, DKC**
- AEP PROJECT NUMBER**
- 214-1882-077**
- © 2009 REYNOLDS, SMITH AND HILLS INC.
- SHEET TITLE**
- ## SAFETY AND SECURITY NOTES
- SHEET NUMBER**
- C003**
- BID
DOCUMENTS**

T:\P\2141882-077 NORTH DEVELOPMENT\CAD\C004-C004.dwg, 8/18/2009 5:33:56 AM

RUNWAY/ TAXIWAY CLOSURE NOTES:

1. WORK WITHIN 160' OF TAXIWAY 'B' CENTERLINE SHALL REQUIRE THE CLOSING OF THE TAXIWAY. SEE SAFETY NOTES.
2. TAXIWAY 'B' MAY BE CLOSED AS REQUIRED PER THE PHASING PLAN. THE TAXIWAY SHALL BE RE-OPENED UPON COMPLETION OF PHASE AND ACCEPTANCE BY THE ENGINEER AND INSPECTION BY THE OWNER OF ALL THE WORK.
3. THE CONTRACTOR SHALL SUPPLY A POWER BROOM/SWEEPER ON SITE FOR PAVEMENT CLEAN UP AT ALL TIMES WHEN THE CONTRACTOR IS WORKING ON OR ADJACENT TO ANY TAXIWAY OR PERIMETER ROAD PAVEMENTS. THE CONTRACTOR SHALL BE CONTINUOUSLY MONITORING THE CONDITION OF THE PAVEMENTS TO IMMEDIATELY REMOVE ANY FOD FROM THOSE SURFACES.

HAUL ROAD / SITE ACCESS

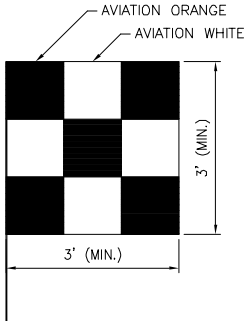
1. THE COST OF ANY HAUL ROAD; STORAGE AREA, GATE AND FENCING CONSTRUCTION AND REMOVAL/SITE RESTORATION SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.
2. SEE BARRICADE DETAIL SHEET FOR TYPE AND SPACING OF BARRICADES.
3. EQUIPMENT MATERIAL STORAGE AREAS SHALL BE REMOVED DURING DEMOBILIZATION AND THE SITE RESTORED.

NOTE:

1. CONTRACTOR SHALL NOT HAVE ACCESS ON ANY PART OF TAXIWAY "B", OR ANY AIRCRAFT MOVEMENT AREAS WITHOUT PERMISSION FROM ENGINEER AND DAA OPERATIONS.
2. CONTRACTOR SHALL ALWAYS LEAVE ACCESS FOR THE ARFF FACILITY STAFF AND DAA. FIRE FIGHTING EQUIPMENT MUST AT ALL TIME BE ABLE TO MOVE ALONG TAXIWAY 'B' FOR EMERGENCY SERVICES PROVIDED TO THE DULUTH AIRPORT.
3. ALL HAUL ROUTES SHALL BE ON THE MARTIN ROAD AND ACCESS POINTS NORTH SIDE OF RUNWAY 9/27 OUTSIDE AOA.
4. DUE TO OTHER CONSTRUCTION OPERATIONS HAUL ROUTES / SITE ACCESS MAY CHANGE.

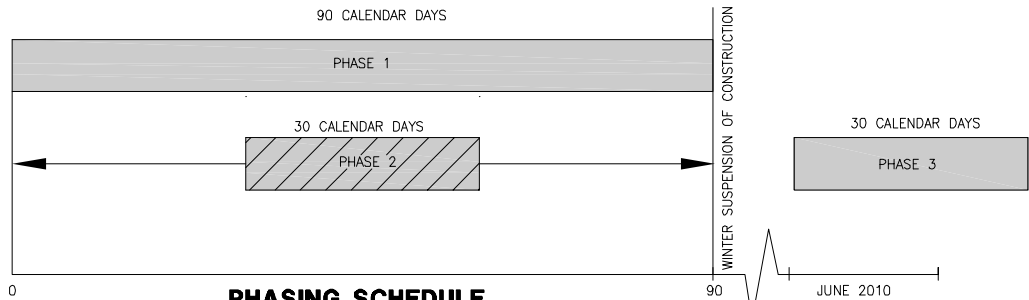
REFERENCE POINT	DESCRIPTION	LATITUDE	LONGITUDE
*①	R/W 27 THRESHOLD	465028.865	921047.041
*②	R/W 9 THRESHOLD	465032.839	921313.063
③	PROPOSED FENCE CORNER	465043.11239	921139.38493
④	PROPOSED FENCE CORNER	465043.36501	921139.21179
⑤	PROPOSED FENCE CORNER	465044.75727	921133.58020
⑥	PROPOSED FENCE CORNER	465044.63789	921133.21442
⑦	PROPOSED NW CORNER OF APRON	465042.75356	921138.59030
⑧	PROPOSED NE CORNER OF APRON	465043.89251	921133.98975
⑨	PROPOSED FENCE CORNER	465039.18552	921137.53870
⑩	PROPOSED FENCE CORNER	465039.35761	921137.41309
⑪	PROPOSED SW CORNER OF APRON	465039.50378	921136.88473
⑫	PROPOSED SE CORNER OF APRON	465040.63811	921132.27798
⑬	PROPOSED FENCE CORNER	465041.47127	921128.92009
⑭	PROPOSED FENCE CORNER	465041.79449	921128.46138
⑮	PROPOSED CONTRACTOR STAGING AREA	465044.09532	921131.91056

* POINT NOT SHOWN ON THIS SHEET



CONSTRUCTION SAFETY FLAG

N.T.S.
(SAFETY FLAG SHALL BE PROMINENTLY DISPLAYED ON ALL CONSTRUCTION EQUIPMENT)



PHASING SCHEDULE

PHASE 1

THIS PHASE SHALL INCLUDE ALL WORK GREATER THAN 260' FROM TAXIWAY 'B' CENTERLINE, EXCEPT BITUMINOUS PAVING AND STRIPING.

PHASE 2

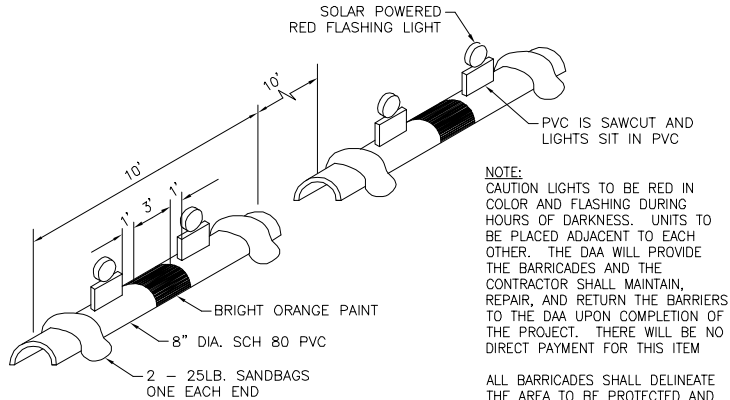
THIS PHASE SHALL INCLUDE ALL WORK WITHIN 260' OF TAXIWAY 'B' CENTERLINE, EXCEPT BITUMINOUS PAVING. PRIOR TO THE START OF THIS PHASE TAXIWAY 'B' SHALL BE CLOSED TO AIRCRAFT.

PHASE 3

THIS PHASE SHALL BE CONSTRUCTED IN THE SPRING OF 2010 AND SHALL INCLUDE FINAL GRADING, BITUMINOUS PAVING, AND STRIPING.

LOW LEVEL LIGHTED BARRICADES

1. LOW LEVEL LIGHTED BARRICADES SHALL BE PLACED AROUND ALL OPEN EXCAVATIONS, HOLES, TRENCHES, PAVEMENT DROP-OFFS, AND AREAS IDENTIFIED ON THE PHASING PLAN.
2. STEEL CONCRETE FORMS OR OTHER MATERIALS MAY BE SUBSTITUTED FOR TIMBER WITH APPROVAL OF ENGINEER.
3. PLACE BARRICADES @ 20 FT. O.C. UNLESS OTHERWISE NOTED.
4. LOW LEVEL BARRICADES WILL BE PROVIDED BY THE DAA. LIGHTS WILL BE MAINTAINED BY THE CONTRACTOR.

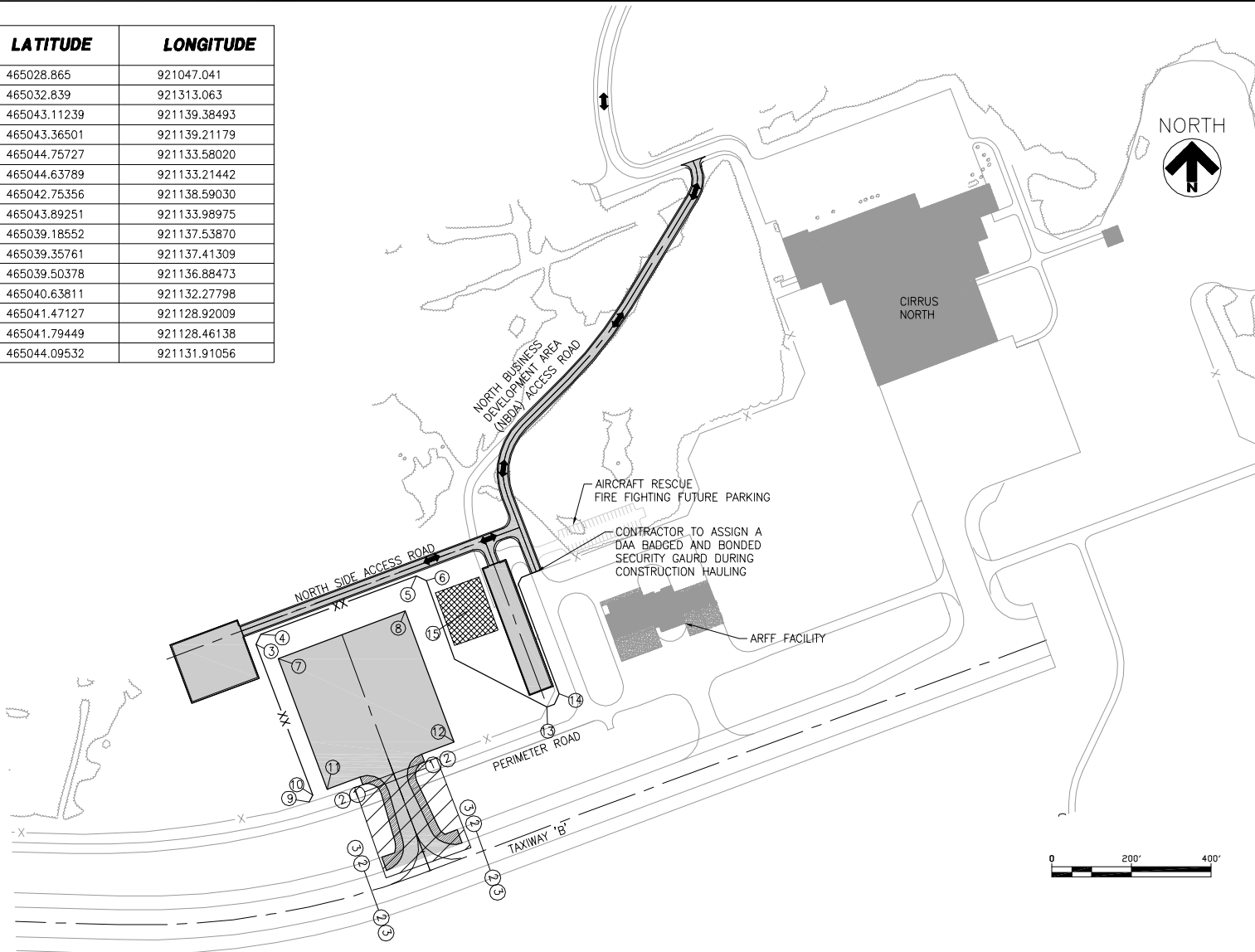


NOTE:
CAUTION LIGHTS TO BE RED IN COLOR AND FLASHING DURING HOURS OF DARKNESS. UNITS TO BE PLACED ADJACENT TO EACH OTHER. THE DAA WILL PROVIDE THE BARRICADES AND THE CONTRACTOR SHALL MAINTAIN, REPAIR, AND RETURN THE BARRIERS TO THE DAA UPON COMPLETION OF THE PROJECT. THERE WILL BE NO DIRECT PAYMENT FOR THIS ITEM

ALL BARRICADES SHALL DELINEATE THE AREA TO BE PROTECTED AND THE BARRICADE LINE SHALL EXTEND TO 10' OFF THE EDGE OF EITHER SIDE OF ANY PAVEMENT.

LOW LEVEL LIGHTED BARRICADES DETAIL

N.T.S.



NOTE:

SEQUENCE OF CONSTRUCTION SHOWN IS FOR INFORMATION ONLY AND TO BE USED FOR BIDDING PURPOSES

LEGEND

- ① — ② BARRICADE (# 1, 2 & 3 ARE FOR PHASING)
- ↔ ↔ ↔ CONTRACTOR ACCESS AND HAUL ROUTES
- ▨ CONTRACTOR STAGING AREA MATERIAL STOCKPILES
- ① PART 77 REFERENCE POINTS

- ▨ EXISTING BUILDINGS/HANGARS
- ▨ PROPOSED BITUMINOUS PAVEMENT

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AO
DULUTH INTERNATIONAL AIRPORT

NORTH
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DEVELOPMENT
AREA

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Signature *Darren K. Christopher*

Typed Name DARREN K. CHRISTOPHER

Date 08/18/2009 Reg. No. 45052

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: 08-18-2009

REVIEWED BY: MLS

DRAWN BY: JKE

DESIGNED BY: DKC

AEP PROJECT NUMBER

214-1882-077

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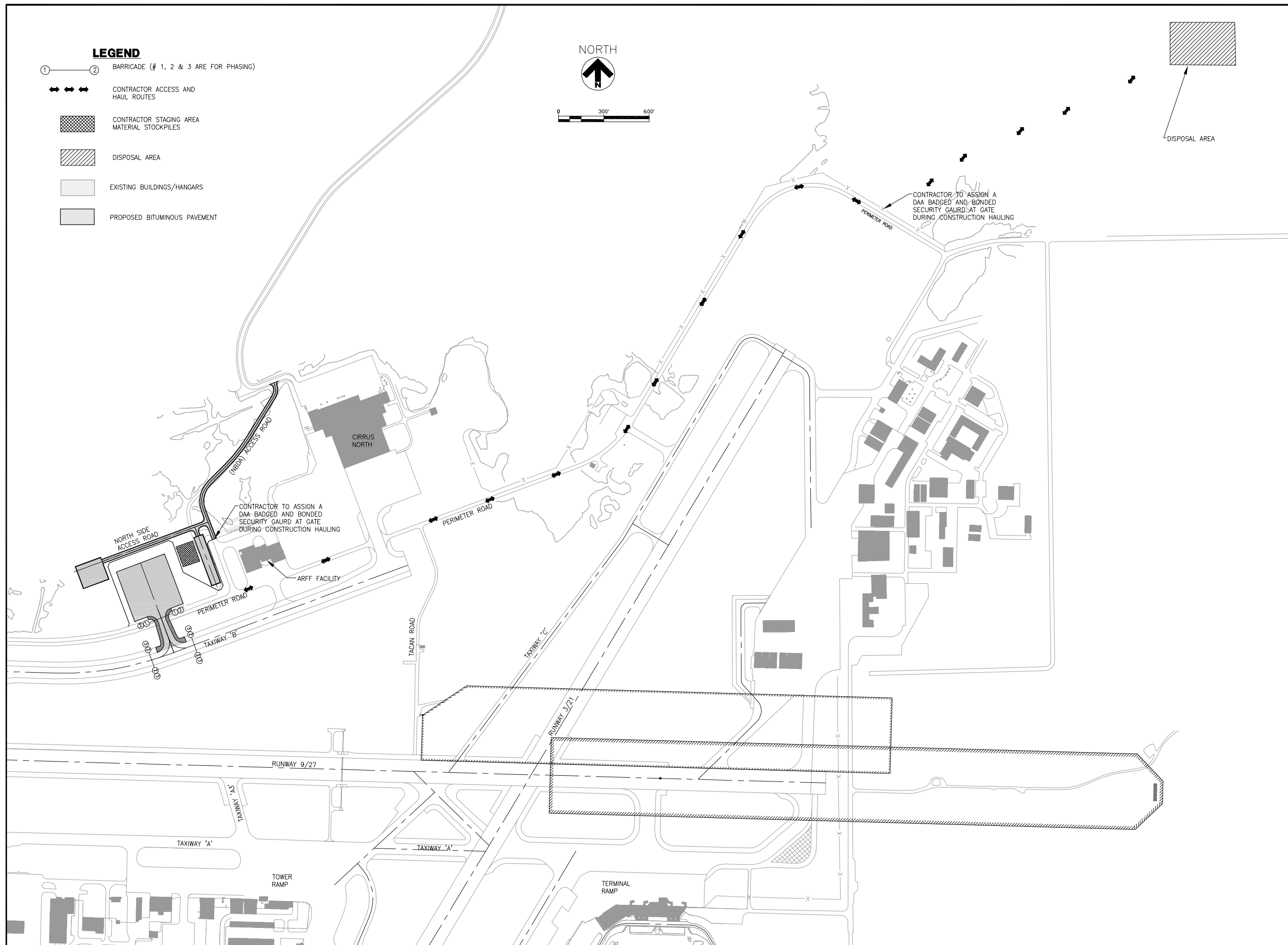
SHEET TITLE

CONSTRUCTION
SAFETY AND
PHASING PLAN
(SHEET 1 OF 2)

SHEET NUMBER

C004

BID
DOCUMENTS



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SHEET TITLE

**CONSTRUCTION
SAFETY AND
PHASING PLAN
(SHEET 2 OF 2)**

SHEET NUMBER

C005

BID DOCUMENTS

HORIZONTAL AND VERTICAL CONTROL POINTS

NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION	NORTH SIDE ACCESS ROAD STATION	NORTH SIDE ACCESS ROAD OFFSET	TAXIWAY/APRON STATION	TAXIWAY/APRON OFFSET
CP-1	N:454956.44	E:2851329.41	1415.91	CP-1 IS A 3/4" X 36" REBAR WITH "SALO" CAP	-1+17.81	425.68 RT	3+03.50	350.56 LT
CP-2	N:455181.01	E:2852268.22	1420.84	CP-2 IS A AN "X" CHISELED ON CONCRETE PAD	8+40.24	543.85 RT	1+84.80	607.43 RT
CP-3	N:455622.61	E:2852142.68	1428.38	CP-3 IS A 3/4" X 36" REBAR WITH "SALO" CAP	8+77.14	86.28 RT	6+42.36	644.58 RT

- NOTES:
- CONTROL POINT INFORMATION PROVIDED BY SALO ENGINEERING DATE: 3-30-2009
 - BORING INFORMATION DATA SHEETS CAN BE FOUND IN THE SPECIFICATIONS.

LEGEND

- ⊕ CP-01 CONTROL POINT LOCATION
- ⊙ SB-1 SOIL BORING LOCATION

- 5' --- EXISTING MAJOR CONTOUR (5')
- 1' --- EXISTING MINOR CONTOUR (1')

NOTE:
ALL NORTHINGS, EASTINGS AND ELEVATIONS LABELED ON THESE PLANS ARE IN:
MINNESOTA STATE PLANE NORTH (1996)
DATUM IS NAVD 88



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SHEET TITLE
GEOTECHNICAL
BORING LAYOUT
AND
CONTROL POINTS

SHEET NUMBER

C006

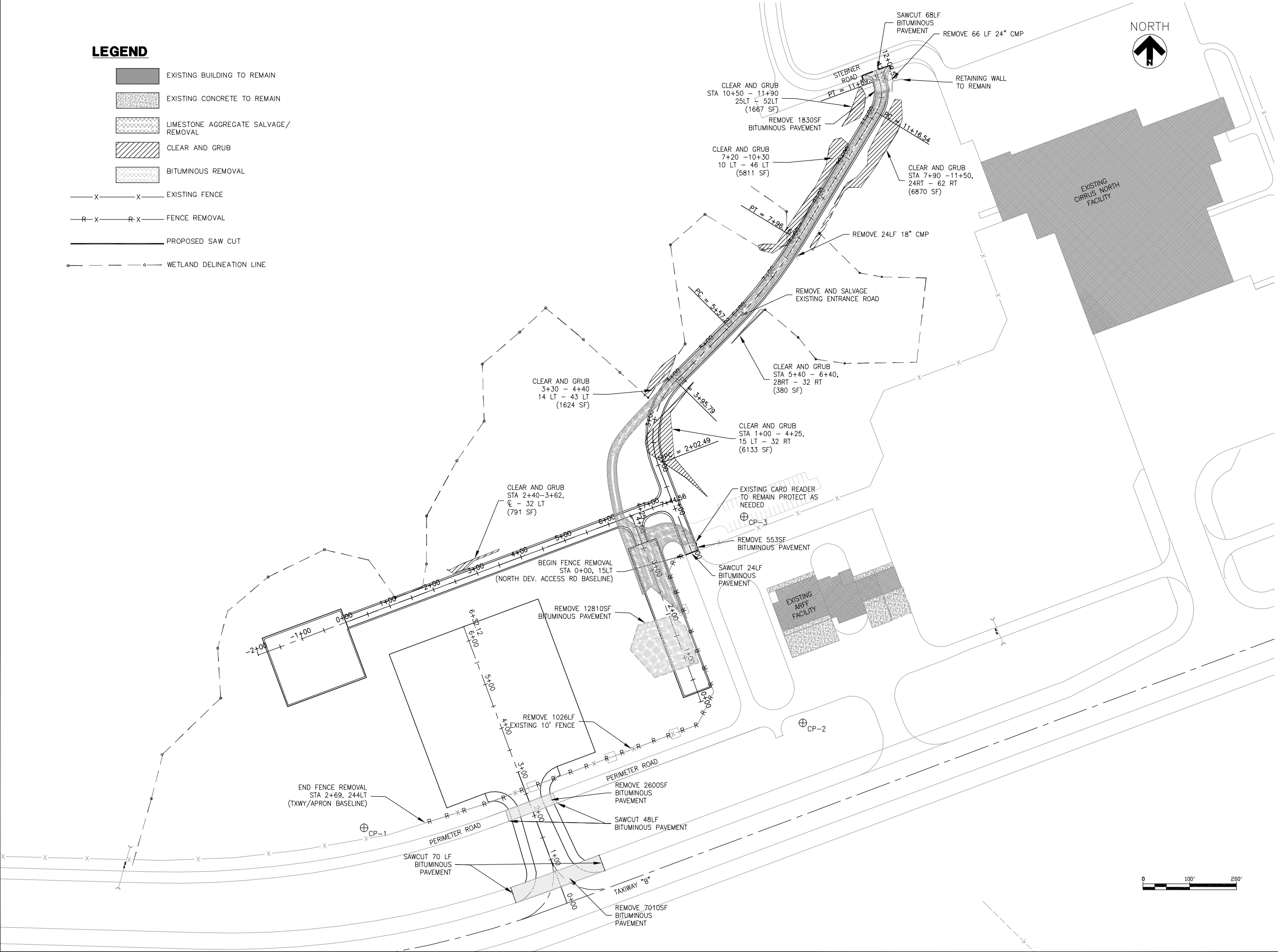
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DOCUMENTS

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LEGEND

- EXISTING BUILDING TO REMAIN
- EXISTING CONCRETE TO REMAIN
- LIMESTONE AGGREGATE SALVAGE/REMOVAL
- CLEAR AND GRUB
- BITUMINOUS REMOVAL

- EXISTING FENCE
- FENCE REMOVAL
- PROPOSED SAW CUT
- WETLAND DELINEATION LINE



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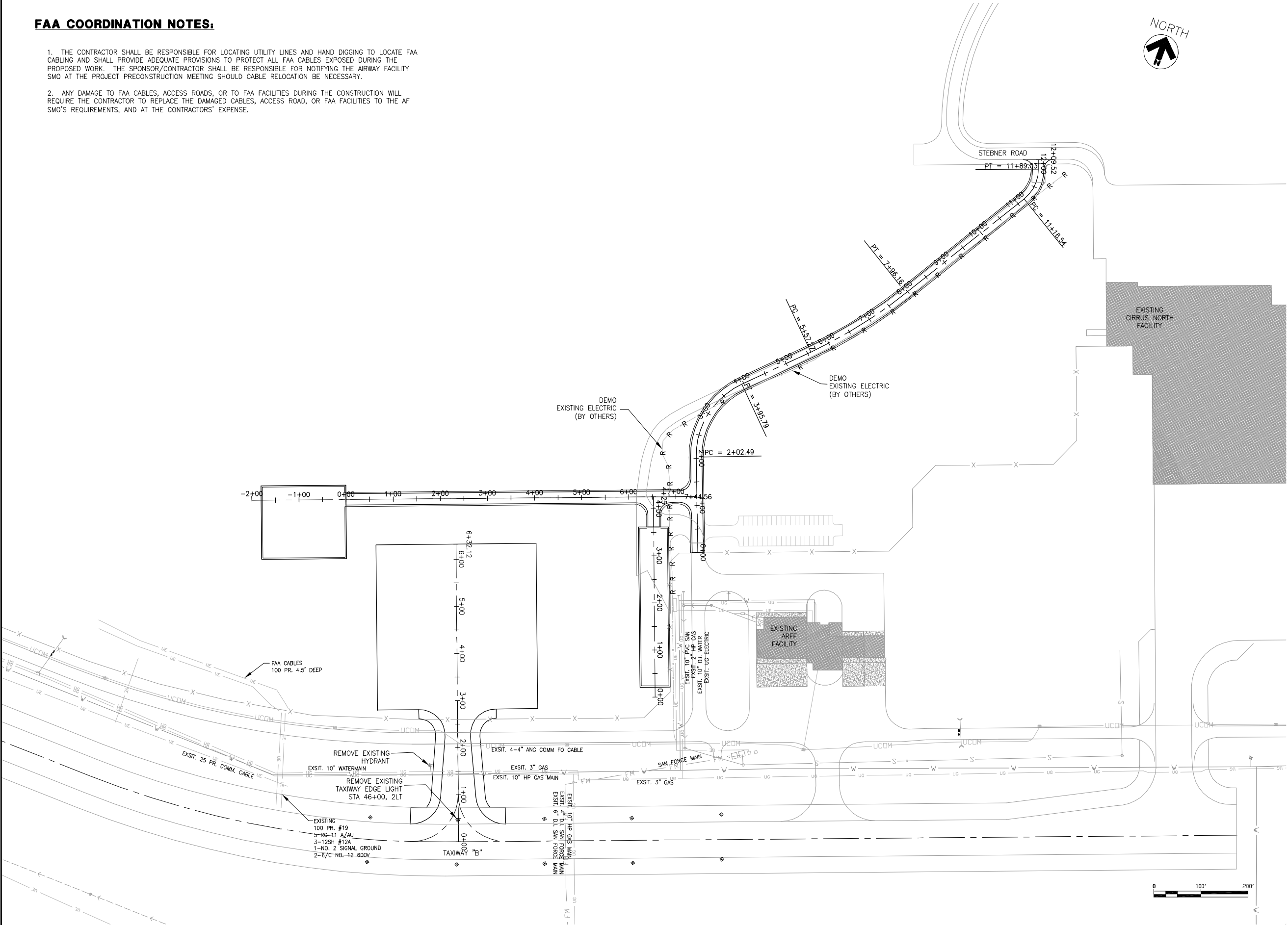
**SHEET TITLE
DEMOLITION
SITE
PLAN**

SHEET NUMBER
C100

**BID
DOCUMENTS**

FAA COORDINATION NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING UTILITY LINES AND HAND DIGGING TO LOCATE FAA CABLING AND SHALL PROVIDE ADEQUATE PROVISIONS TO PROTECT ALL FAA CABLES EXPOSED DURING THE PROPOSED WORK. THE SPONSOR/CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE AIRWAY FACILITY SMO AT THE PROJECT PRECONSTRUCTION MEETING SHOULD CABLE RELOCATION BE NECESSARY.
2. ANY DAMAGE TO FAA CABLES, ACCESS ROADS, OR TO FAA FACILITIES DURING THE CONSTRUCTION WILL REQUIRE THE CONTRACTOR TO REPLACE THE DAMAGED CABLES, ACCESS ROAD, OR FAA FACILITIES TO THE AF SMO'S REQUIREMENTS, AND AT THE CONTRACTORS' EXPENSE.



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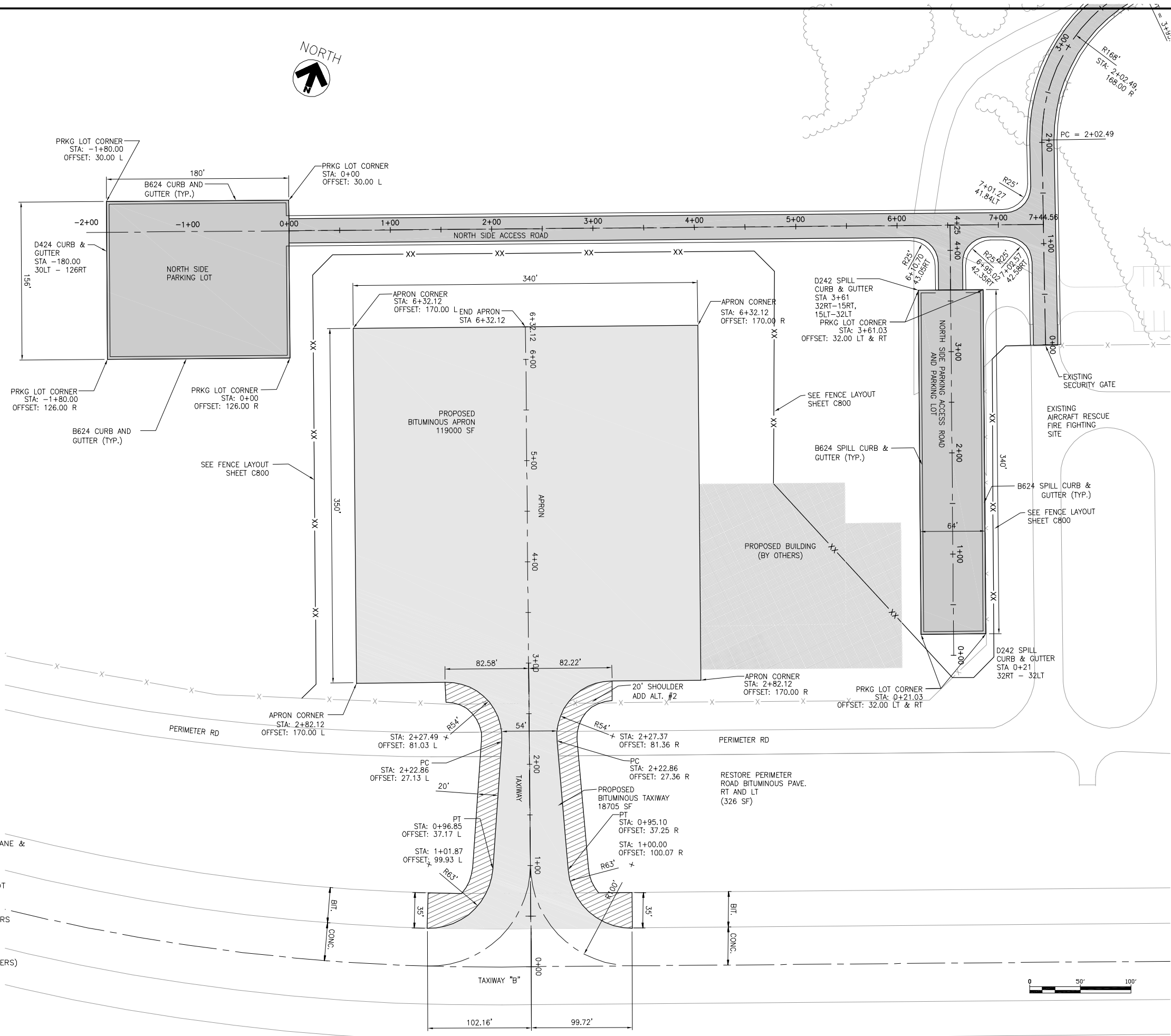
SHEET TITLE
DEMOLITION
UTILITY
PLAN

SHEET NUMBER

C101

BID
DOCUMENTS

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LEGEND

[Solid Grey Box]	PROPOSED BITUMINOUS TAXILANE & APRON PAVEMENT
[Dark Grey Box]	PROPOSED BITUMINOUS ACCESS ROAD & PARKING LOT
[Hatched Box]	PROPOSED TAXIWAY SHOULDERS ADD ALT. #2
[Light Grey Box]	PROPOSED BUILDING (BY OTHERS)

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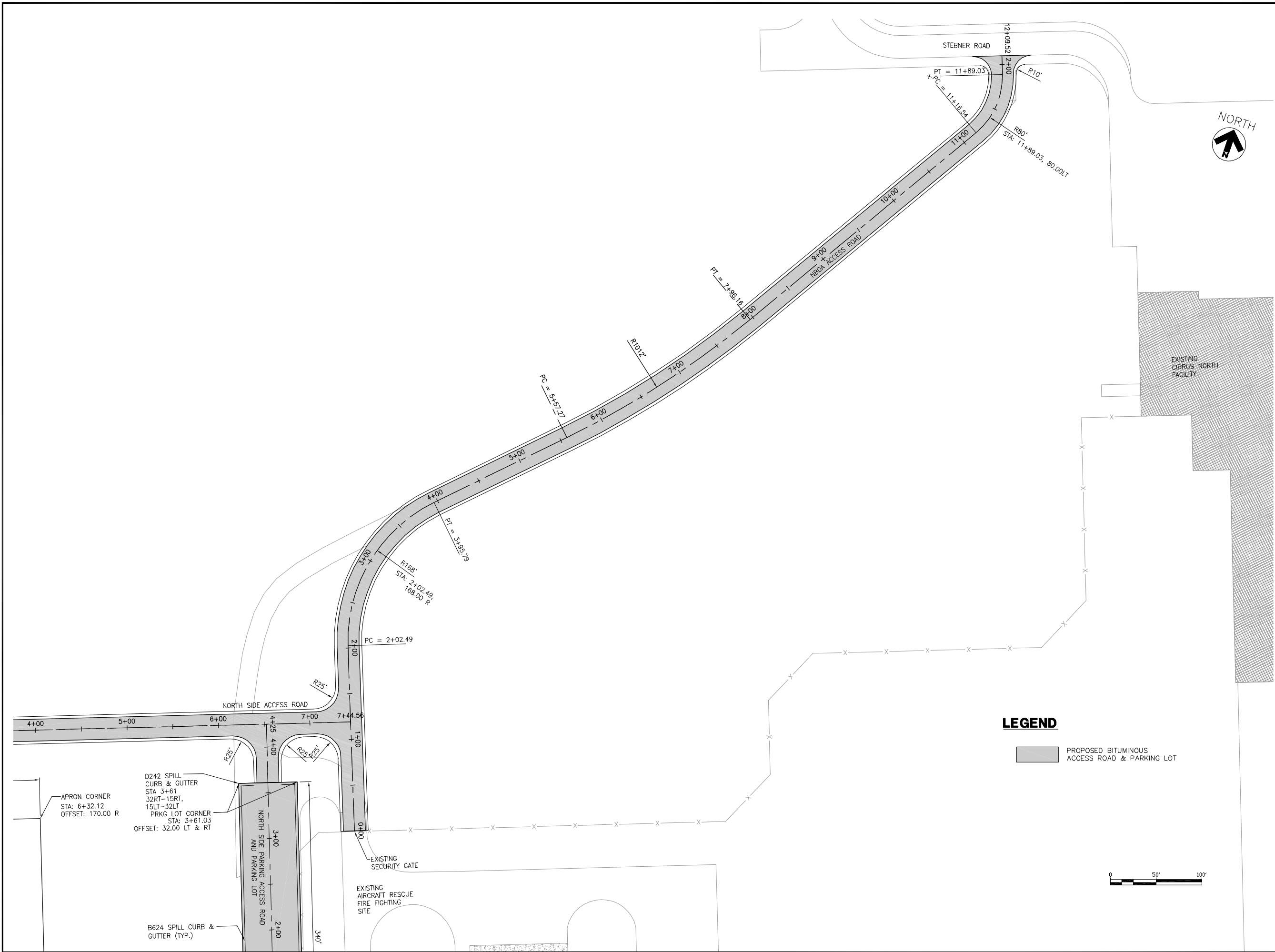
SHEET TITLE
**GEOMETRY &
PAVING PLAN**

SHEET
1 OF 2

SHEET NUMBER
C200

BID
DOCUMENTS

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SHEET TITLE
**GEOMETRY &
PAVING PLAN**

SHEET
2 OF 2

SHEET NUMBER
C201

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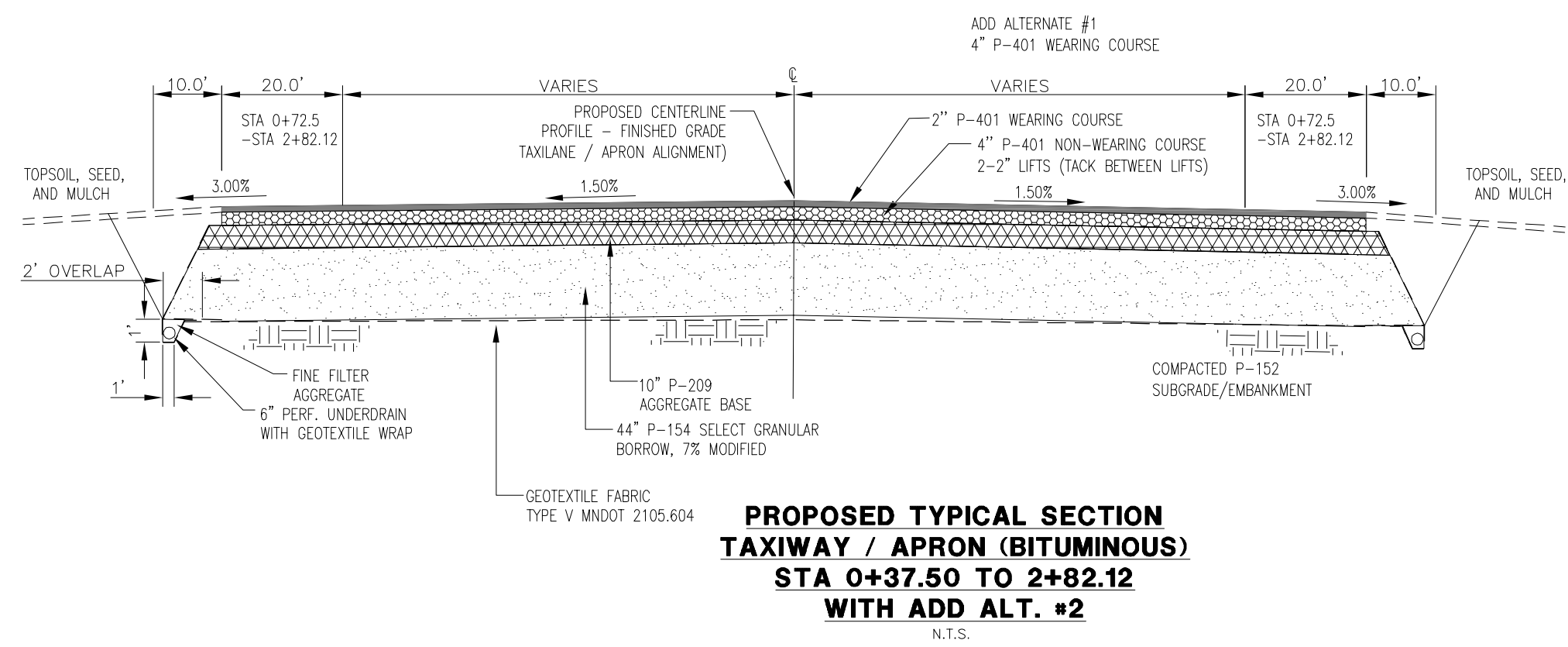
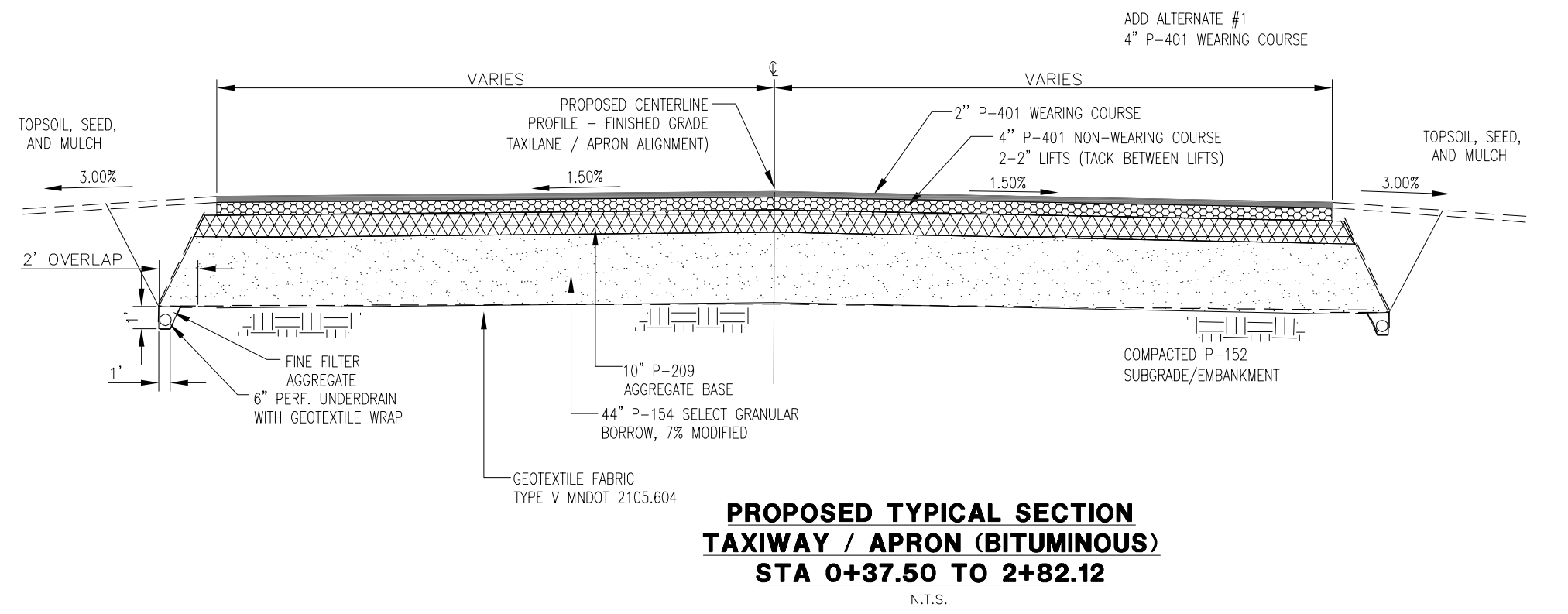
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SHEET TITLE
**TYPICAL
PAVEMENT
SECTIONS**

SHEET NUMBER
C202

**BID
DOCUMENTS**





Signature Dorcas K Christensen

Typed Name DARREN K. CHRISTOPHER

Date 08/18/2009 Req. No. 45052

REVISIONS

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DATE ISSUED: 08-18-2009

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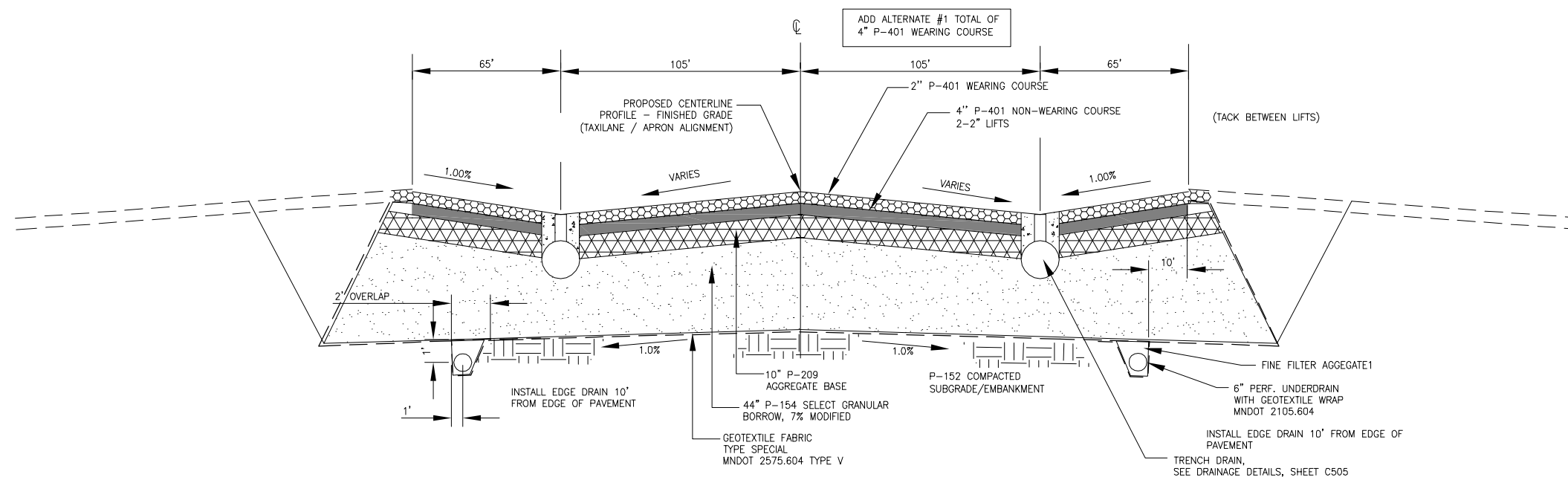
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TYPICAL PAVEMENT SECTIONS

SHEET NUMBER

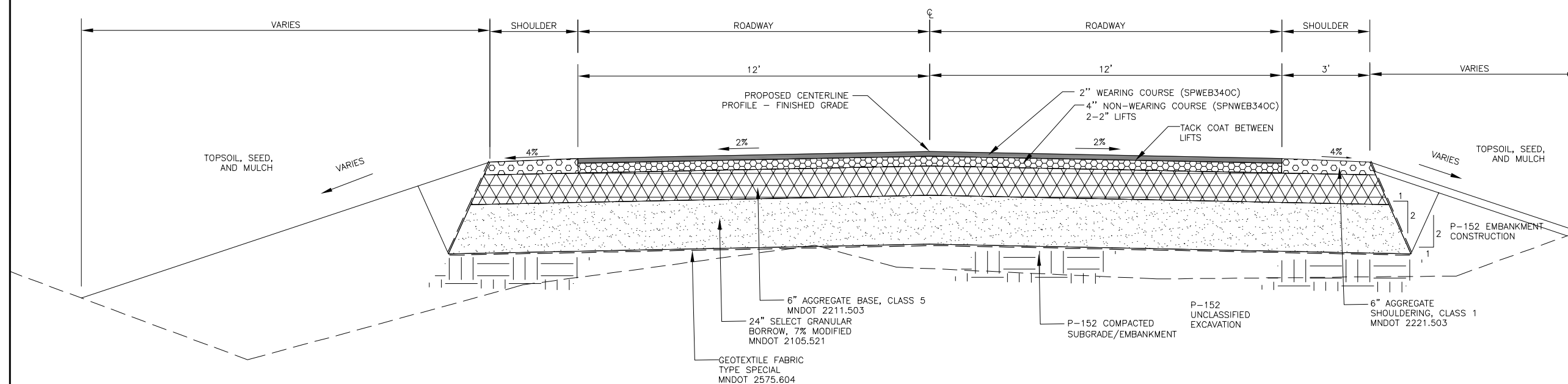
C203

BID DOCUMENTS



PROPOSED TYPICAL SECTION APRON (BITUMINOUS) STA 2+82.12 TO 6+32.12

N.T.S.



PROPOSED ROAD TYPICAL SECTION

NBDA ACCESS ROAD STA 0+00 - 12+09.52

NORTH SIDE ACCESS ROAD STA 0+00 - 7+32.56

NORTH SIDE PARKING ACCESS ROAD STA 3+61 - STA 4+13

N.T.S.



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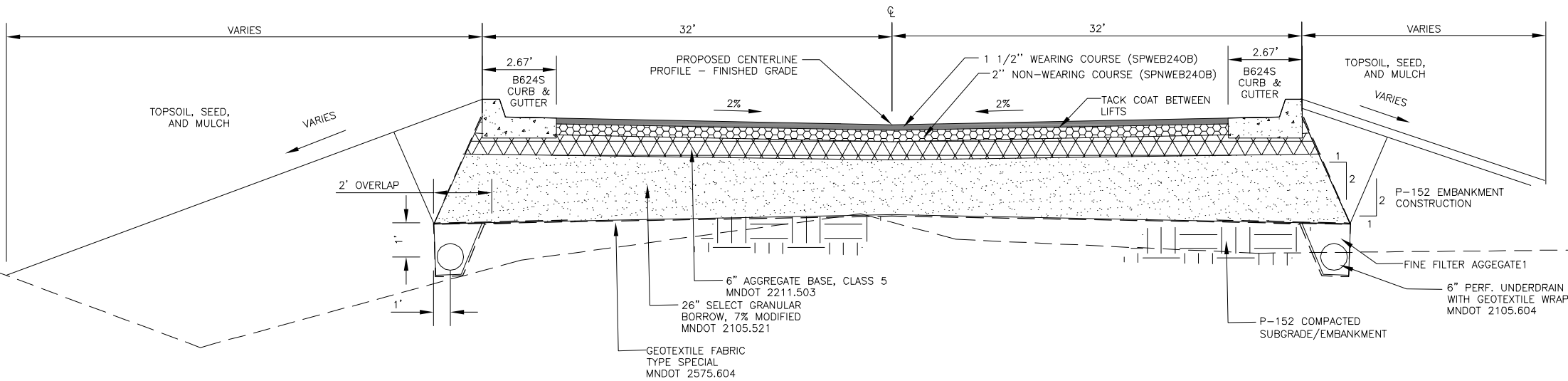
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**TYPICAL
PAVEMENT
SECTIONS**

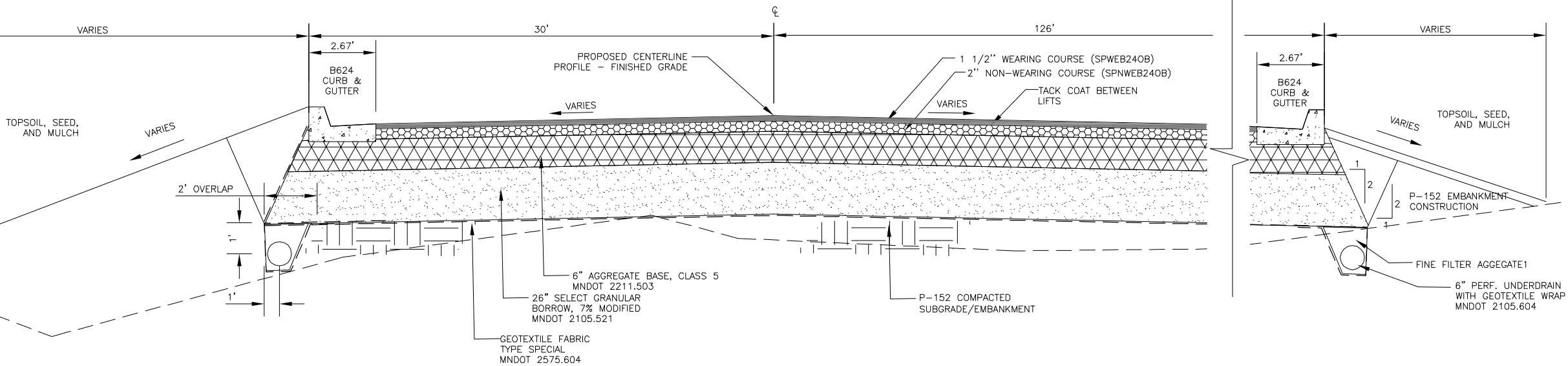
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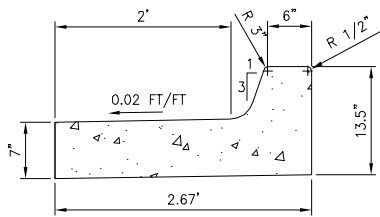
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DOCUMENTS**



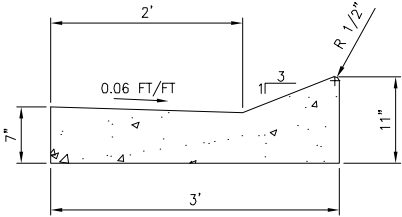
PROPOSED PARKING LOT TYPICAL SECTION
STA 0+21 - 3+61
NORTH SIDE PARKING ACCESS ROAD
N.T.S.



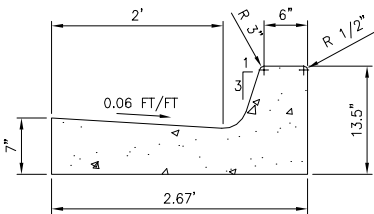
PROPOSED PARKING LOT SECTION
STA -1+80 - 0+00
NORTH SIDE ACCESS ROAD
N.T.S.



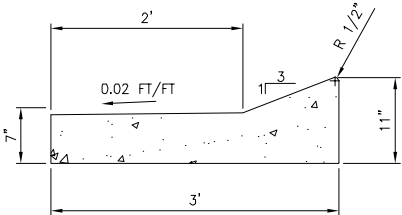
DESIGN B624 - SPILL: CURB AND GUTTER DETAIL
N.T.S.



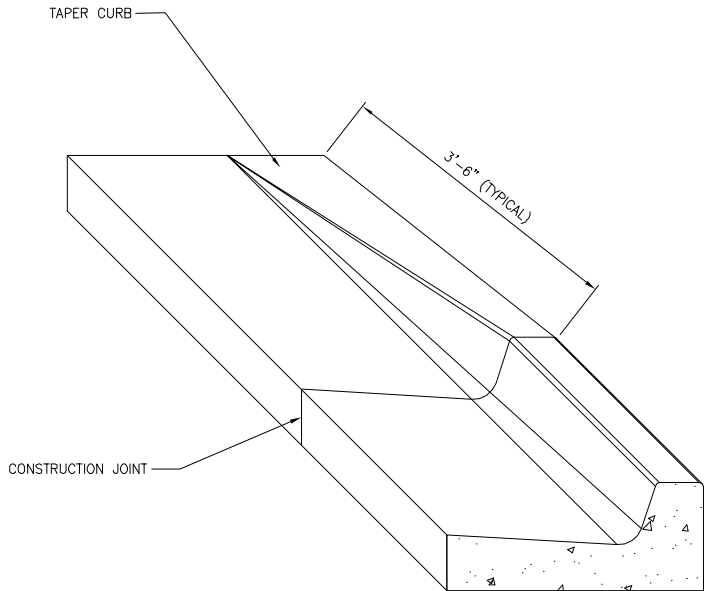
DESIGN D424 - NORMAL: CURB AND GUTTER DETAIL
N.T.S.



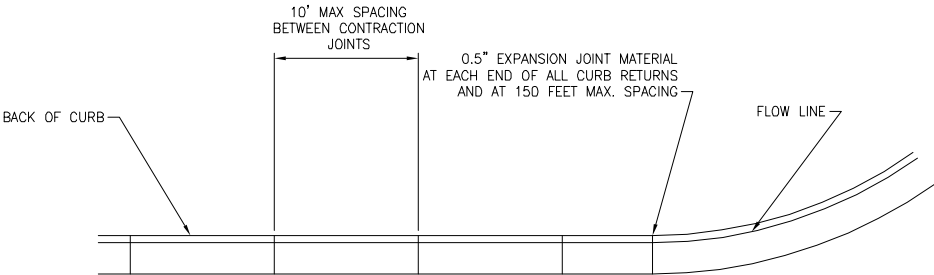
DESIGN B624 - NORMAL: CURB AND GUTTER DETAIL
N.T.S.



DESIGN D424 - SPILL: CURB AND GUTTER DETAIL
N.T.S.



DETAIL OF CURB AND GUTTER TERMINATION
N.T.S.



CURB AND GUTTER LAYOUT DETAIL
N.T.S.

NOTES:

1. SEE PLAN SHEETS FOR LOCATIONS OF EACH TYPE OF CURB AND GUTTER.
2. FORMS MAY BE TILTED TO ACHIEVE THE SPECIFIED SLOPE.

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Signature *Darren K. Christopher*
Typed Name DARREN K. CHRISTOPHER
Date 08/18/2009 Reg. No. 45052

REVISIONS		
NO.	DESCRIPTION	DATE

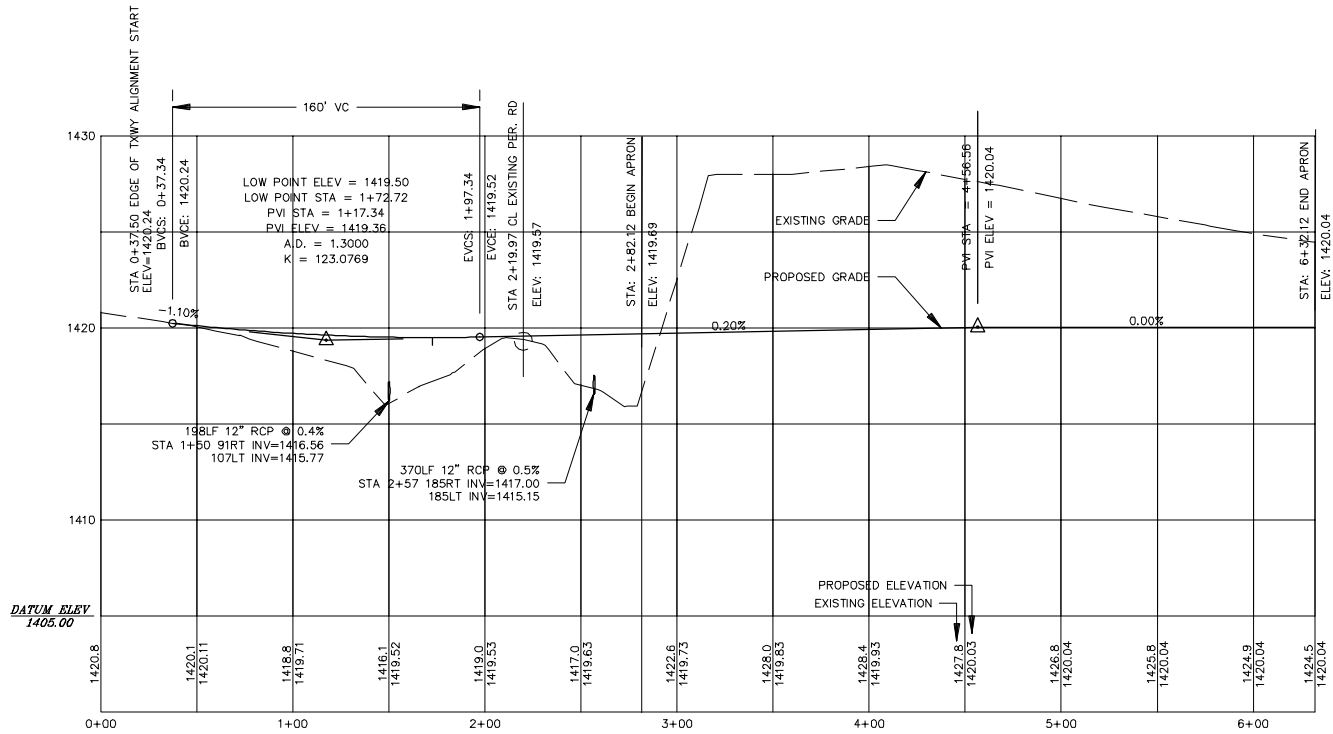
DATE ISSUED: 08-18-2009
REVIEWED BY: MLS
DRAWN BY: JKE
DESIGNED BY: DKC

AEP PROJECT NUMBER
214-1882-077
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SHEET TITLE
**TYPICAL
CURB AND
GUTTER
DETAILS**

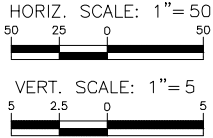
SHEET NUMBER
C205

**BID
DOCUMENTS**



SEE SHEET C500 (GRADING PLAN)
FOR FINISH GRADING

APRON/TAXIWAY PROFILE



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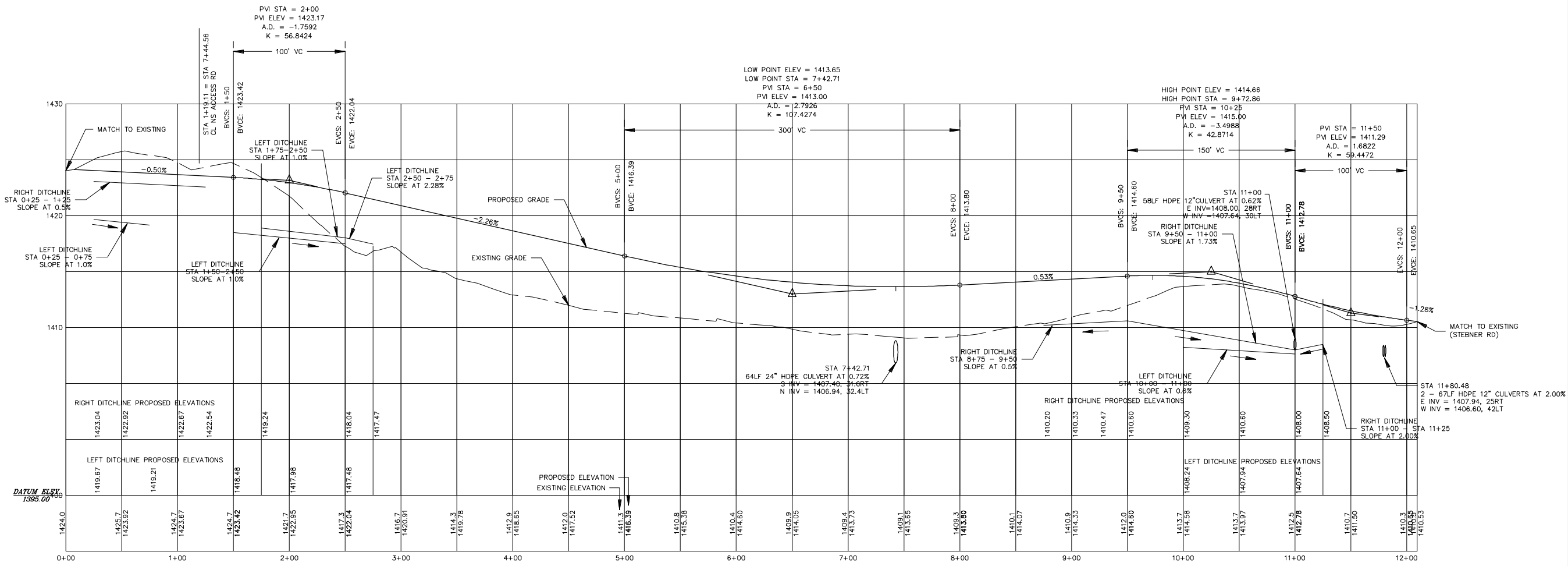
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SHEET TITLE
APRON/
TAXIWAY
PROFILES

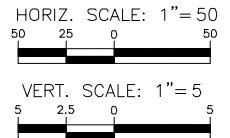
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C300

BID
DOCUMENTS

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NBDA ACCESS ROAD PROFILE



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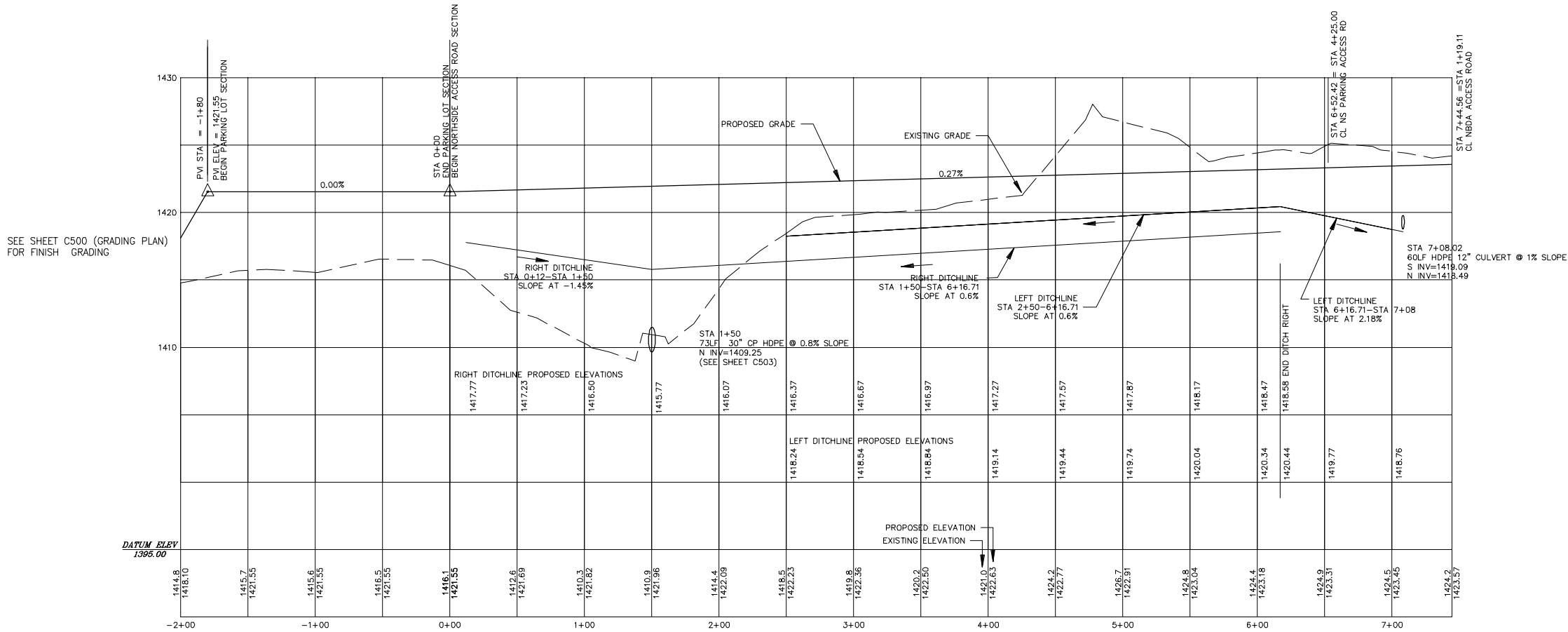
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SHEET TITLE
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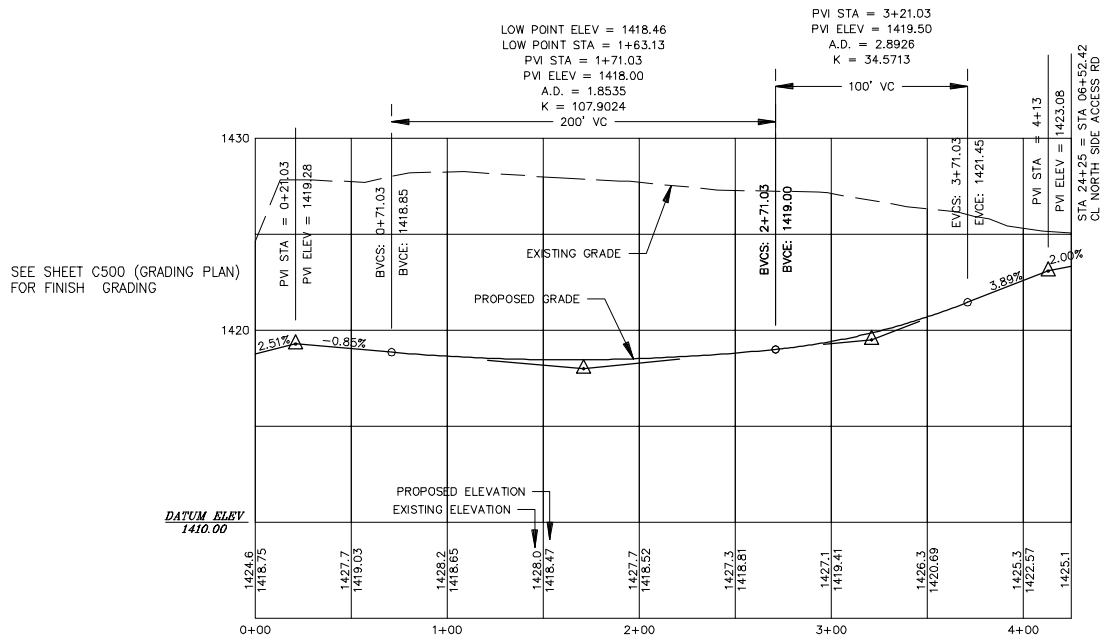
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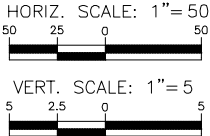
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NORTH SIDE ACCESS ROAD PROFILE



NORTH SIDE PARKING ACCESS ROAD PROFILE



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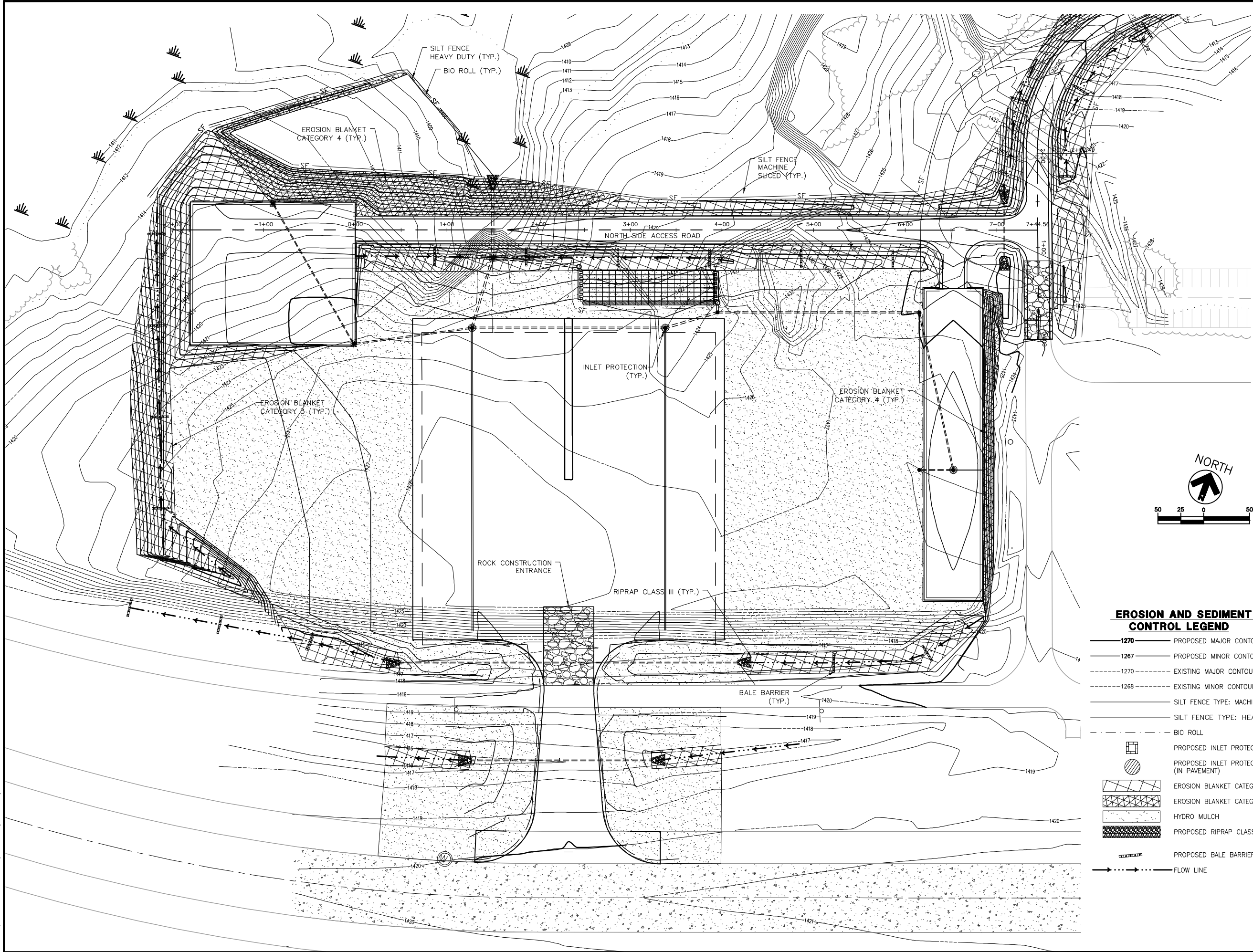
REVISIONS		
NO.	DESCRIPTION	DATE

DATE ISSUED: 08-18-2009
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DRAWN BY: JKE
DESIGNED BY: JEH

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SHEET TITLE
ACCESS
ROAD
PROFILES

SHEET NUMBER
C302
BID
DOCUMENTS



**EROSION AND SEDIMENT
CONTROL LEGEND**

- 1270— PROPOSED MAJOR CONTOUR (5')
- 1267— PROPOSED MINOR CONTOUR (1')
- - -1270- - - EXISTING MAJOR CONTOUR (5')
- - -1268- - - EXISTING MINOR CONTOUR (1')
- SILT FENCE TYPE: MACHINE SLICED
- SILT FENCE TYPE: HEAVY DUTY
- - - BIO ROLL
- [Symbol] PROPOSED INLET PROTECTION
- [Symbol] PROPOSED INLET PROTECTION (IN PAVEMENT)
- [Symbol] EROSION BLANKET CATEGORY 3
- [Symbol] EROSION BLANKET CATEGORY 4
- [Symbol] HYDRO MULCH
- [Symbol] PROPOSED RIPRAP CLASS III
- [Symbol] PROPOSED BALE BARRIER
- FLOW LINE

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Typed Name SCOTT T. STEMPHAR
Date 08/18/09 Reg. No. 47565

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: 08-18-2009

REVIEWED BY: PJM

DRAWN BY: SCA

DESIGNED BY: STS

AEP PROJECT NUMBER

214-1882-093

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SHEET TITLE

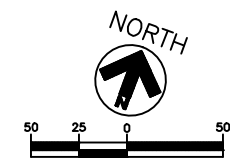
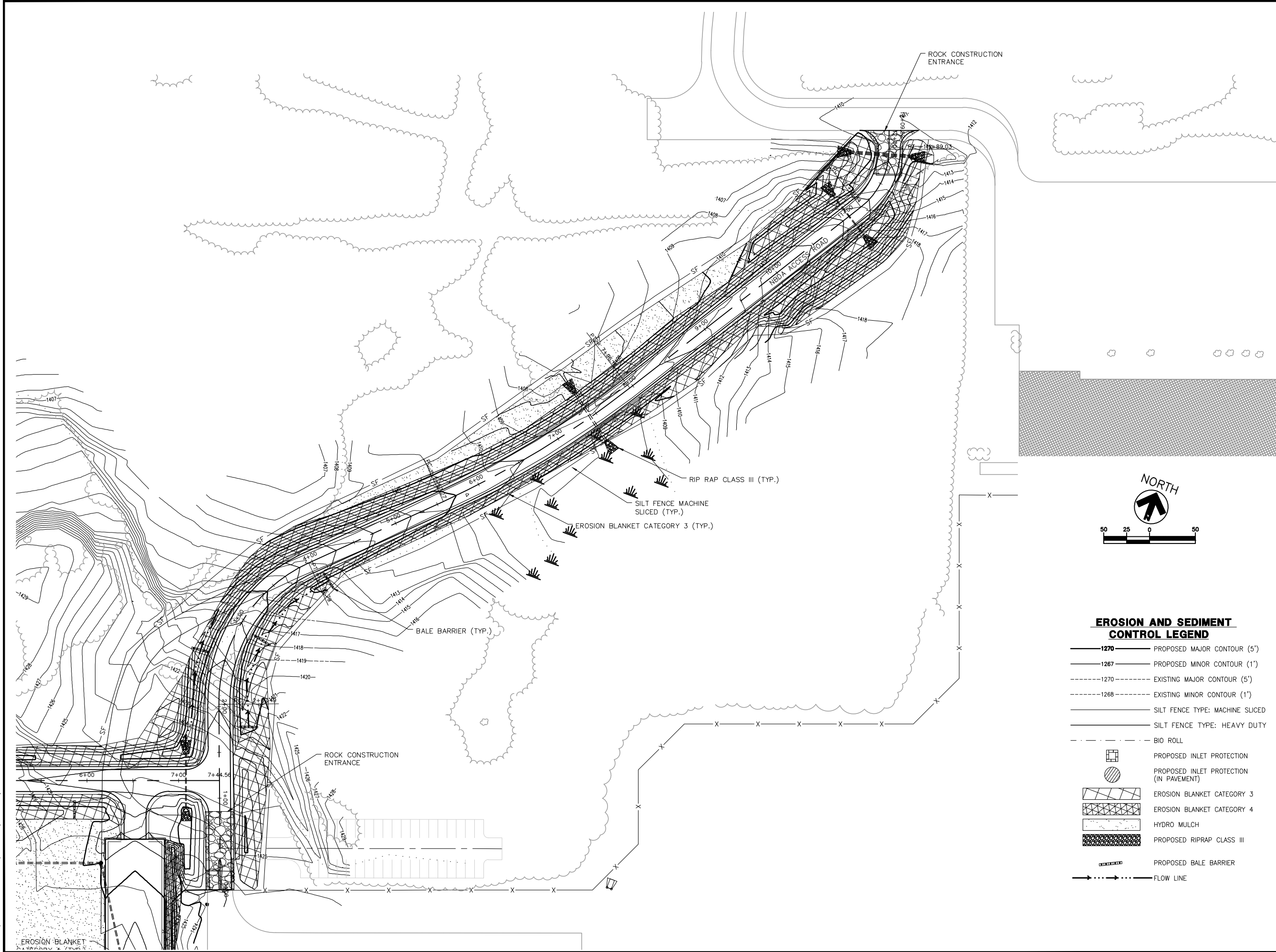
**EROSION AND
SEDIMENT
CONTROL PLAN**

SHEET 1 OF 2

SHEET NUMBER

C400

**BID
DOCUMENTS**



**EROSION AND SEDIMENT
CONTROL LEGEND**

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- 1267 PROPOSED MINOR CONTOUR (1')
- 1270 EXISTING MAJOR CONTOUR (5')
- 1268 EXISTING MINOR CONTOUR (1')
- SILT FENCE TYPE: MACHINE SLICED
- SILT FENCE TYPE: HEAVY DUTY
- BIO ROLL
- PROPOSED INLET PROTECTION
- PROPOSED INLET PROTECTION (IN PAVEMENT)
- EROSION BLANKET CATEGORY 3
- EROSION BLANKET CATEGORY 4
- HYDRO MULCH
- PROPOSED RIPRAP CLASS III
- PROPOSED BALE BARRIER
- FLOW LINE

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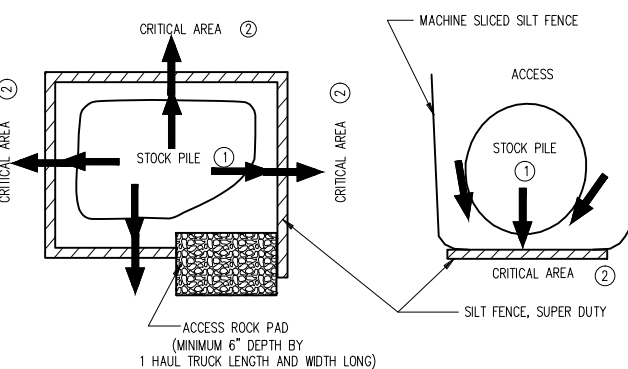
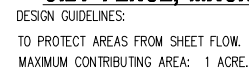
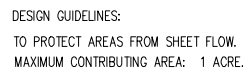
**SHEET TITLE
EROSION AND
SEDIMENT
CONTROL PLAN**

SHEET 2 OF 2
SHEET NUMBER
C401

**BID
DOCUMENTS**



(1) COARSE FILTER AGGREGATE (SPEC. 3149) SHALL BE INCIDENTAL.



**SILT FENCE, SUPER DUTY
STOCK PILE CONTAINMENT**

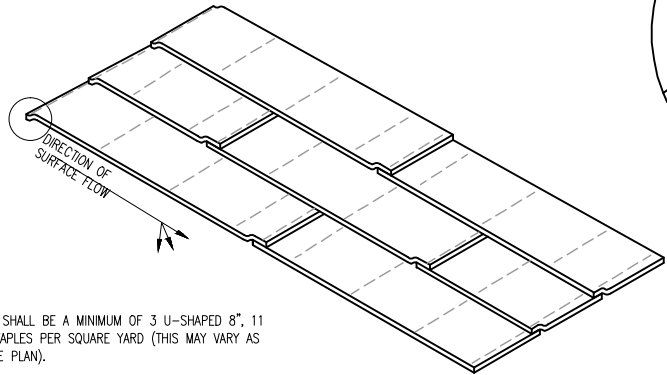
- ① PLACING STOCK PILES NEXT TO AN ENVIRONMENTALLY SENSITIVE AREA IS NOT RECOMMENDED, WHEN THERE ARE NO FEASIBLE ALTERNATIVES, THE SUPER DUTY SLIT FENCE IS TO BE USED AS SHOWN OR AS DIRECTED BY THE ENGINEER.
- ② CRITICAL AREAS INCLUDE WETLANDS, JUDICIAL DITCHES, STREAMS, WATER BODIES, AND OTHER AREAS REQUIRING PROTECTION.
- ③ FOR CERTAIN APPLICATIONS PLASTIC WATER FILLED BARRIERS MAY BE USES IN PLACE OF CONCRETE BARRIER OR LINEAR RUNS OF SHEET PILE.
- ④ INSTALL TO FIT LAND FORM AND ITEM TO PROTECT.



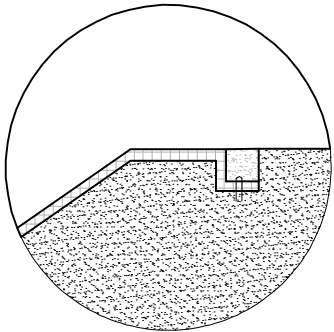
BID DOCUMENTS

ANCHOR TRENCH (SEE DETAIL AND NOTES TO THE RIGHT)

OVERLAP END JOINTS MINIMUM OF 6" AND STAPLE OVERLAP AT 1.5' INTERVALS.



STAPLE DENSITY SHALL BE A MINIMUM OF 3 U-SHAPED 8", 11 GAUGE METAL STAPLES PER SQUARE YARD (THIS MAY VARY AS DIRECTED BY THE PLAN).

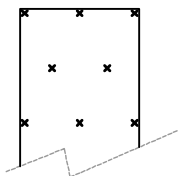


- ANCHOR TRENCH
1. DIG 6" X 6" TRENCH
 2. LAY BLANKET IN TRENCH
 3. STAPLE AT 1.5' INTERVALS
 4. BACKFILL WITH NATURAL SOIL AND COMPACT
 5. BLANKET LENGTH SHALL NOT EXCEED 100' WITHOUT AN ANCHOR TRENCH

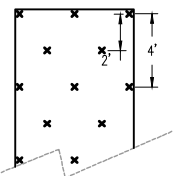
OVERLAP LONGITUDINAL JOINTS MINIMUM OF 6"

EROSION BLANKET INSTALLATION

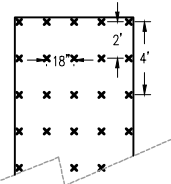
SLOPES FLATTER THAN 1:2 (1.2 STAPLES PER SQ. YD.)



SLOPES 1:2 TO 1:1 (1.7 STAPLES PER SQ. YD.)

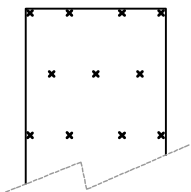


CHANNEL AND DITCH APPLICATIONS (3.5 STAPLES PER SQ. YD.)

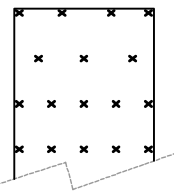


STANDARD 6' BLANKET

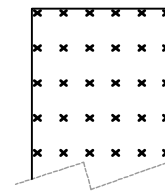
SLOPES FLATTER THAN 1:2 (1.2 STAPLES PER SQ. YD.)



SLOPES 1:2 TO 1:1 (1.7 STAPLES PER SQ. YD.)

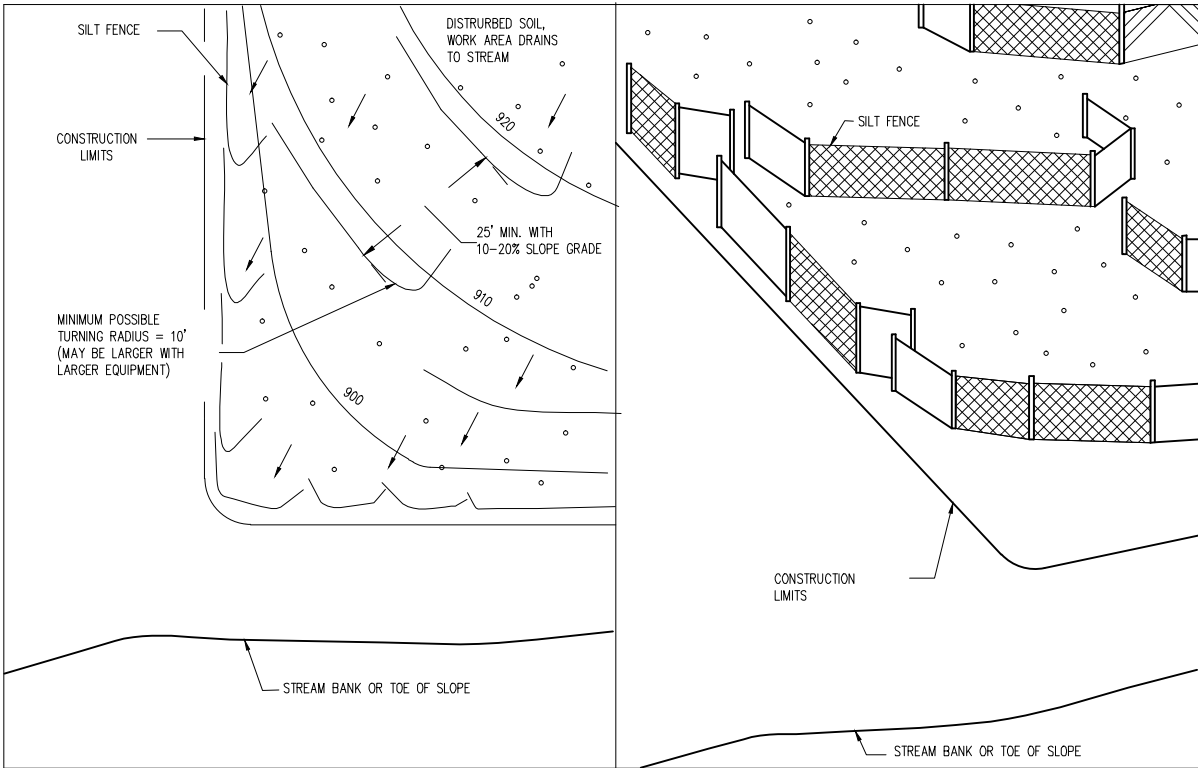


CHANNEL AND DITCH APPLICATIONS (3.5 STAPLES PER SQ. YD.)



BLANKET STAPLING PATTERN

STANDARD 8' BLANKET



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DRAWN BY: SCA

DESIGNED BY: DJL

AEP PROJECT NUMBER

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SHEET TITLE
**EROSION, AND
SEDIMENT
CONTROL NOTES
AND DETAILS
2 OF 7**

SHEET NUMBER

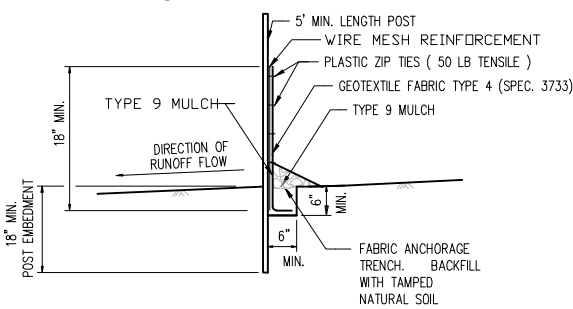
C403

**BID
DOCUMENTS**

NOTES:

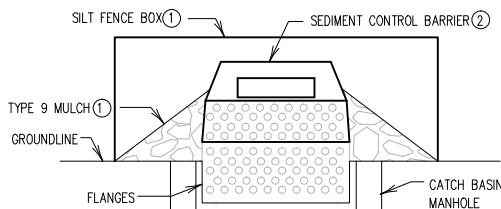
THE SEDIMENT CONTROL BARRIER SHALL BE A METAL OR PLASTIC/POLYETHYLENE RISER SIZED TO FIT INSIDE THE CATCH BASIN/MANHOLE; HAVE PERFORATIONS TO ALLOW FOR WATER INFILTRATION; HAVE AN OVERFLOW OPENING, FLANGES AND A LID/COVER.

- ① USE INLET PROTECTION TYPE A OR TYPE 9 MULCH, AS DIRECTED BY THE ENGINEER.
② PAID FOR AS SEDIMENT CONTROL BARRIER.



INLET PROTECTION TYPE A (SILT FENCE TO PROTECT DROP INLETS)

USE WHERE INLET DRAINS AN AREA WITH SLOPES AT 1:3 OR LESS
(TYPE A SPEC. 3891)



SEDIMENT CONTROL BARRIER

NOTES:

-INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER.
-MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENTS EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.
-WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

INLET PROTECTION, TYPE C

DETAIL
(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX)

NOTES:

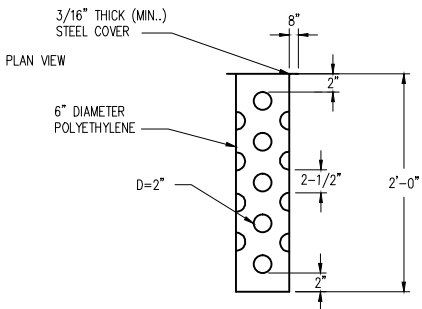
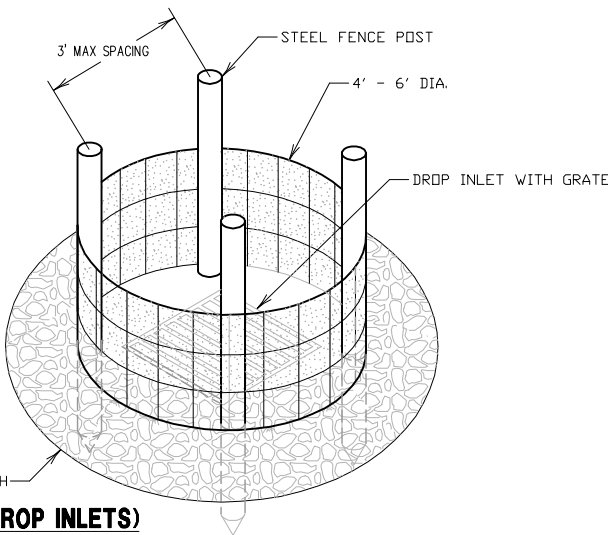
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-WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

- ① FINISHED SIZE, INCLUDING POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
② FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" X 4".
③ INSTALLATION NOTES:

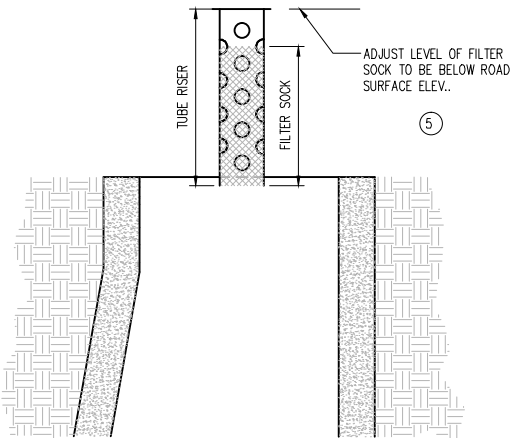
DO NOT INSTALL PROTECTION IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CLINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.



TUBE RISER



SECTION
(UP POSITION)

WIMCO EROSION BARRIER POP-UP HEAD

PAYMENT SHALL INCLUDE ALL MATERIALS, FILLING OF LOG, PLACEMENT, MAINTENANCE, & REMOVAL. 80% OF BID PRICE SHALL BE PAID UPON PROPER PLACEMENT WITH THE FINAL 20% PAID UPON REMOVAL.

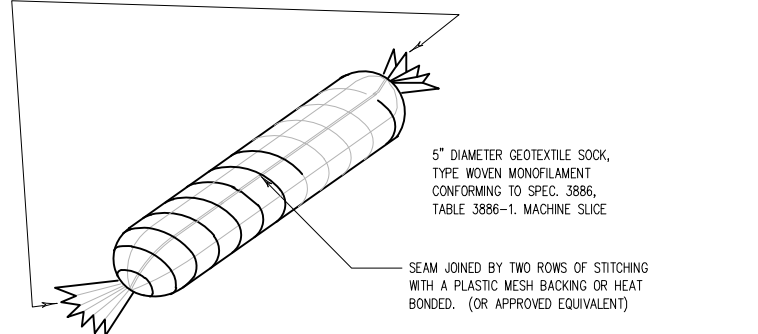
FILL ROCK LOG WITH 45 LBS. OF OPEN GRADED AGGREGATE CONSISTING OF SOUND, DURABLE PARTICLES OF CRUSHED QUARRY ROCK OR GRAVEL CONFORMING TO THE FOLLOWING GRADATION.

GRADATION	
SIEVE SIZE	PERCENT PASSING
1 1/2 INCH	100
1 INCH	95-100
3/4 INCH	65-95
3/8 INCH	30-65
NO. 4	10-35
NO. 10	3-20
NO. 40	0-8
NO. 200	0-3

NOTE: CRUSHED CONCRETE OR BITUMINOUS SHALL NOT BE USED FOR OPEN GRADED AGGREGATE.

INLET PROTECTION WITH ROCK LOG

ENDS SECURELY CLOSED TO PREVENT LOSS OF OPEN GRADED AGGREGATE FILL. SECURED WITH 50 PSI. ZIP TIE.



TEMPORARY DITCH CHECK, TYPE ROCK LOG DETAIL

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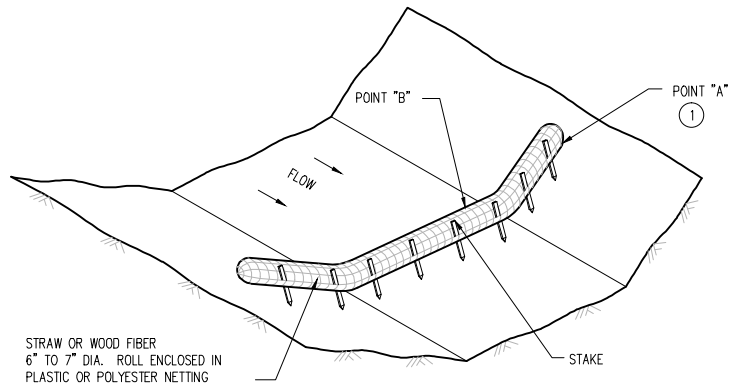
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SHEET TITLE
EROSION, AND SEDIMENT CONTROL NOTES AND DETAILS
3 OF 7

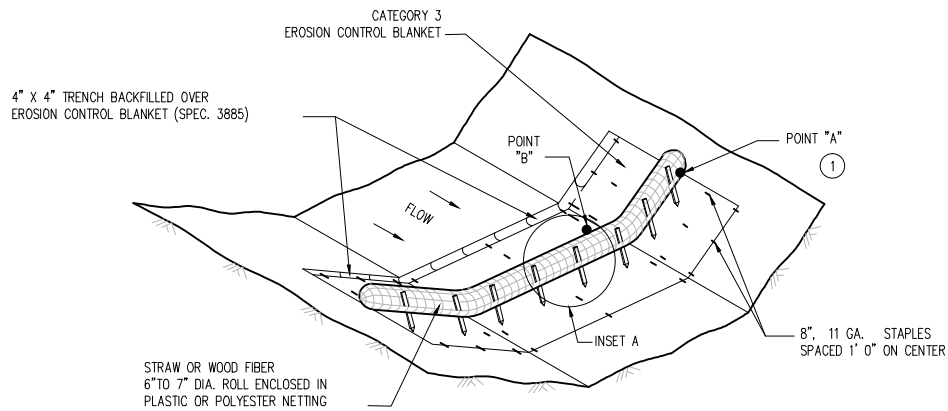
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C404

BID DOCUMENTS

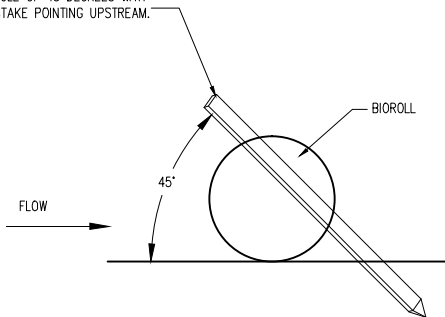


TYPE 2: BIOROLL DITCH CHECK
USE ON ROUGH GRADED AREAS



TYPE 3: BIOROLL BLANKET SYSTEM DITCH CHECK

0.5" X 2" X 16" LONG WOODEN STAKES AT 1' 0" SPACING MAXIMUM. STAKES SHALL BE DRIVEN THROUGH THE BACK HALF OF THE BIOROLL AT AN ANGLE OF 45 DEGREES WITH THE TOP OF THE STAKE POINTING UPSTREAM.



BIOROLL STAKING DETAIL

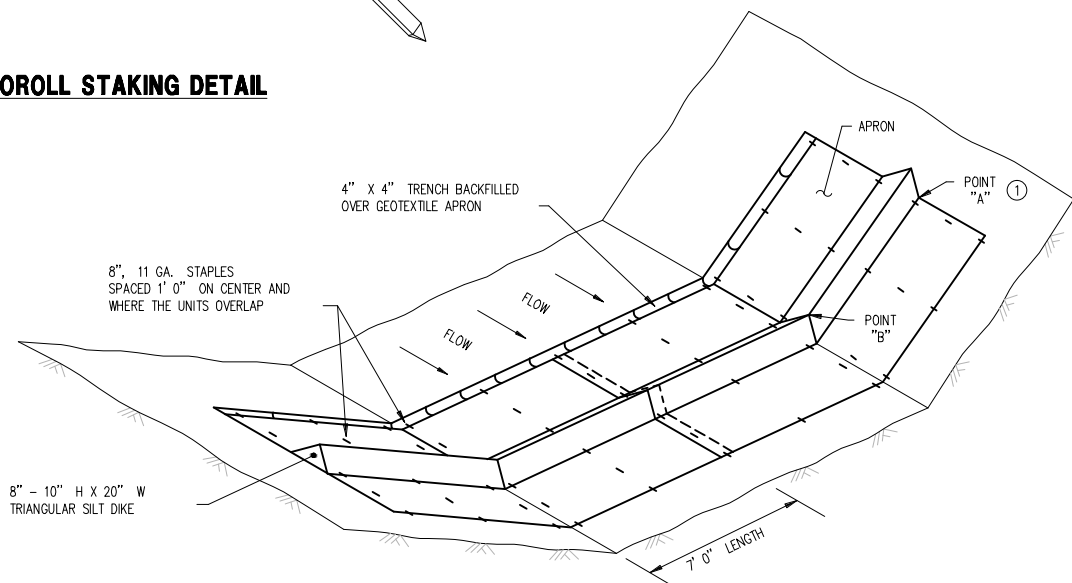
NOTES:

SEE SPECS. 2573, 3885, 3886 & 3889.

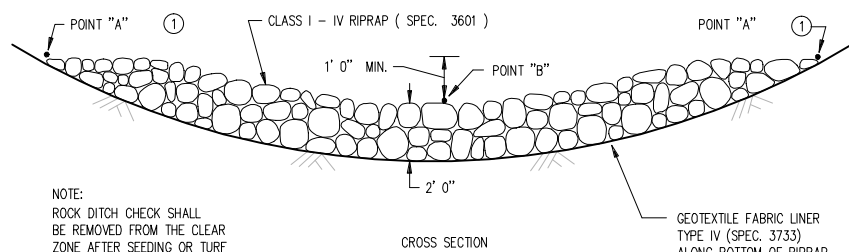
SPACING BETWEEN EACH DITCH CHECK SHOULD BE DETERMINED FROM SPACING FORMULA:

$$\text{SPACING OF DITCH CHECKS (FT.)} = \frac{\text{DITCH CHECK HEIGHT (FT)}}{\% \text{ CHANNEL SLOPE}} \times 100$$

- ① POINT "A" MUST BE A MINIMUM OF 6 INCHES HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
- ② CLASS I - IV RIPRAP (SPEC. 3601) WITH GEOTEXTILE FABRIC LINER, TYPE IV (SPEC. 3733).
- ③ THE ROCK WEEPER FILTERS SEDIMENT OUT OF THE WATER BETTER THAN THE OTHER DITCH CHECKS. THE ROCK WEEPER COULD BE USED AS A PERMANENT WATER FILTERING FEATURE.

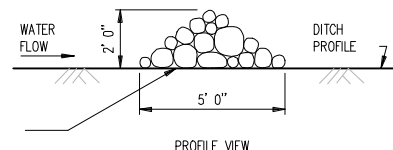


GEOTEXTILE TRIANGULAR DIKE
(TYPE 6 SPEC. 3889)



NOTE: ROCK DITCH CHECK SHALL BE REMOVED FROM THE CLEAR ZONE AFTER SEEDING OR TURF IS ESTABLISHED AND PRIOR TO FINAL ACCEPTANCE.

ROCK CHECK
(TYPE 7 SPEC. 3889)



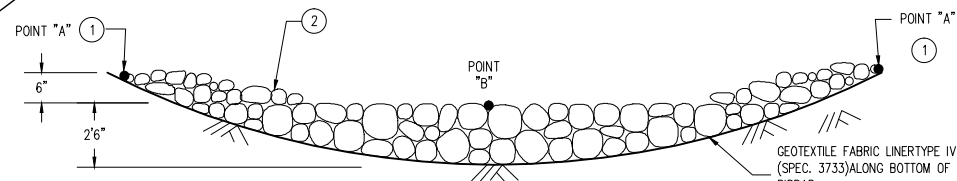
NOTES:

SEE MNDOT SPEC. 3889.

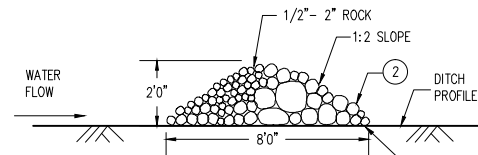
SPACING BETWEEN EACH DITCH CHECK SHOULD BE DETERMINED FROM SPACING FORMULA:

$$\text{SPACING OF DITCH CHECKS (FT.)} = \frac{\text{HEIGHT OF DITCH CHECK (FT)} \times 100}{\text{DITCH GRADE IN PERCENT}}$$

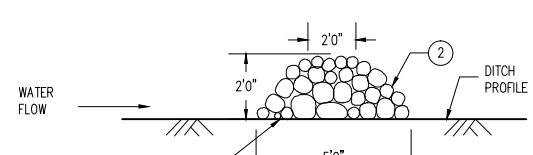
- ① POINT A MUST BE 1' 0" MIN. HIGHER THAN POINT B TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
- ② TWO 2 IN. X 2 IN. WOOD STAKES OR REINFORCING BARS IN EACH BALE AND EMBEDDED IN THE GROUND 10 IN. MINIMUM.



CROSS SECTION (ROCK WEEPER AND ROCK CHECK)



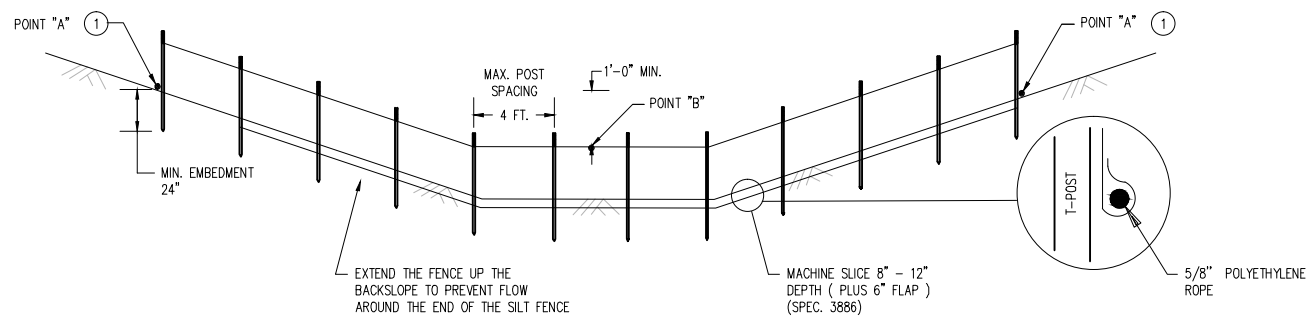
TYPE 5: ROCK WEEPER PROFILE VIEW



TYPE 7: ROCK CHECK PROFILE VIEW

ROCK WEEPER AND ROCK CHECK DITCH CHECKS

USE ON ROUGH GRADED AREAS



NOTE: WHEN SEDIMENT BUILD UP REACHES 8 INCHES OR 1/3 OF SILT FENCE HEIGHT, THE SILT FENCE MUST BE CLEANED OUT OR REPLACED.

MACHINE SLICED SILT FENCE
(TYPE 1 SPEC. 3889)

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NORTH BUSINESS DEVELOPMENT AREA

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 Professional Engineer under the laws of the State of Minnesota.

Signature *Scott T. Stempihar*
Typed Name SCOTT T. STEMPIHAR

Date 08/18/09 Reg. No. 47565

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: 08-18-2009

REVIEWED BY: PJM

DRAWN BY: SCA

DESIGNED BY: DJL

AEP PROJECT NUMBER

214-1882-093

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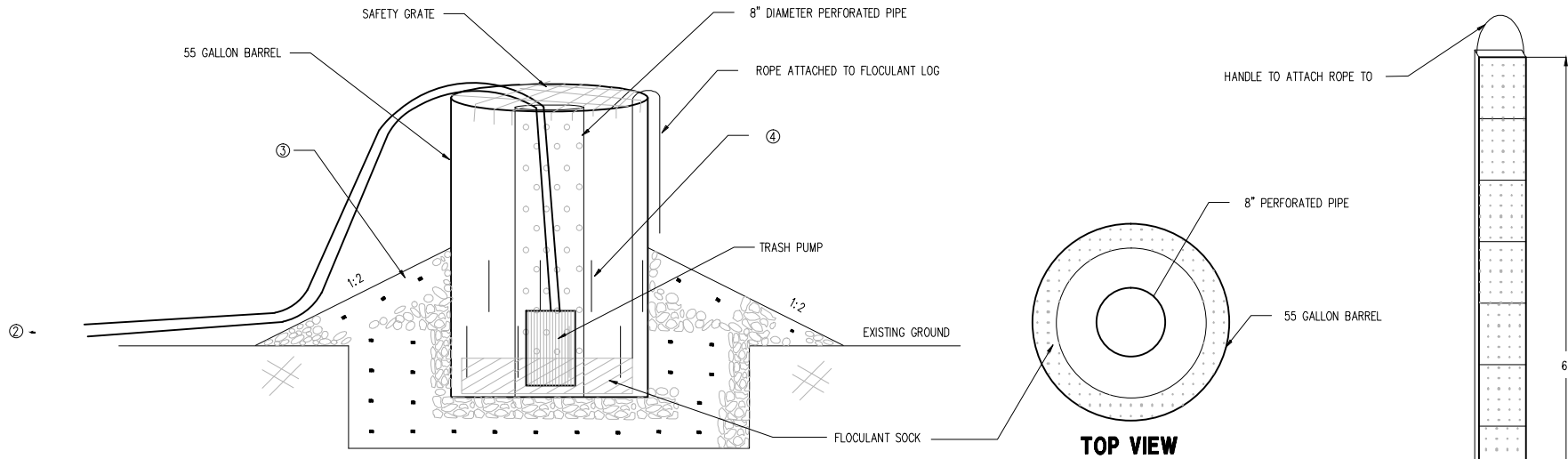
SHEET TITLE

EROSION, AND SEDIMENT CONTROL NOTES AND DETAILS
4 OF 7

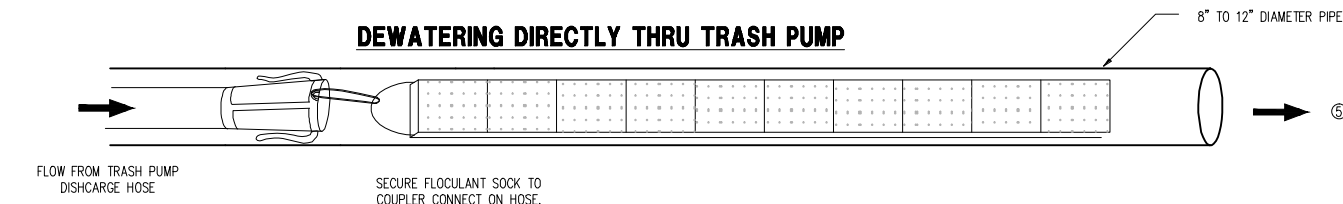
SHEET NUMBER

C405

BID DOCUMENTS

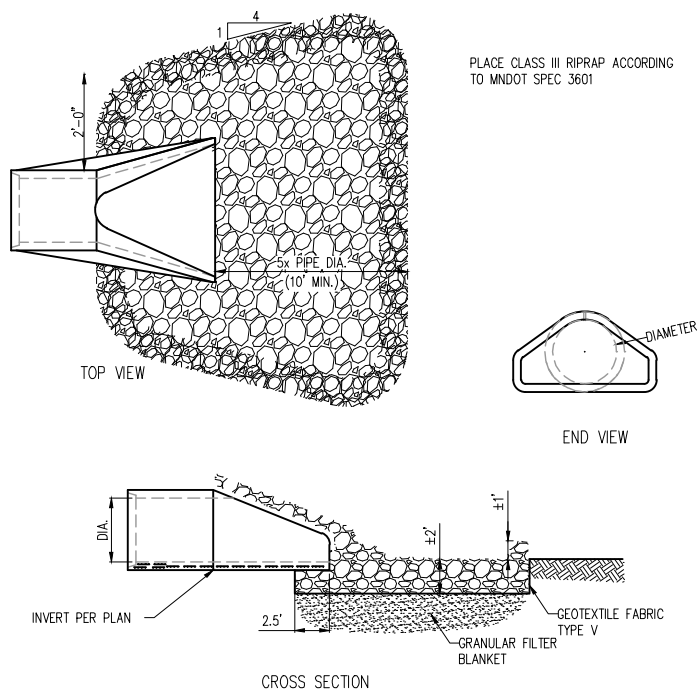


SUMP DEWATERING FOR POND



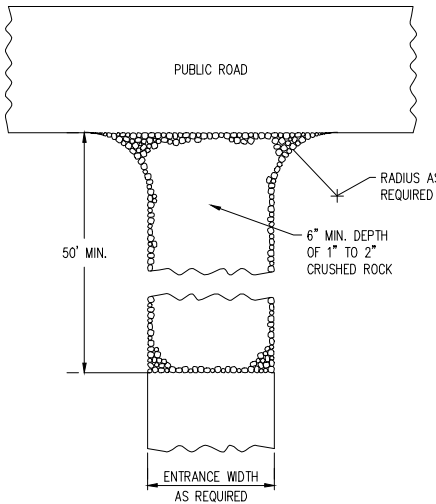
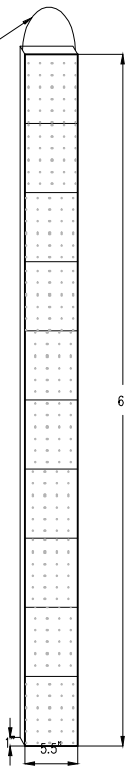
NOTES

1. DEWATERING DEVICE SHOULD BE PLACED AT THE LOW POINT OF THE AREA TO DRAIN
2. MUST DISCHARGE WATER TO AN APPROPRIATE LOCATION SUCH AS A SMALL SETTING BASIN. DO NOT DISCHARGE TO AN EXISTING SURFACE WATER. MUST USE APPROPRIATE ENERGY DISSIPATION TO PREVENT SOIL SCOUR AND TRANSPORT.
3. 1"-2" DIAMETER CLEAN ROCK. ROCK IS TO BE PLACED 2 INCHES ABOVE HIGHEST SUT IN BARREL.
4. 12" SLITS CUT INTO LOWER HALF OF BARREL.
5. MUST DISCHARGE WATER TO A SEDIMENT BASIN OR SEDIMENT TRAP. DO NOT DISCHARGE DIRECTLY TO A WATER BODY.



RIPRAP APRON

TYPICAL FLOCULANT SOCK



ROCK CONSTRUCTION ENTRANCE

- NOTES:
- SEE SPECS. 2573, 3892, & 3894.

- ① ROCKS AT ENTRANCE CLEAN WORKSITE MUD OFF OF TRUCK TIRES BEFORE TRUCKS ENTER MAIN ROAD. KEEPING MUD OFF THE ROAD WILL PREVENT AUTO DAMAGE AND KEEP CONSTRUCTION SEDIMENT OUT OF DRAINAGE SYSTEMS AND WETLANDS. GEOTEXTILE MAY BE PLACED UNDER THE ROCK TO KEEP ROCKS SEPARATE FROM SOIL.

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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 Professional Engineer under the laws of the State of Minnesota.

Signature *Scott T. Stempihar*
Typed Name SCOTT T. STEMPIHAR
Date 08/18/09 Reg. No. 47565

REVISIONS

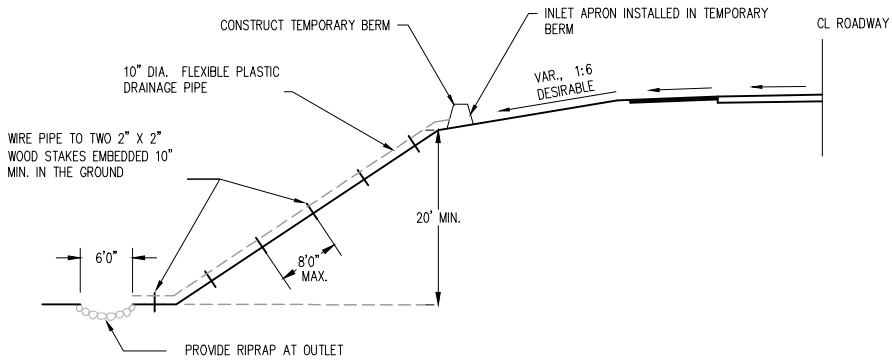
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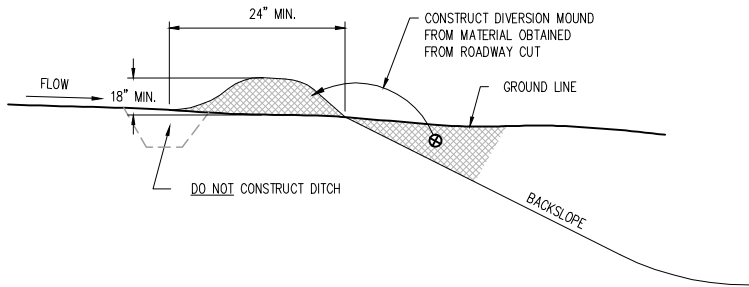
SHEET TITLE
**EROSION, AND
SEDIMENT
CONTROL NOTES
AND DETAILS
5 OF 7**

SHEET NUMBER
C406
**BID
DOCUMENTS**



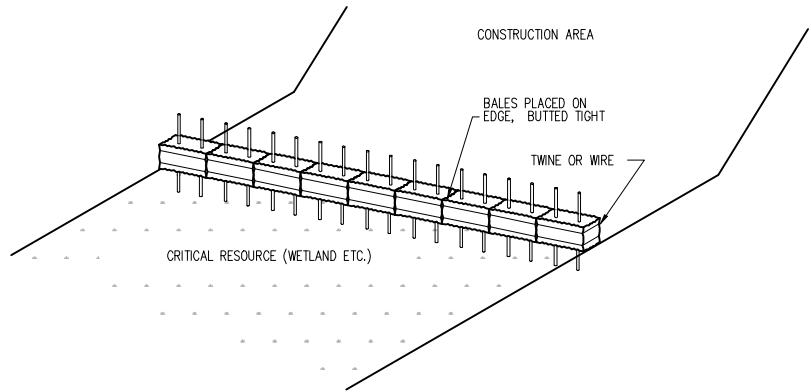
TEMPORARY DOWN DRAIN ON FILL SLOPE
(SPEC. 3892)

DESIGN GUIDELINES:
STORM FREQUENCY: 2 YEAR - 24 HOUR
MAXIMUM DRAINAGE AREA: 3 ACRES

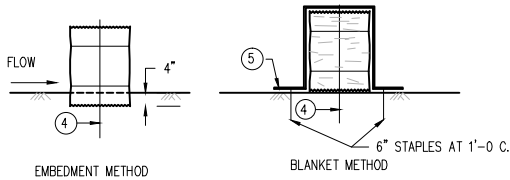


DIVERSION MOUND

DESIGN GUIDELINES:
STORM FREQUENCY: 10 YEAR - 24 HOUR
MAXIMUM DRAINAGE AREA: 5 ACRES MAXIMUM
DIVERSION: GRADE 5%



BALE BARRIERS
TO BE USED FOR CRITICAL PERIMETER CONTROL AREAS
(SPEC. 2573)



BALE BARRIER DETAIL
APPROX. BALE SIZE: 14" X 18" X 36" LONG

NOTES:

SEE SPECS. 2573, 3892, & 3894.

- ROCKS AT ENTRANCE CLEAN WORKSITE MUD OFF OF TRUCK TIRES BEFORE TRUCKS ENTER MAIN ROAD. KEEPING MUD OFF THE ROAD WILL PREVENT AUTO DAMAGE AND KEEP CONSTRUCTION SEDIMENT OUT OF DRAINAGE SYSTEMS AND WETLANDS.
- W = 10 FT. MIN., 20 FT. MAX.
- D = 2 FT.
- TWO 2 IN. X 2 IN. WOOD STAKES OR REINFORCING BARS IN EACH BALE EMBEDDED 10 INCHES MINIMUM IN THE GROUND.
- PLACE A CATEGORY 3 EROSION CONTROL BLANKET, 6 FT. WIDE MINIMUM, OVER THE BALE INSTEAD OF TRENCHING.

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SHEET TITLE

**EROSION, AND
SEDIMENTATION
CONTROL NOTES
AND DETAILS
6 OF 7**

SHEET NUMBER

C407

**BID
DOCUMENTS**

GENERAL NOTES

1. THESE PLANS ARE PART OF THE GENERAL STORM WATER PERMIT FOR CONSTRUCTION ACTIVITY ISSUED BY THE MINNESOTA POLLUTION CONTROL AGENCY (MPCA). FAILURE TO COMPLY WITH THE CONDITIONS SET FORTH IN THESE PLANS IS A VIOLATION OF THE PERMIT.
2. SEDIMENT AND EROSION CONTROL BEST MANAGEMENT PRACTICES (BMP'S) SHALL BE CONSTRUCTED AND IMPLEMENTED IN ACCORDANCE WITH THE MPCA REFERENCE MANUAL. PROTECTING WATER QUALITY IN URBAN AREAS BEST MANAGEMENT PRACTICES FOR MINNESOTA (*MPCA MANUAL*) AVAILABLE AT: HTTP://WWW.PCA.STATE.MN.US/WATER/PUBS/SW-BMPMANUAL.HTML

SUBSEQUENT NOTES ON SPECIFIC BMP'S REFERENCE SECTION NUMBERS OF THE MPCA MANUAL.

3. SITE DISTURBANCE INCLUDES THE FOLLOWING ACREAGE:

TYPE OF AREA	EXISTING AREA	COMPLETED AREA	CHANGED AREA
IMPERVIOUS	1.9 AC	8.0 AC	6.1 AC
PERVIOUS	11.3 AC	5.2 AC	-6.1 AC
TOTAL	13.2 AC	13.2 AC	

PERMIT EXCERPTS

THE FOLLOWING SECTIONS ARE INCLUDED IN THE GENERAL REQUIREMENTS OF THE STORM WATER PERMIT FOR CONSTRUCTION ACTIVITY

PART III. STORMWATER DISCHARGE DESIGN REQUIREMENTS

D. RECORD RETENTION

THE SWPPP (ORIGINAL OR COPIES) INCLUDING, ALL CHANGES TO IT, AND INSPECTIONS AND MAINTENANCE RECORDS MUST BE KEPT AT THE SITE DURING CONSTRUCTION BY THE PERMITTEE WHO HAS OPERATIONAL CONTROL OF THAT PORTION OF THE SITE. THE SWPPP CAN BE KEPT IN EITHER THE FIELD OFFICE OR IN AN ON SITE VEHICLE DURING NORMAL WORKING HOURS.

ALL OWNER(S) MUST KEEP THE SWPPP, ALONG WITH THE FOLLOWING ADDITIONAL RECORDS, ON FILE FOR THREE (3) YEARS AFTER SUBMITTAL OF THE NOT AS OUTLINED IN PART II.C. THIS DOES NOT INCLUDE ANY RECORDS AFTER SUBMITTAL OF THE NOT.

1. ANY OTHER PERMITS REQUIRED FOR THE PROJECT;
2. RECORDS OF ALL INSPECTION AND MAINTENANCE CONDUCTED DURING CONSTRUCTION (SEE PART IV.E. INSPECTIONS AND MAINTENANCE);
3. ALL PERMANENT OPERATION AND MAINTENANCE AGREEMENTS THAT HAVE BEEN IMPLEMENTED, INCLUDING ALL RIGHT OF WAY, CONTRACTS, COVENANTS AND OTHER BINDING REQUIREMENTS REGARDING PERPETUAL MAINTENANCE; AND
4. ALL REQUIRED CALCULATIONS FOR DESIGN OF THE TEMPORARY AND PERMANENT STORMWATER MANAGEMENT SYSTEMS.

PART IV. CONSTRUCTION ACTIVITY REQUIREMENTS

B. EROSION PREVENTION PRACTICES

1. THE PERMITTEE(S) MUST PLAN FOR AND IMPLEMENT APPROPRIATE CONSTRUCTION PHASING, VEGETATIVE BUFFER STRIPS, HORIZONTAL SLOPE GRADING, AND OTHER CONSTRUCTION PRACTICES THAT MINIMIZE EROSION, SO THAT THE INSPECTION AND MAINTENANCE REQUIREMENTS OF PART IV.E. ARE COMPLIED WITH. THE LOCATION OF AREAS NOT TO BE DISTURBED MUST BE DELINEATED (E.G. WITH FLAGS, STAKES, SIGNS, SILT FENCE ETC.) ON THE DEVELOPMENT SITE BEFORE WORK BEGINS.
2. ALL EXPOSED SOIL AREAS MUST BE STABILIZED AS SOON AS POSSIBLE TO LIMIT SOIL EROSION BUT IN NO CASE LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. TEMPORARY STOCKPILES WITHOUT SIGNIFICANT SILT, CLAY OR ORGANIC COMPONENTS (E.G., CLEAN AGGREGATE STOCKPILES, DEMOLITION CONCRETE STOCKPILES, SAND STOCKPILES) AND THE CONSTRUCTED BASE COMPONENTS OF ROADS, PARKING LOTS AND SIMILAR SURFACES ARE EXEMPT FROM THIS REQUIREMENT BUT MUST COMPLY WITH PART IV.C.5.

3. THE NORMAL WETTED PERIMETER OF ANY TEMPORARY OR PERMANENT DRAINAGE DITCH OR SWALE THAT DRAINS WATER FROM ANY PORTION OF THE CONSTRUCTION SITE, OR DIVERTS WATER AROUND THE SITE, MUST BE STABILIZED WITHIN 200 LINEAL FEET FROM THE PROPERTY EDGE, OR FROM THE POINT OF DISCHARGE INTO ANY SURFACE WATER. STABILIZATION OF THE LAST 200 LINEAL FEET MUST BE COMPLETED WITHIN 24 HOURS AFTER CONNECTING TO A SURFACE WATER.

STABILIZATION OF THE REMAINING PORTIONS OF ANY TEMPORARY OR PERMANENT DITCHES OR SWALES MUST BE COMPLETE WITHIN 14 DAYS AFTER CONNECTING TO A SURFACE WATER AND CONSTRUCTION IN THAT PORTION OF THE DITCH HAS TEMPORARILY OR PERMANENTLY CEASED.

TEMPORARY OR PERMANENT DITCHES OR SWALES THAT ARE BEING USED AS A SEDIMENT CONTAINMENT SYSTEM (WITH PROPERLY DESIGNED ROCK DITCH CHECKS, BIO ROLLS, SILT DIKES ETC.) DO NOT NEED TO BE STABILIZED. THESE AREAS MUST BE STABILIZED WITHIN 24 HOURS AFTER NO LONGER BEING USED AS A SEDIMENT CONTAINMENT SYSTEM.

4. PIPE OUTLETS MUST BE PROVIDED WITH TEMPORARY OR PERMANENT ENERGY DISSIPATION WITHIN 24 HOURS AFTER CONNECTION TO A SURFACE WATER.

C. SEDIMENT CONTROL PRACTICES

1. SEDIMENT CONTROL PRACTICES MUST MINIMIZE SEDIMENT FROM ENTERING SURFACE WATERS, INCLUDING CURB AND GUTTER SYSTEMS AND STORM SEWER INLETS.

a. TEMPORARY OR PERMANENT DRAINAGE DITCHES AND SEDIMENT BASINS THAT ARE DESIGNED AS PART OF A SEDIMENT CONTAINMENT SYSTEM (E.G., DITCHES WITH ROCK CHECK DAMS) REQUIRE SEDIMENT CONTROL PRACTICES ONLY AS APPROPRIATE FOR SITE CONDITIONS.

b. IF THE DOWN GRADIENT TREATMENT SYSTEM IS OVERLOADED, ADDITIONAL UPGRADIENT SEDIMENT CONTROL PRACTICES OR REDUNDANT BMPS MUST BE INSTALLED TO ELIMINATE THE OVERLOADING, AND THE SWPPP MUST BE AMENDED TO IDENTIFY THESE ADDITIONAL PRACTICES AS REQUIRED IN PART III.A.4, A. THROUGH C.

c. IN ORDER TO MAINTAIN SHEET FLOW AND MINIMIZE RILLS AND/OR GULLIES, THERE SHALL BE NO UNBROKEN SLOPE LENGTH OF GREATER THAN 75 FEET FOR SLOPES WITH A GRADE OF 3:1 OR STEEPER.

2. SEDIMENT CONTROL PRACTICES MUST BE ESTABLISHED ON ALL DOWN GRADIENT PERIMETERS BEFORE ANY UPGRADIENT LAND DISTURBING ACTIVITIES BEGIN. THESE PRACTICES SHALL REMAIN IN PLACE UNTIL FINAL STABILIZATION HAS BEEN ESTABLISHED IN ACCORDANCE WITH PART IV.G.

3. THE TIMING OF THE INSTALLATION OF SEDIMENT CONTROL PRACTICES MAY BE ADJUSTED TO ACCOMMODATE SHORT-TERM ACTIVITIES SUCH AS CLEARING OR GRUBBING, OR PASSAGE OF VEHICLES. ANY SHORT-TERM ACTIVITY MUST BE COMPLETED AS QUICKLY AS POSSIBLE AND THE SEDIMENT CONTROL PRACTICES MUST BE INSTALLED IMMEDIATELY AFTER THE ACTIVITY IS COMPLETED. HOWEVER, SEDIMENT CONTROL PRACTICES MUST BE INSTALLED BEFORE THE NEXT PRECIPITATION EVENT EVEN IF THE ACTIVITY IS NOT COMPLETE.

4. ALL STORM DRAIN INLETS MUST BE PROTECTED BY APPROPRIATE BMPS DURING CONSTRUCTION UNTIL ALL SOURCES WITH POTENTIAL FOR DISCHARGING TO THE INLET HAVE BEEN STABILIZED. INLET PROTECTION MAY BE REMOVED FOR A PARTICULAR INLET IF A SPECIFIC SAFETY CONCERN (STREET FLOODING/FREEZING) HAS BEEN IDENTIFIED AND THE PERMITTEE(S) HAVE RECEIVED WRITTEN CORRESPONDENCE FROM THE JURISDICTIONAL AUTHORITY (E.G. CITY/COUNTY/TOWNSHIP/MNDOT ENGINEER) VERIFYING THE NEED FOR REMOVAL. THE WRITTEN CORRESPONDENCE MUST BE DOCUMENTED IN THE SWPPP OR AVAILABLE WITHIN 72 HOURS UPON REQUEST. WHEN WRITTEN CORRESPONDENCE CAN NOT BE OBTAINED IN A TIMELY MANNER, THE SPECIFIC INLET PROTECTION CAN BE REMOVED TO ALLEVIATE THE IMMEDIATE SAFETY CONCERN. HOWEVER, EFFORTS TO OBTAIN WRITTEN CORRESPONDENCE MUST BE DOCUMENTED IN THE SWPPP AND AVAILABLE WITHIN 72 HOURS UPON REQUEST. PERMISSION TO REMOVE INLET PROTECTION BASED ON A SPECIFIC SAFETY CONCERN MUST STILL BE OBTAINED FROM THE JURISDICTIONAL AUTHORITY WITHIN 30 DAYS OF REMOVAL.

5. TEMPORARY SOIL STOCKPILES MUST HAVE SILT FENCE OR OTHER EFFECTIVE SEDIMENT CONTROLS, AND CANNOT BE PLACED IN SURFACE WATERS, INCLUDING STORMWATER CONVEYANCES SUCH AS CURB AND GUTTER SYSTEMS, OR CONDUITS AND DITCHES UNLESS THERE IS A BYPASS IN PLACE FOR THE STORMWATER.

6. VEHICLE TRACKING OF SEDIMENT FROM THE CONSTRUCTION SITE (OR ONTO STREETS WITHIN THE SITE) MUST BE MINIMIZED BY BMPS SUCH AS STONE PADS, CONCRETE OR STEEL WASH RACKS, OR EQUIVALENT SYSTEMS. STREET SWEEPING MUST BE USED IF SUCH BMPS ARE NOT ADEQUATE TO PREVENT SEDIMENT FROM BEING TRACKED ONTO THE STREET (SEE PART IV.E.4.D.).

7. THE PERMITTEE MUST INSTALL TEMPORARY SEDIMENTATION BASINS AS REQUIRED IN PART III.B. OF THIS PERMIT.

E. INSPECTIONS AND MAINTENANCE

1. THE PERMITTEE(S) (EITHER THE OWNER OR OPERATOR, WHOEVER IS IDENTIFIED IN THE SWPPP) MUST ROUTINELY INSPECT THE ENTIRE CONSTRUCTION SITE AT LEAST ONCE EVERY SEVEN (7) DAYS DURING ACTIVE CONSTRUCTION AND WITHIN 24 HOURS AFTER A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 24 HOURS. FOLLOWING AN INSPECTION WHICH OCCURS WITHIN 24 HOURS AFTER A RAINFALL EVENT, THE NEXT INSPECTION MUST BE CONDUCTED WITHIN SEVEN (7) DAYS AFTER THAT.

2. ALL INSPECTIONS AND MAINTENANCE CONDUCTED DURING CONSTRUCTION MUST BE RECORDED IN WRITING AND THESE RECORDS MUST BE RETAINED WITH THE SWPPP IN ACCORDANCE WITH PART II.D. RECORDS OF EACH INSPECTION AND MAINTENANCE ACTIVITY SHALL INCLUDE:
- a. DATE AND TIME OF INSPECTIONS;
- b. NAME OF PERSON(S) CONDUCTING INSPECTIONS;
- c. FINDINGS OF INSPECTIONS, INCLUDING RECOMMENDATIONS FOR CORRECTIVE ACTIONS;
- d. CORRECTIVE ACTIONS TAKEN (INCLUDING DATES, TIMES, AND PARTY COMPLETING MAINTENANCE ACTIVITIES);
- e. DATE AND AMOUNT OF ALL RAINFALL EVENTS GREATER THAN 1/2 INCH (0.5 INCHES) IN 24 HOURS;
- f. DOCUMENTATION OF CHANGES MADE TO THE SWPPP AS REQUIRED IN PART III.A.4; AND

3. WHERE PARTS OF THE CONSTRUCTION SITE HAVE PERMANENT COVER, BUT WORK REMAINS ON OTHER PARTS OF THE SITE, INSPECTIONS OF THE AREAS WITH PERMANENT COVER MAY BE REDUCED TO ONCE PER MONTH. WHERE CONSTRUCTION SITES HAVE PERMANENT COVER ON ALL EXPOSED SOIL AREAS AND NO CONSTRUCTION ACTIVITY IS OCCURRING ANYWHERE ON THE SITE, THE SITE MUST BE INSPECTED FOR A PERIOD OF TWELVE (12) MONTHS (THE INSPECTIONS MAY BE CEASED DURING FROZEN GROUND CONDITIONS). FOLLOWING THE TWELFTH MONTH OF PERMANENT COVER AND NO CONSTRUCTION ACTIVITY, INSPECTIONS MAY BE TERMINATED UNTIL CONSTRUCTION ACTIVITY IS ONCE AGAIN INITIATED OR SOONER IF NOTIFIED IN WRITING BY THE MPCA. WHERE WORK HAS BEEN SUSPENDED DUE TO FROZEN GROUND CONDITIONS, THE REQUIRED INSPECTIONS AND MAINTENANCE SCHEDULE MUST BEGIN WITHIN 24 HOURS AFTER RUNOFF OCCURS AT THE SITE OR PRIOR TO RESUMING CONSTRUCTION, WHICHEVER COMES FIRST.

4. ALL EROSION PREVENTION AND SEDIMENT CONTROL BMPS MUST BE INSPECTED TO ENSURE INTEGRITY AND EFFECTIVENESS. ALL NONFUNCTIONAL BMPS MUST BE REPAIRED, REPLACED, OR SUPPLEMENTED WITH FUNCTIONAL BMPS WITHIN 24 HOURS AFTER DISCOVERY, OR AS SOON AS FIELD CONDITIONS ALLOW ACCESS UNLESS ANOTHER TIME FRAME IS SPECIFIED BELOW. THE PERMITTEE(S) MUST INVESTIGATE AND COMPLY WITH THE FOLLOWING INSPECTION AND MAINTENANCE REQUIREMENTS:

a. ALL SILT FENCES MUST BE REPAIRED, REPLACED, OR SUPPLEMENTED WHEN THEY BECOME NONFUNCTIONAL OR THE SEDIMENT REACHES 1/3 OF THE HEIGHT OF THE FENCE. THESE REPAIRS MUST BE MADE WITHIN 24 HOURS OF DISCOVERY, OR AS SOON AS FIELD CONDITIONS ALLOW ACCESS.

b. TEMPORARY AND PERMANENT SEDIMENTATION BASINS MUST BE DRAINED AND THE SEDIMENT REMOVED WHEN THE DEPTH OF SEDIMENT COLLECTED IN THE BASIN REACHES 1/2 THE STORAGE VOLUME. DRAINAGE AND REMOVAL MUST BE COMPLETED WITHIN 72 HOURS OF DISCOVERY, OR AS SOON AS FIELD CONDITIONS ALLOW ACCESS (SEE PART IV.D.).

c. SURFACE WATERS, INCLUDING DRAINAGE DITCHES AND CONVEYANCE SYSTEMS, MUST BE INSPECTED FOR EVIDENCE OF EROSION AND SEDIMENT DEPOSITION. THE PERMITTEE(S) MUST REMOVE ALL DELTAS AND SEDIMENT DEPOSITED IN SURFACE WATERS, INCLUDING DRAINAGE WAYS, CATCH BASINS, AND OTHER DRAINAGE SYSTEMS, AND RESTABILIZE THE AREAS WHERE SEDIMENT REMOVAL RESULTS IN EXPOSED SOIL. THE REMOVAL AND STABILIZATION MUST TAKE PLACE WITHIN SEVEN (7) DAYS OF DISCOVERY UNLESS PRECLUDED BY LEGAL, REGULATORY, OR PHYSICAL ACCESS CONSTRAINTS. THE PERMITTEE SHALL USE ALL REASONABLE EFFORTS TO OBTAIN ACCESS. IF PRECLUDED, REMOVAL AND STABILIZATION MUST TAKE PLACE WITHIN SEVEN (7) CALENDAR DAYS OF OBTAINING ACCESS. THE PERMITTEE IS RESPONSIBLE FOR CONTACTING ALL LOCAL, REGIONAL, STATE AND FEDERAL AUTHORITIES AND RECEIVING ANY APPLICABLE PERMITS, PRIOR TO CONDUCTING ANY WORK.

d. CONSTRUCTION SITE VEHICLE EXIT LOCATIONS MUST BE INSPECTED FOR EVIDENCE OF OFF-SITE SEDIMENT TRACKING ONTO PAVED SURFACES. TRACKED SEDIMENT MUST BE REMOVED FROM ALL PAVED SURFACES, WITHIN 24 HOURS OF DISCOVERY, OR IF APPLICABLE, WITHIN A SHORTER TIME TO COMPLY WITH PART IV.C.6.

e. THE PERMITTEE(S) ARE RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF TEMPORARY AND PERMANENT WATER QUALITY MANAGEMENT BMPS, AS WELL AS ALL EROSION PREVENTION AND SEDIMENT CONTROL BMPS, FOR THE DURATION OF THE CONSTRUCTION WORK AT THE SITE. THE PERMITTEE(S) ARE RESPONSIBLE UNTIL ANOTHER PERMITTEE HAS ASSUMED CONTROL ACCORDING TO PART II.B.5 OVER ALL AREAS OF THE SITE THAT HAVE NOT BEEN FINALLY STABILIZED OR THE SITE HAS UNDERGONE FINAL STABILIZATION, AND A NOT HAS BEEN SUBMITTED TO THE MPCA.

f. IF SEDIMENT ESCAPES THE CONSTRUCTION SITE, OFF-SITE ACCUMULATIONS OF SEDIMENT MUST BE REMOVED IN A MANNER AND AT A FREQUENCY SUFFICIENT TO MINIMIZE OFF-SITE IMPACTS (E.G., FUGITIVE SEDIMENT IN STREETS COULD BE WASHED INTO STORM SEWERS BY THE NEXT RAIN AND/OR POSE A SAFETY HAZARD TO USERS OF PUBLIC STREETS).

5. ALL INFILTRATION AREAS MUST BE INSPECTED TO ENSURE THAT NO SEDIMENT FROM ONGOING CONSTRUCTION ACTIVITY IS REACHING THE INFILTRATION AREA AND THESE AREAS ARE PROTECTED FROM COMPACTION DUE TO CONSTRUCTION EQUIPMENT DRIVING ACROSS THE INFILTRATION AREA.

TEMPORARY EROSION & SEDIMENT CONTROL NOTES

THE CONTRACTOR SHALL REFER TO THE TEMPORARY EROSION AND SEDIMENT CONTROL PRACTICES AS OUTLINED IN THE SWPPP.

PERMANENT EROSION & SEDIMENT CONTROL NOTES

THE CONTRACTOR SHALL REFER TO THE PERMANENT EROSION AND SEDIMENT CONTROL PRACTICES AS OUTLINED IN THE SWPPP.



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DESIGNED BY: DJL

AEP PROJECT NUMBER
214-1882-093
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SHEET TITLE
EROSION, AND
SEDIMENT
CONTROL NOTES
AND DETAILS
7 OF 7

SHEET NUMBER
C408
BID
DOCUMENTS

8. THE CONTRACTOR SHALL TAKE ALL POSSIBLE PRECAUTIONS TO PREVENT APPRECIABLE SOIL TRACKING ONTO ROADWAYS. APPRECIABLE SOIL, MUD, OR DEBRIS WASHED, TRACKED, OR DEPOSITED ONTO PAVED SURFACES SHALL BE REMOVED PRIOR TO THE END OF EACH WORK DAY.
9. STABILIZED CONSTRUCTION ENTRANCE(S) SHALL BE REMOVED AND AREA RESTORED AFTER GRADING IS COMPLETE.
10. THE CONTRACTOR QC PROGRAM SHALL ENSURE THAT A COMPETENT INDIVIDUAL SHALL INSPECT EROSION AND SEDIMENT CONTROL DEVICES WEEKLY AND AFTER EACH RAIN EVENT. ALL NONFUNCTIONAL DEVICES SHALL BE REPAIRED/REPLACED/CLEANED. MAINTAIN WRITTEN LOG OF ALL WEEKLY AND RAIN EVENT INSPECTIONS - INCLUDE THE CORRECTIVE ACTIONS THAT WERE TAKEN.
11. THE CONTRACTOR SHALL MAINTAIN THE CAPABILITY TO IMPLEMENT RAPID STABILIZATION METHOD 4 (MNDOT 2573.4) AT ALL TIMES. INCLUDES CAT III EROSION CONTROL BLANKET (ECB) [N. AMERICAN GREEN S150 OR APPROVED EQUAL] ALONG WITH SEED MIXTURE, FERTILIZER, AND SOIL STAPLES PER 2573-3. THE UPGRADE END OF EACH BLANKET STRIP SHALL BE BURIED AT LEAST 6 INCHES IN A VERTICAL CHECK SLOT. STAPLES SHALL BE PLACED AT SEAMS AND THROUGHOUT THE BLANKET AT A MAXIMUM SPACING IN ALL DIRECTIONS OF 2 FEET. PAYMENT ALLOWED SHALL BE PER CONTRACT OR IN ABSENCE OF CONTRACT BID PRICE IN ACCORDANCE WITH MNDOT SPECIFICATION 2575.5

CONSTRUCTION PRACTICES TO MINIMIZE STORM WATER CONTAMINATION

TO PREVENT STORM WATER CONTAMINATION FROM OCCURRING, THE FOLLOWING BMPS WILL BE IMPLEMENTED:

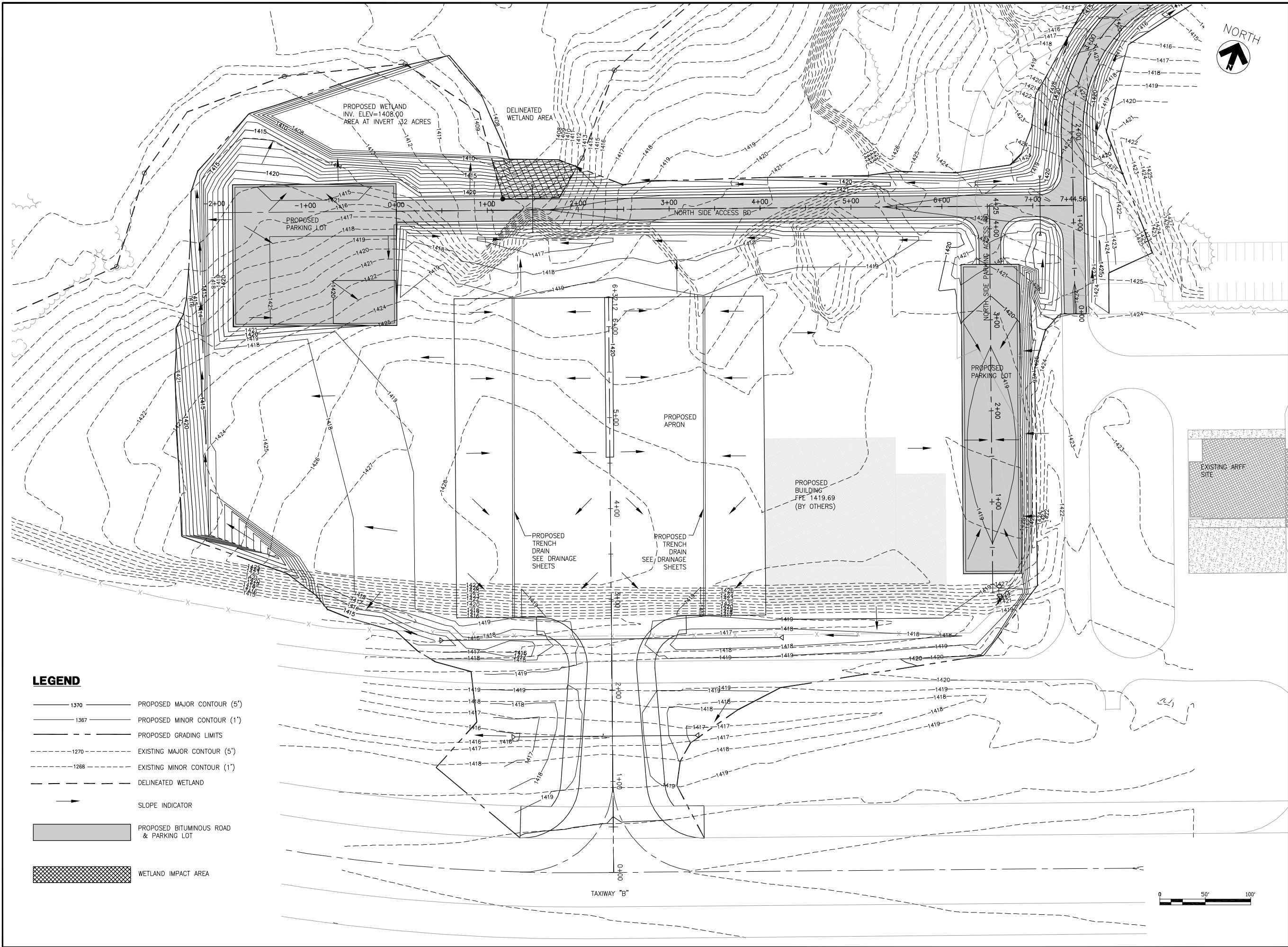
1. ALL AREAS THAT ARE ROUGH GRADED MUST BE KEPT IN A SMOOTH CONDITION TO ALLOW SHEET FLOW OF STORM WATER WHEREVER PRACTICAL AND ALWAYS READY FOR SURFACE APPLICATION OF DEGRADABLE OR NON-DEGRADABLE BLANKETS, MULCH, OR OTHER PROTECTIVE COVERS.

2. A STABILIZED CONSTRUCTION ENTRANCE/EXIT WILL BE CONSTRUCTED TO REDUCE VEHICLE TRACKING OF SEDIMENTS OFF THE PROJECT RIGHT OF WAY.

3. ALL SOLID WASTE MATERIALS WILL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER OR OTHER APPROVED CONTAINMENT METHOD AT THE END OF EACH DAY. ANY ALTERNATIVE TO A METAL DUMPSTER MUST BE SUBMITTED IN WRITING FOR APPROVAL BY THE PROJECT ENGINEER. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN THE DUMPSTER. THE DUMPSTER WILL BE EMPTIED AS NECESSARY TO FUNCTION AS INTENDED FOR DEBRIS COLLECTION. NO CONSTRUCTION MATERIALS WILL BE BURIED ON-SITE. THE CONTRACTOR'S EROSION CONTROL SUPERVISOR WILL INSTRUCT ALL PERSONNEL REGARDING THE CORRECT PROCEDURE FOR DISPOSAL.

4. RECYCLABLE MATERIALS MUST BE SEPARATED ON-SITE AND SEGREGATED IN DESIGNATED CONTAINERS.
5. A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR WILL COLLECT ALL SANITARY WASTE FROM THE PORTABLE UNITS AT A RATE NECESSARY TO MAINTAIN DESIGNED FUNCTION.
6. ALL VEHICLES ON SITE WILL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE THE CHANCE OF LEAKAGE.
7. FERTILIZERS WILL BE STORED IN A COVERED SHED AND PARTIALLY USED BAGS WILL BE TRANSFERRED TO A SEALABLE BIN TO REDUCE THE CHANCE OF SPILLAGE.
8. PETROLEUM PRODUCTS WILL BE STORED IN TIGHTLY SEALED CONTAINERS, WHICH ARE CLEARLY LABELED.
9. SPILL KITS WILL BE INCLUDED WITH ALL FUELING SOURCES AND MAINTENANCE ACTIVITIES. SECONDARY CONTAINMENT MEASURES WILL BE INSTALLED AND MAINTAINED BY THE CONTRACTOR.
10. ANY ASPHALT SUBSTANCES USED ON SITE WILL BE APPLIED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
11. ALL PAINT CONTAINERS AND CURING COMPOUNDS WILL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE. EXCESS PAINT WILL NOT BE DISCHARGED TO THE STORM WATER SYSTEM BUT WILL BE PROPERLY DISPOSED OF ACCORDING TO MANUFACTURER'S INSTRUCTION.
12. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEAN-UP SHALL BE READILY AVAILABLE AND BE KEPT IN AN ENCLOSED TRAILER OR SHED ON SITE. EQUIPMENT WILL INCLUDE, BUT NOT LIMITED TO, BROOMS, MOPS, DUST PANS, RAGS, GLOVES, GOGGLES, ABSORBENT (KITTY LITTER, OIL ABSORBENT BOOMS AND DIAPERS) AND BUCKETS.
13. ALL SPILLS WILL BE CONTAINED AND CLEANED UP IMMEDIATELY UPON DISCOVERY. SPILLS LARGE ENOUGH TO REACH THE STORM WATER CONVEYANCE SYSTEM WILL BE REPORTED TO THE MINNESOTA DUTY OFFICER AT 1-800-422-0798.
14. CONCRETE TRUCKS WILL NOT BE ALLOWED TO WASH OUT OR DISCHARGE SURPLUS CONCRETE OR DRUM WASH WATER ON THE SITE UNLESS DONE IN AN ENGINEERED CONTAINMENT SYSTEM. THE ENGINEERED SYSTEM MUST INCLUDE SITE DRAWINGS FOR THE PROJECT FILE AND WRITTEN ASSURANCE THAT THE SYSTEM WILL WORK AS DESIGNED AND LEAVE NO DISCHARGE OF CONCRETE OR CONCRETE RESIDUE POTENTIAL TO ENTER WATERS OF THE STATE.
15. FORM RELEASE OIL USED FOR CONCRETE WORK MUST BE APPLIED OVER A PALLET CONTAINING ABSORBENT TO COLLECT EXCESS LIQUID. THE ABSORBENT MATERIAL WILL BE REPLACED AND PROPERLY DISPOSED OF WHEN SATURATED.
16. DISCHARGES FROM BASIN DEWATERING OPERATIONS THAT ARE TURBID OR SEDIMENT LADEN SHALL BE DISCHARGED TO TEMPORARY SEDIMENT BASINS CONSTRUCTED ON THE SITE TO PROVIDE TREATMENT PRIOR TO DISCHARGE TO A WATER OF THE STATE.

T:\P\2141882-077 NORTH DEVELOPMENT\CAD\C500.dwg, 8/18/2009 6:12:34 AM



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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 Professional Engineer under the laws of the State of Minnesota.

Signature *Darren K. Christopher*
Typed Name DARREN K. CHRISTOPHER

Date 08/18/2009 Reg. No. 45052

REVISIONS		
NO.	DESCRIPTION	DATE

DATE ISSUED: 08-18-2009
REVIEWED BY: MLS
DRAWN BY: JKE
DESIGNED BY: DKC

AEP PROJECT NUMBER
214-1882-077

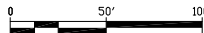
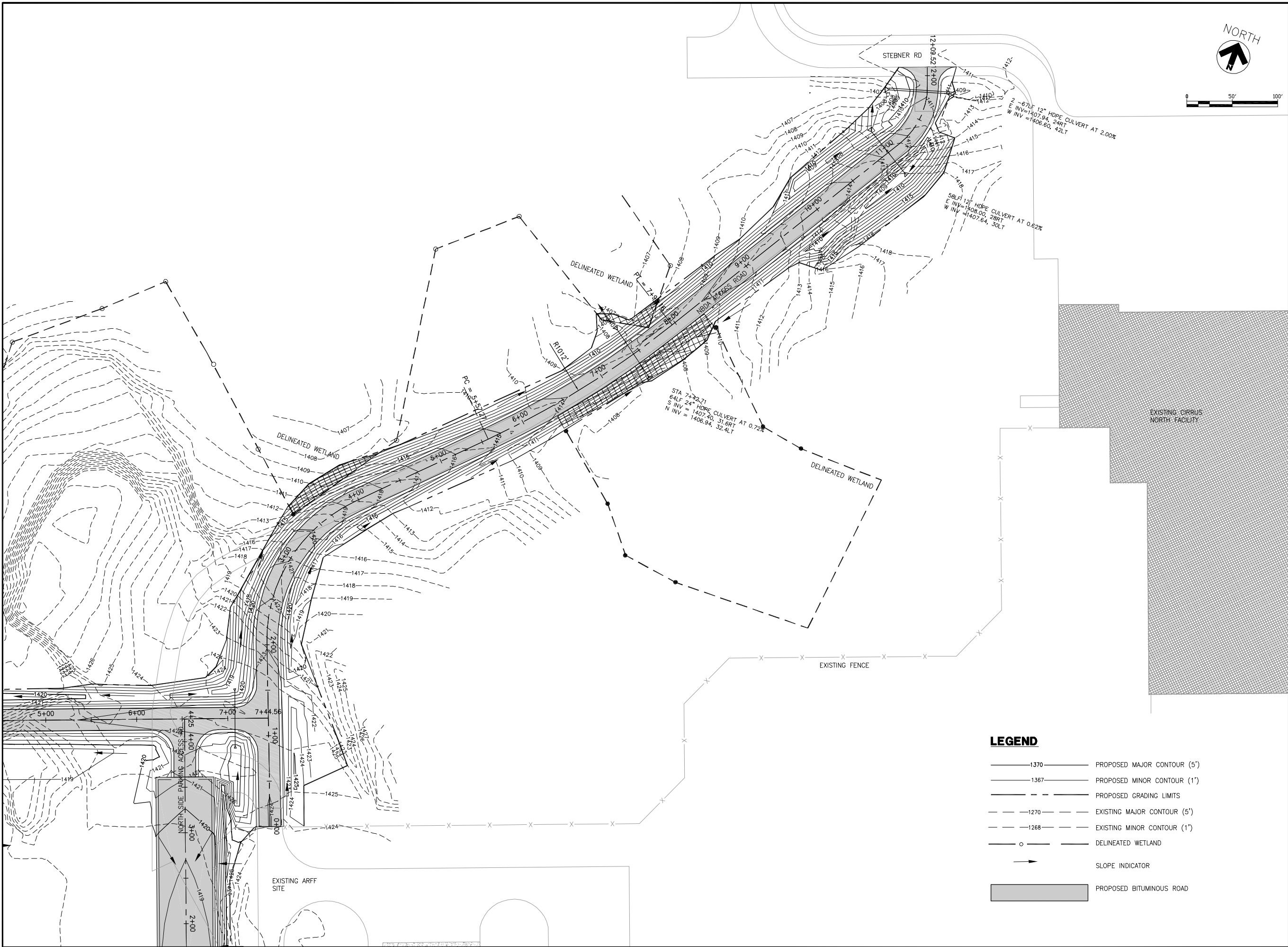
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SHEET TITLE
**GRADING
PLAN**

SHEET
1 OF 2

SHEET NUMBER
C500

**BID
DOCUMENTS**



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Signature *Darren K. Christopher*

Typed Name DARREN K. CHRISTOPHER

Date 08/18/2009 Reg. No. 45052

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SHEET TITLE
GRADING
PLAN

SHEET
2 OF 2

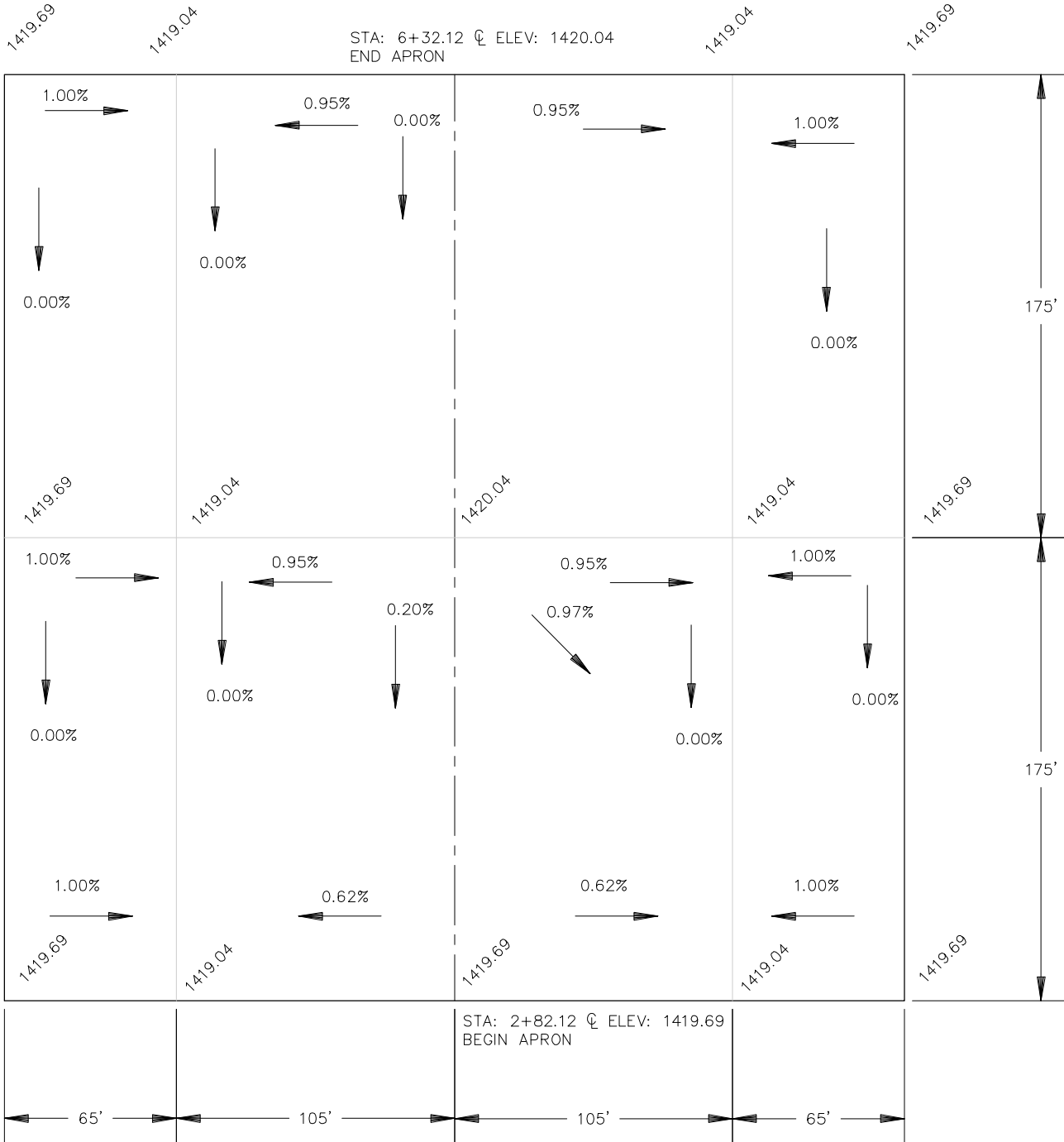
SHEET NUMBER
C501

BID
DOCUMENTS

LEGEND

- 1370 — PROPOSED MAJOR CONTOUR (5')
- 1367 — PROPOSED MINOR CONTOUR (1')
- - - - - PROPOSED GRADING LIMITS
- - - 1270 - - - EXISTING MAJOR CONTOUR (5')
- - - 1268 - - - EXISTING MINOR CONTOUR (1')
- DELINEATED WETLAND
- SLOPE INDICATOR
- PROPOSED BITUMINOUS ROAD

APRON GRADING PLAN



NOTE:
ALL ELEVATIONS SHOWN
ARE PROPOSED

ALSO SEE TAXIWAY\APRON PROFILE AND CROSS SECTION
SHEETS



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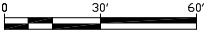
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REVIEWED BY: MLS
DRAWN BY: JKE
DESIGNED BY: DKC

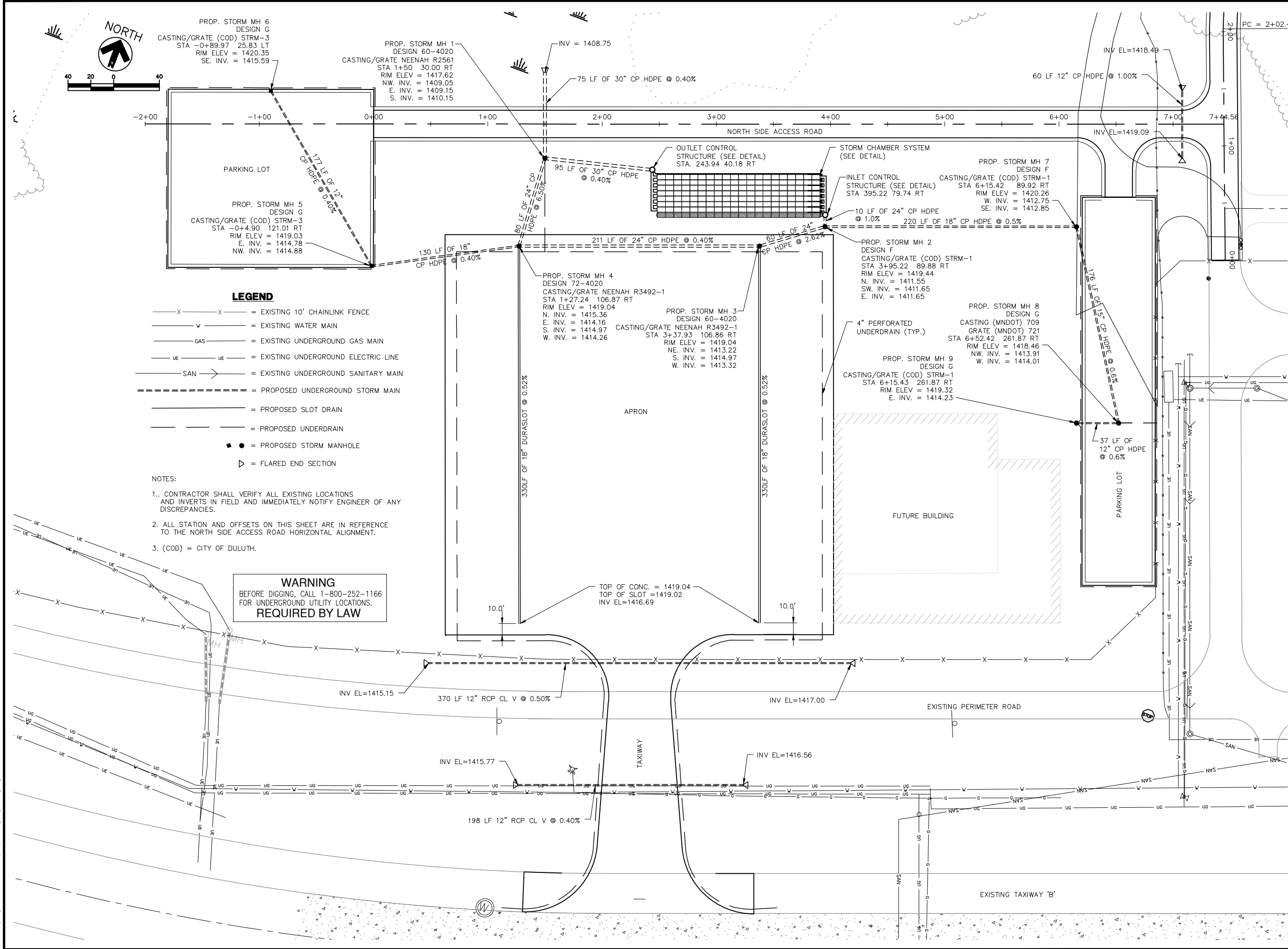
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SHEET TITLE
APRON
GRADING
PLAN

SHEET NUMBER
C502

BID
DOCUMENTS





LEGEND

- X X = EXISTING 10' CHAINLINK FENCE
- W = EXISTING WATER MAIN
- GAS = EXISTING UNDERGROUND GAS MAIN
- UE UE = EXISTING UNDERGROUND ELECTRIC LINE
- SAN → = EXISTING UNDERGROUND SANITARY MAIN
- ===== = PROPOSED UNDERGROUND STORM MAIN
- ===== = PROPOSED SLOT DRAIN
- = PROPOSED UNDERDRAIN
- = PROPOSED STORM MANHOLE
- ▷ = FLARED END SECTION

NOTES:

- CONTRACTOR SHALL VERIFY ALL EXISTING LOCATIONS AND INVERTS IN FIELD AND IMMEDIATELY NOTIFY ENGINEER OF ANY DISCREPANCIES.
- ALL STATION AND OFFSETS ON THIS SHEET ARE IN REFERENCE TO THE NORTH SIDE ACCESS ROAD HORIZONTAL ALIGNMENT.
- (COD) = CITY OF DULUTH.

WARNING
BEFORE DIGGING, CALL 1-800-252-1166
FOR UNDERGROUND UTILITY LOCATIONS.
REQUIRED BY LAW

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KRECH OJARD
& ASSOCIATES, P.A.
Engineers & Architects
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Ph: 218.727.3382 Fx: 218.727.1216
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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 Professional Engineer under the laws of the State of Minnesota.

Signature *Scott T. Stemphar*
Typed Name SCOTT T. STEMPHAR
Date 08/18/09 Reg. No. 47565

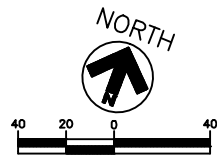
REVISIONS		
NO.	DESCRIPTION	DATE

DATE ISSUED: 08-18-2009
REVIEWED BY: PJM
DRAWN BY: SCA
DESIGNED BY: STS

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**SHEET TITLE
DRAINAGE
PLAN**

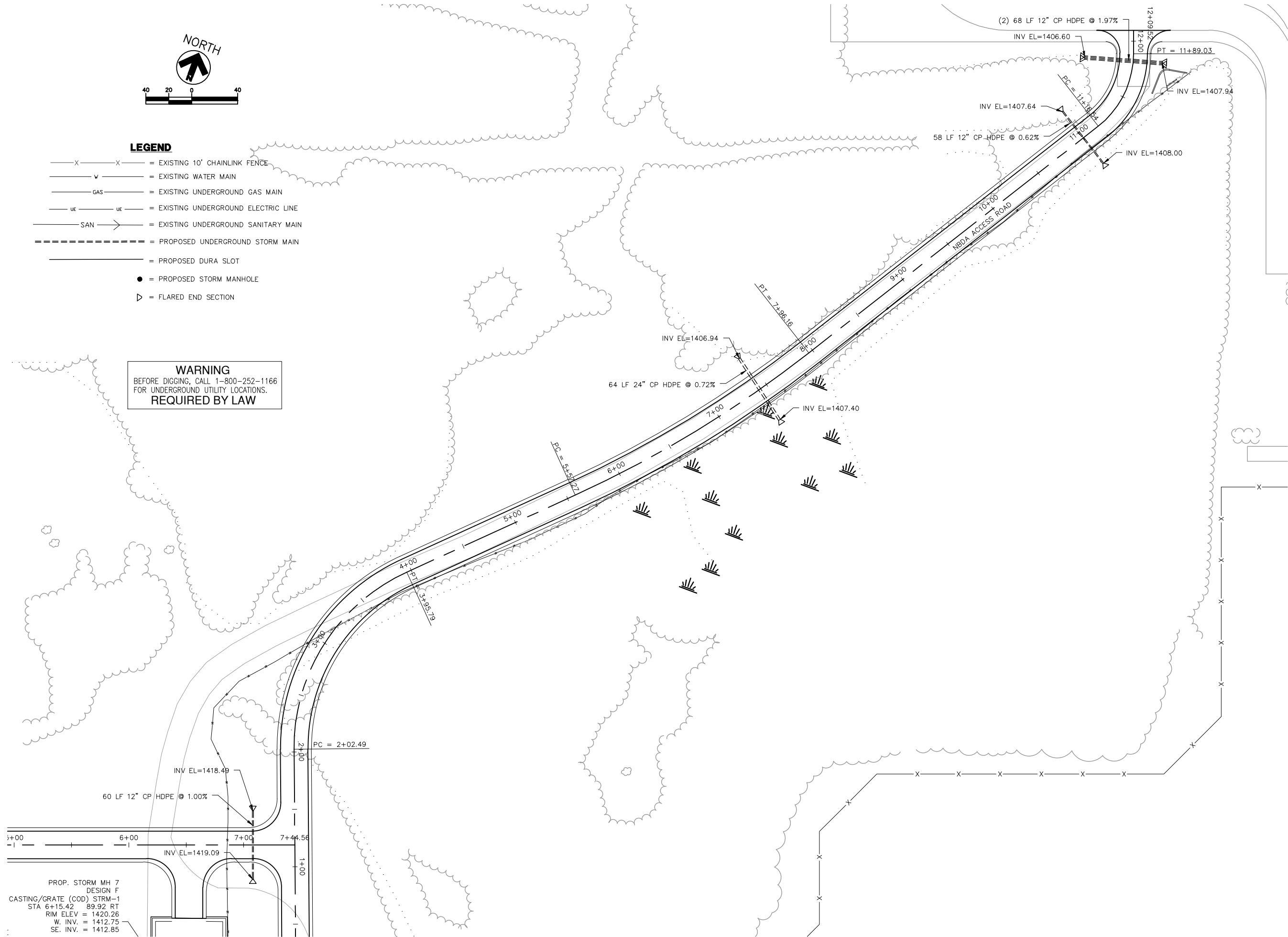
SHEET NUMBER
C503
BID
DOCUMENTS



LEGEND

- X — X — = EXISTING 10' CHAINLINK FENCE
— W — = EXISTING WATER MAIN
— GAS — = EXISTING UNDERGROUND GAS MAIN
— UE — UE — = EXISTING UNDERGROUND ELECTRIC LINE
— SAN —>— = EXISTING UNDERGROUND SANITARY MAIN
- - - - - = PROPOSED UNDERGROUND STORM MAIN
— — — — — = PROPOSED DURA SLOT
● = PROPOSED STORM MANHOLE
▷ = FLARED END SECTION

WARNING
BEFORE DIGGING, CALL 1-800-252-1166
FOR UNDERGROUND UTILITY LOCATIONS.
REQUIRED BY LAW



PROP. STORM MH 7
DESIGN F
CASTING/GRATE (COD) STRM-1
STA 6+15.42 89.92 RT
RIM ELEV = 1420.26
W. INV. = 1412.75
SE. INV. = 1412.85

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Signature *Scott T. Stempihar*
Typed Name SCOTT T. STEMPIHAR
Date 08/18/09 Reg. No. 47565

REVISIONS

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SHEET TITLE

**DRAINAGE
PLAN**

SHEET NUMBER

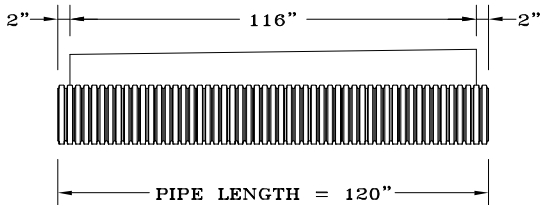
C504

**BID
DOCUMENTS**

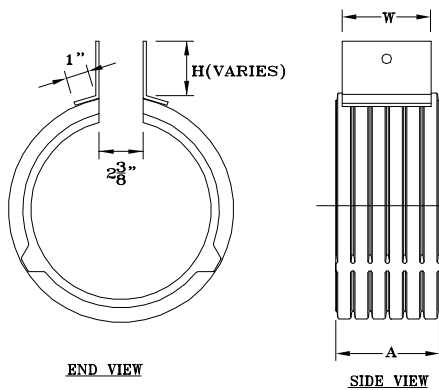
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TRENCH DRAIN VARIABLE HEIGHT TABLE

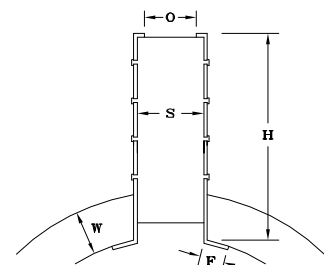
APRON VARIABLE HIEGHT SLOT DRAIN TABLE 330' RUN (FG ELEV. 1419.04)								
2 EA. 330LF @ 0.52% DURASLOT OR EQUAL VARIABLE HEIGHT STA. 2+91.5 TO STA. 6+21.5, 105.0' LT & 105.0' RT								
PER 10' PIPE SECTION W/ GRATES, END CAP, COUPLER BANDS, ADAPTORS TO N-12 & ALL HARDWARE								
DURASLOT				INV PIPE	INV ELEV.	INV PIPE		
NUMBER	H-1	H-2	PIPE DIA.	FG	START	START	END	INV ELEV. END
18-V13	10.000	10.625	18	1419.04	2.333	1416.71	2.385	1416.65
18-V14	10.625	11.250	18	1419.04	2.385	1416.65	2.438	1416.60
18-V15	11.250	11.875	18	1419.04	2.438	1416.60	2.490	1416.55
18-V16	11.875	12.500	18	1419.04	2.490	1416.55	2.542	1416.50
18-V17	12.500	13.125	18	1419.04	2.542	1416.50	2.594	1416.45
18-V18	13.125	13.750	18	1419.04	2.594	1416.45	2.646	1416.39
18-V19	13.750	14.375	18	1419.04	2.646	1416.39	2.698	1416.34
18-V20	14.375	15.000	18	1419.04	2.698	1416.34	2.750	1416.29
18-V21	15.000	15.625	18	1419.04	2.750	1416.29	2.802	1416.24
18-V22	15.625	16.250	18	1419.04	2.802	1416.24	2.854	1416.19
18-V23	16.250	16.875	18	1419.04	2.854	1416.19	2.906	1416.13
18-V24	16.875	17.500	18	1419.04	2.906	1416.13	2.958	1416.08
18-V25	17.500	18.125	18	1419.04	2.958	1416.08	3.010	1416.03
18-V26	18.125	18.750	18	1419.04	3.010	1416.03	3.063	1415.98
18-V27	18.750	19.375	18	1419.04	3.063	1415.98	3.115	1415.93
18-V28	19.375	20.000	18	1419.04	3.115	1415.93	3.167	1415.87
18-V29	20.000	20.625	18	1419.04	3.167	1415.87	3.219	1415.82
18-V30	20.625	21.250	18	1419.04	3.219	1415.82	3.271	1415.77
18-V31	21.250	21.875	18	1419.04	3.271	1415.77	3.323	1415.72
18-V32	21.875	22.500	18	1419.04	3.323	1415.72	3.375	1415.67
18-V33	22.500	23.125	18	1419.04	3.375	1415.67	3.427	1415.61
18-V34	23.125	23.750	18	1419.04	3.427	1415.61	3.479	1415.56
18-V35	23.750	24.375	18	1419.04	3.479	1415.56	3.531	1415.51
18-V36	24.375	25.000	18	1419.04	3.531	1415.51	3.583	1415.46
18-V37	25.000	25.625	18	1419.04	3.583	1415.46	3.635	1415.40
18-V38	25.625	26.250	18	1419.04	3.635	1415.40	3.688	1415.35
18-V39	26.250	26.875	18	1419.04	3.688	1415.35	3.740	1415.30
18-V40	26.875	27.500	18	1419.04	3.740	1415.30	3.792	1415.25
18-V41	27.500	28.125	18	1419.04	3.792	1415.25	3.844	1415.20
18-V42	28.125	28.750	18	1419.04	3.844	1415.20	3.896	1415.14
18-V43	28.750	29.375	18	1419.04	3.896	1415.14	3.948	1415.09
18-V44	29.375	30.000	18	1419.04	3.948	1415.09	4.000	1415.04
18-V45	30.000	30.625	18	1419.04	4.000	1415.04	4.052	1414.99
DURASLOT OR APROVED EQUAL								



TRENCH DRAIN PIPE AND SLOT LENGTH

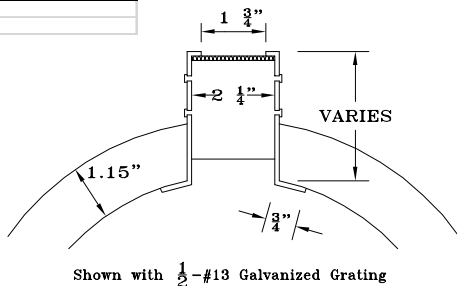


18" TRENCH DRAIN COUPLER BANDS

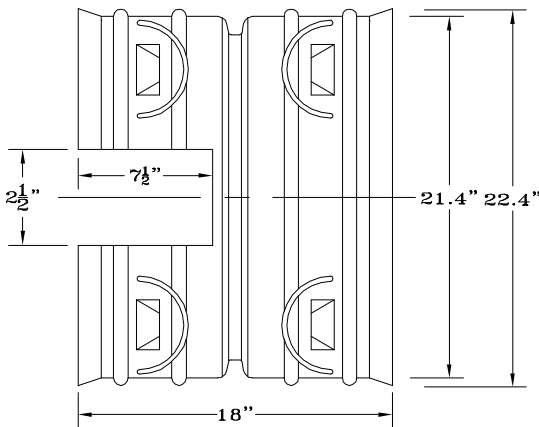


TRENCH DRAIN PHYSICAL DIMENSIONS

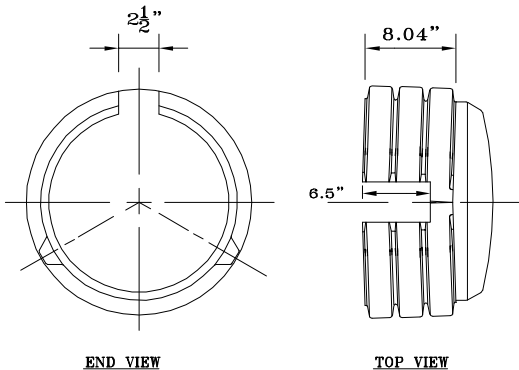
Dimension from grade to pipe invert = H + PIPE DIAMETER



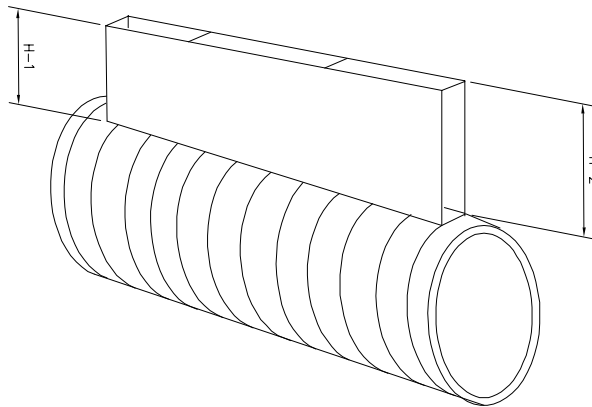
TRENCH DRAIN PHYSICAL DIMENSIONS



18" TRENCH DRAIN ADAPTER

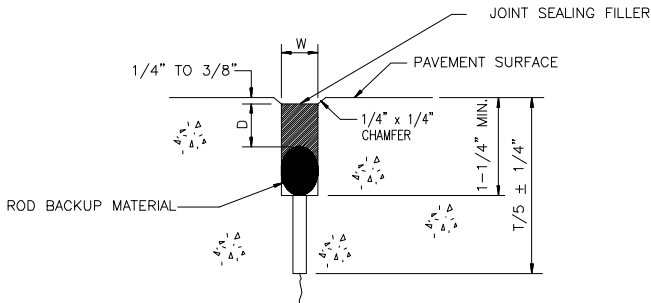


18" TRENCH DRAIN END CAP



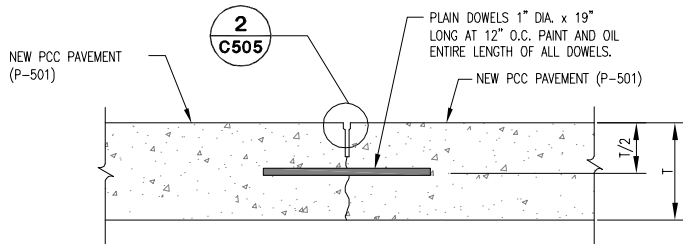
TRENCH DRAIN VARIABLE HEIGHT

N.T.S.



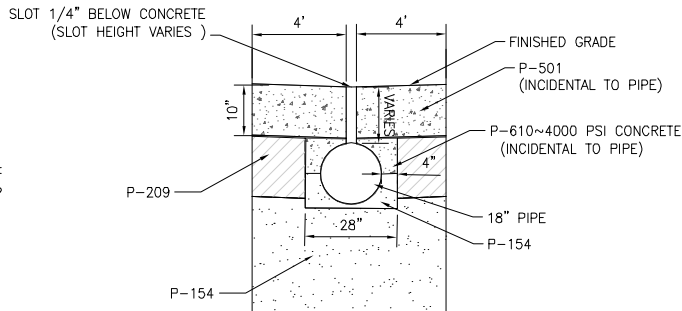
DETAIL 2 - CONTRACTION JOINT

N.T.S.



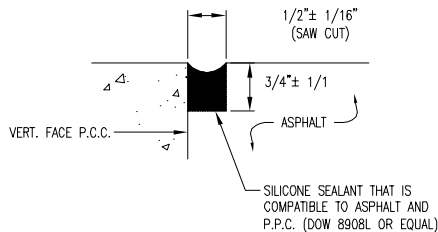
TYPE F CONTRACTION JOINT DETAIL

N.T.S.



TRENCH DRAIN VARIABLE HEIGHT
(HEAVY TRAFFIC CONDITION)

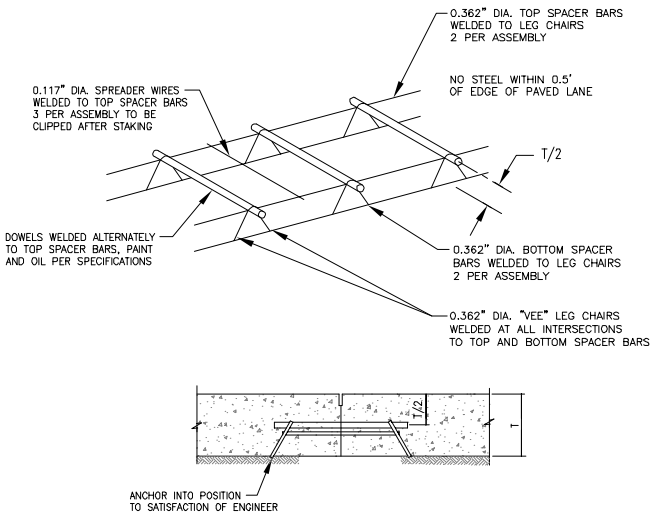
N.T.S.



DETAIL A

N.T.S.

NOTE:
THE CONTRACTOR SHALL FORM THE P.C.C. TO PROVIDE A VERTICAL FACE AFTER
PLACEMENT OF ASPHALT, THE CONTRACTOR SHALL SAW AND SEAL, AS SHOWN.



TYPICAL DOWEL AND TIE-BAR BASKET

N.T.S.

NOTES:
1. BASKET MUST BE FIRMLY ATTACHED TO EXISTING OR NEW BASE PRIOR TO PLACING P.C.C.
2. ALL WIRE SIZES SHOWN ARE MINIMUM SIZE.
3. DOWELS SHALL BE HELD FIRMLY IN THE ABOVE WELDED ASSEMBLY.
4. ANY PAVEMENT SHOWN WITH THICKENED EDGE WILL BE PAID AS NOMINAL THICKNESS (T).
5. THE TOLERANCE FOR DOWEL ALIGNMENT IN EITHER HORIZONTAL OR VERTICAL PLANE IS 1/4" / FT.
6. DOWEL BARS SHALL BE EVENLY SPACED ACROSS EACH PANEL WITH NO BAR BEING LESS THAN ONE
FOOT FROM THE PANEL EDGE.

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214-1882-077

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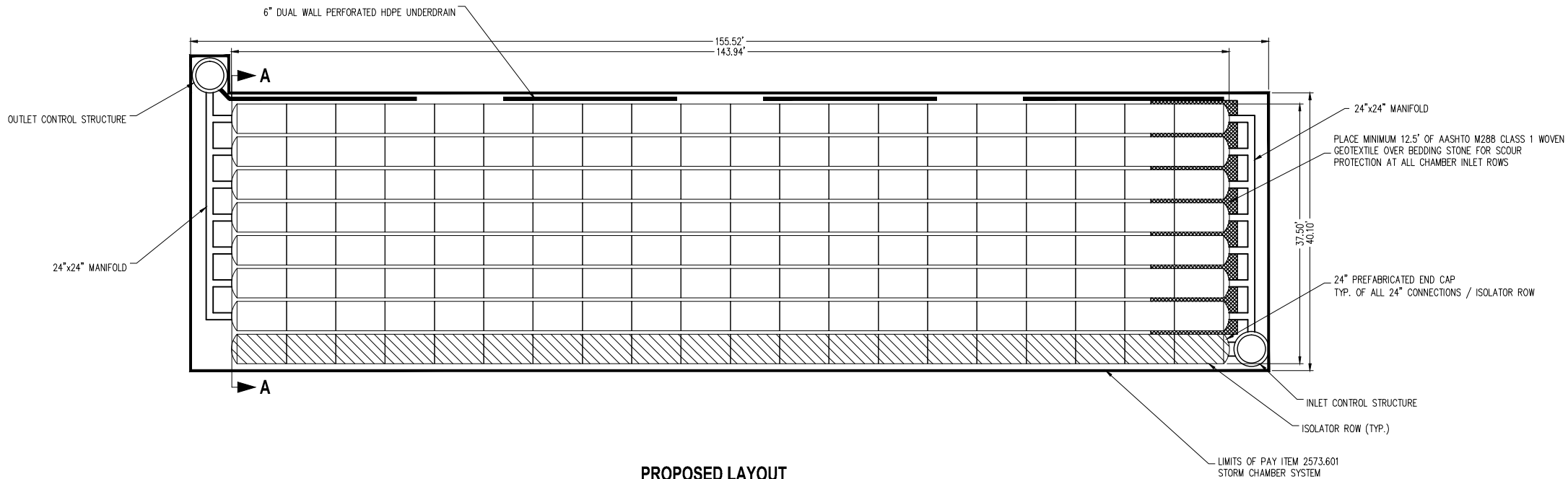
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DETAILS**

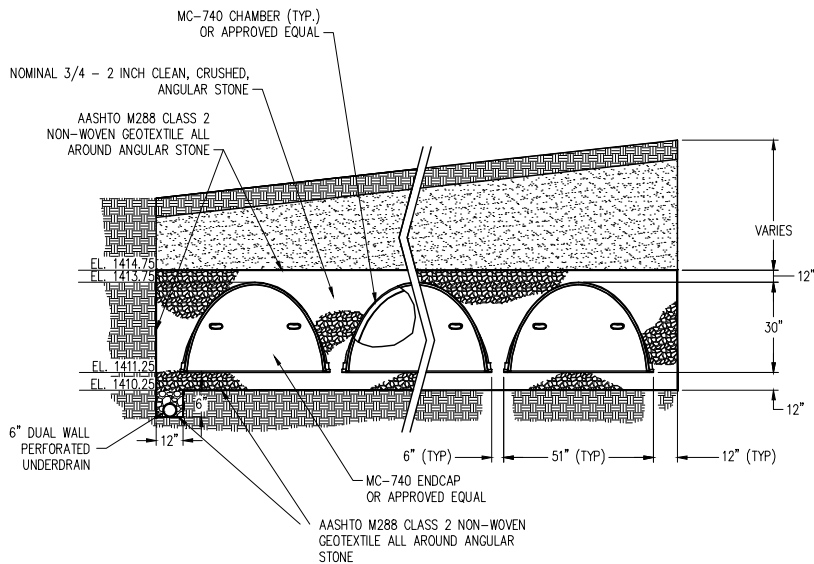
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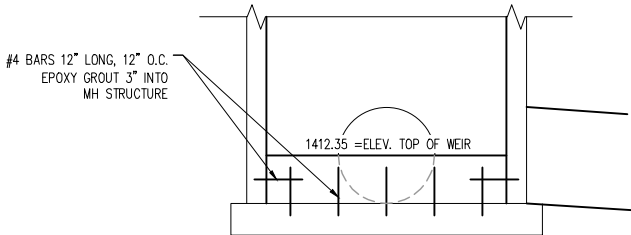
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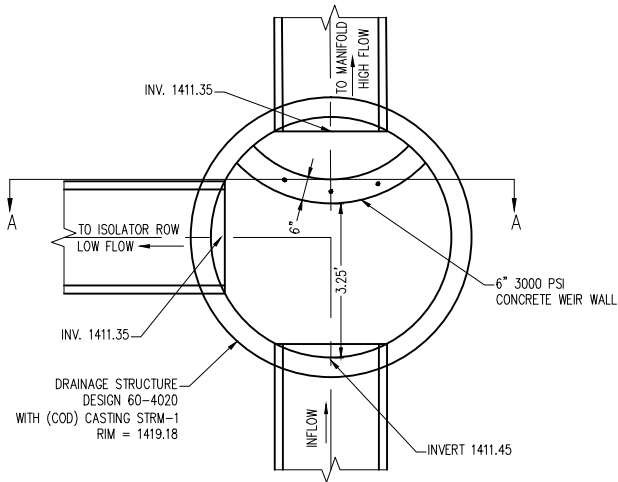
PROPOSED LAYOUT
 (160) CHAMBERS
 (16) ENDCAPS
 INSTALLED WITH 12" COVER STONE, 12" BASE STONE, 40% STONE VOID
 INSTALLED SYSTEM VOLUME = 15,600 CF



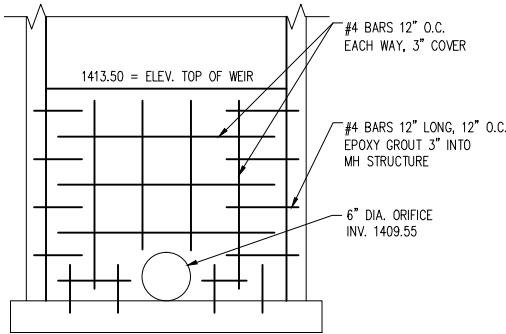
**STORM CHAMBER SYSTEM
 TYPICAL SECTION (A-A)
 N.T.S.**



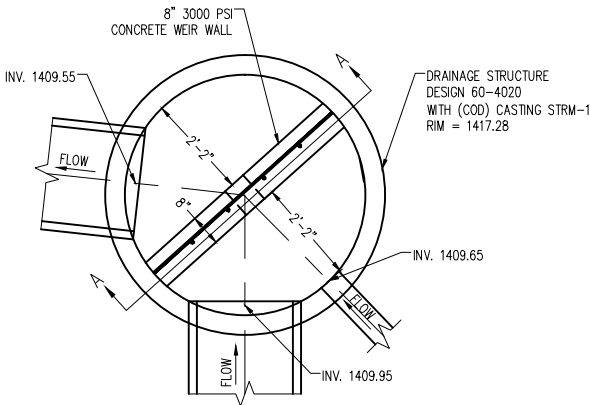
**INLET CONTROL STRUCTURE A-A
 N.T.S.**



**INLET CONTROL STRUCTURE
 N.T.S.**



**OUTLET CONTROL STRUCTURE A-A
 N.T.S.**



**OUTLET CONTROL STRUCTURE
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Signature *Scott T. Stemphar*
 Typed Name SCOTT T. STEMPHAR
 Date 08/18/09 Reg. No. 47565

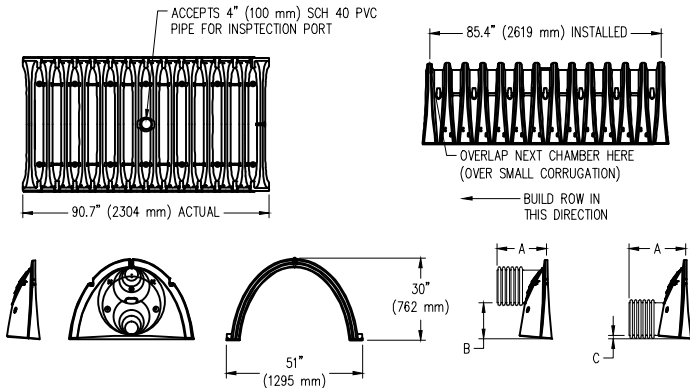
REVISIONS		
NO.	DESCRIPTION	DATE

DATE ISSUED: 08-18-2009
REVIEWED BY: PJM
DRAWN BY: SCA
DESIGNED BY: STS

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214-1882-093
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SHEET TITLE

**STORM CHAMBER
 SYSTEM**

SHEET NUMBER
C506
**BID
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NOMINAL CHAMBER SPECIFICATION
SIZE (W x H x INSTALLED LENGTH) 51.0" x 30.0" x 85.4" (1295 mm x 762 mm x 2169 mm)
CHAMBER STORAGE 45.9 CUBIC FEET (1.30 m³)
MINIMUM INSTALLED STORAGE 74.9 CUBIC FEET (2.12 M³)
WEIGHT 75 lbs. (33.6 kg)

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "I"

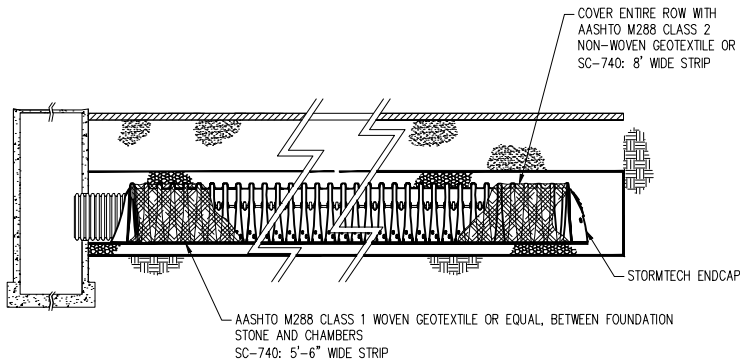
PART#	STUB	A	B	C
SC740EPE06T	6" (150 mm)	10.90" (277 mm)	18.50" (470 mm)	N/A
SC740EPE06B	6" (150 mm)	10.90" (277 mm)	N/A	0.50" (13 mm)
SC740EPE08T	8" (200 mm)	12.20" (310 mm)	16.50" (419 mm)	N/A
SC740EPE08B	8" (200 mm)	12.20" (310 mm)	N/A	0.60" (15 mm)
SC740EPE10T	10" (250 mm)	13.40" (340 mm)	14.50" (368 mm)	N/A
SC740EPE10B	10" (250 mm)	13.40" (340 mm)	N/A	0.70" (18 mm)
SC740EPE12T	12" (300 mm)	14.70" (373 mm)	12.50" (318 mm)	N/A
SC740EPE12B	12" (300 mm)	14.70" (373 mm)	N/A	1.20" (30 mm)
SC740EPE15T	15" (375 mm)	18.40" (467 mm)	9.00" (229 mm)	N/A
SC740EPE15B	15" (375 mm)	18.40" (467 mm)	N/A	1.30" (33 mm)
SC740EPE18T	18" (450 mm)	19.70" (500 mm)	5.00" (127 mm)	N/A
SC740EPE18B	18" (450 mm)	19.70" (500 mm)	N/A	1.60" (41 mm)
*SC740EPE24B	24" (600 mm)	18.50" (470 mm)	N/A	0.10" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

*FOR THE SC740EPE24B THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

STORM CHAMBER TECHNICAL SPECIFICATIONS N.T.S.



ISOLATOR ROW PROFILE N.T.S.

1.0 GENERAL

- 1.1 INSTALLING CONTRACTOR SHALL USE AND UNDERSTAND MANUFACTURE'S LATEST INSTALLATION INSTRUCTIONS PRIOR TO BEGINNING SYSTEM INSTALLATION.
- 1.2 CONTRACTOR SHALL ARRANGE A PRE-INSTALLATION CONSULTATION WITH MANUFACTURE'S REPRESENTATIVES TO ANSWER QUESTIONS OR ADDRESS COMMENTS ON THE CHAMBER SYSTEM AND INFORM THE INSTALLING CONTRACTOR OF THE MINIMUM INSTALLATION REQUIREMENTS BEFORE BEGINNING THE SYSTEM'S CONSTRUCTION.
- 1.3 THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE DESIGN ENGINEER.
- 1.4 AASHTO M288 CLASS 2 NON-WOVEN GEOTEXTILE (FILTER FABRIC) MUST BE USED AS INDICATED IN THE PROJECT PLANS.
- 1.5 STONE PLACEMENT BETWEEN CHAMBERS ROWS AND AROUND PERIMETER MUST FOLLOW INSTRUCTIONS AS INDICATED IN THE MOST CURRENT VERSION OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- 1.6 BACKFILLING OVER THE CHAMBERS MUST FOLLOW REQUIREMENTS AS INDICATED IN THE MOST CURRENT VERSION OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- 1.7 THE CONTRACTOR IS RESPONSIBLE FOR PREVENTING VEHICLES THAT EXCEED THE MANUFACTURER'S REQUIREMENTS FROM TRAVELING ACROSS OR PARKING OVER THE STORMWATER SYSTEM. TEMPORARY FENCING, WARNING TAPE AND APPROPRIATELY LOCATED SIGNS SHALL BE USED TO PREVENT UNAUTHORIZED VEHICLES FROM ENTERING SENSITIVE CONSTRUCTION AREAS.
- 1.8 THE CONTRACTOR MUST APPLY EROSION AND SEDIMENT CONTROL MEASURES TO PROTECT THE STORMWATER SYSTEM DURING ALL PHASES OF SITE CONSTRUCTION PER THE EROSION AND SEDIMENT CONTROL PLAN.

2.0 CHAMBERS

- 2.1 CHAMBERS SHALL BE STORMTECH SC-740 OR APPROVED EQUAL.
- 2.2 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418-05, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- 2.3 CHAMBERS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

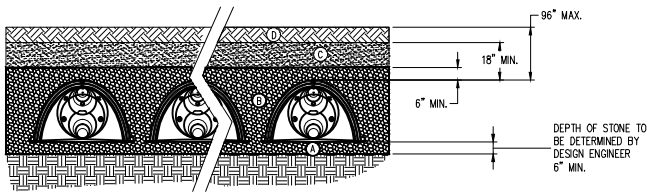
ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEM

MATERIAL LOCATION	DESCRIPTION	AASHTO M43 DESIGNATION ⁽¹⁾	COMPACTION/DENSITY REQUIREMENT
① FILL MATERIAL FOR LAYER D STARTS FROM THE TOP OF THE C LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISH GRADE ABOVE. NOTE THAT PAVEMENT SUB-BASE MAY BE PART OF THIS LAYER.	TOPSOIL	N/A	
③ FILL MATERIAL FOR LAYER C STARTS FROM THE TOP OF THE EMBEIMENT STONE (B LAYER) TO 18" ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUB-BASE MAY BE A PART OF THIS LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, < 35% FINES.	3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTION AFTER 12" OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" LIFTS TO A MIN. 95% STANDARD PROCTOR DENSITY (g). ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs. DYNAMIC FORCE NOT TO EXCEED 20,000 lbs.
⑤ EMBEIMENT STONE SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE (A LAYER) TO THE C LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4 - 2 INCH	3, 357, 4, 457, 5, 56, 57	NO COMPACTION REQUIRED.
④ FOUNDATION STONE BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4 - 2 INCH	3, 35, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A 95% STANDARD PROCTOR DENSITY ⁽²⁾

PLEASE NOTE:

1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".

2. AS AN ALTERNATE TO PROCTOR TESTING AND FIELD DENSITY MEASUREMENTS IN OPEN GRADED STONE, STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (MAX) LIFTS USING TWO FULL COVERAGES WITH AN APPROPRIATE COMPACTOR.



STORM CHAMBER SYSTEM ACCEPTABLE FILL N.T.S.

- 2.4 CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS.
- 2.5 THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12 ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCE.
- 2.6 IF CONTRACTOR PLANS TO USE A CHAMBER IN LIEU OF THAT SPECIFIED, THE CONTRACTOR SHALL SUBMIT (3 SETS) OF THE FOLLOWING TO THE ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
 - a. A STRUCTURAL EVALUATION BY A REGISTERED STRUCTURALENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12 ARE MET. THE 50-YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418-05 MUST BE USED AS A PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
 - b. STRUCTURAL CROSS SECTION DETAIL ON WHICH THE STRUCTURAL CROSS SECTION IS BASED.
- 2.7 ALL DESIGN SPECIFICATIONS FOR CHAMBERS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S LATEST DESIGN MANUAL.
- 2.8 THE INSTALLATION OF CHAMBERS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S LATEST INSTALLATION INSTRUCTIONS.
- 2.9 THE CHAMBER SHALL BE INJECTION MOLDED OF POLYPROPYLENE RESIN TO BE INHERENTLY RESISTANT TO ENVIRONMENTAL STRESS CRACKING (ESCR), AND TO MAINTAIN ADEQUATE STIFFNESS THROUGH HIGHER TEMPERATURES EXPERIENCED DURING INSTALLATION AND SERVICE.
- 2.10 THE CHAMBER SHALL HAVE A CONTINUOUSLY CURVED SECTION PROFILE.
- 2.11 THE CHAMBER SHALL BE OPEN-BOTTOMED.
- 2.12 THE CHAMBER SHALL INCORPORATE AN OVERLAPPING CORRUGATION JOINT SYSTEM TO ALLOW CHAMBER ROWS OF ALMOST ANY LENGTH TO BE CREATED. THE OVERLAPPING CORRUGATION JOINT SYSTEM SHALL BE EFFECTIVE WHILE ALLOWING A CHAMBER TO BE TRIMMED TO SHORTEN ITS OVERALL LENGTH.
- 2.13 THE CHAMBER SHALL HAVE A MINIMUM OF FORTY-EIGHT ORIFICES PENETRATING THE SIDEWALLS TO ALLOW FOR LATERAL CONVEYANCE OF WATER.
- 2.14 THE CHAMBER SHALL HAVE TWO ORIFICES NEAR ITS TOP TO ALLOW FOR EQUALIZATION OF AIR PRESSURE BETWEEN ITS INTERIOR AND EXTERIOR.
- 2.15 THE CHAMBER SHALL HAVE BOTH OF ITS ENDS OPEN TO ALLOW FOR UNIMPEDED HYDRAULIC FLOWS AND VISUAL INSPECTIONS DOWN A ROW'S ENTIRE LENGTH.
- 2.16 THE CHAMBER SHALL HAVE A MIN. 14 CORRUGATIONS.
- 2.17 THE CHAMBER SHALL HAVE A CIRCULAR, INDENTED, FLAT SURFACE ON THE TOP OF THE CHAMBER FOR AN OPTIONAL 4-INCH INSPECTION PORT.
- 2.18 THE CHAMBER SHALL BE ANALYZED AND DESIGNED USING AASHTO METHODS FOR THERMOPLASTIC CULVERTS CONTAINED IN THE LRFD BRIDGE DESIGN SPECIFICATIONS, 2ND EDITION, INCLUDING INTERIM SPECIFICATIONS THROUGH 2001. DESIGN LIVE LOAD SHALL BE THE AASHTO HS20 TRUCK. DESIGN SHALL CONSIDER EARTH AND LIVE LOADS AS APPROPRIATE FOR THE MINIMUM TO MAXIMUM SPECIFIED DEPTH OF FILL.
- 3.0 END CAPS
 - 3.1 END CAPS SHALL BE STORMTECH OR APPROVED EQUAL
 - 3.2 END CAPS WITH PREFABRICATED PIPE CONNECTIONS SHALL BE INJECTION MOLDED FROM POLYETHYLENE RESIN.
 - 3.3 THE END CAP SHALL BE DESIGNED TO FIT INTO ANY CORRUGATION OF A CHAMBER, WHICH ALLOWS: CAPPING A CHAMBER THAT HAS ITS LENGTH TRIMMED; SEGMENTING ROWS INTO STORAGE BASINS OF VARIOUS LENGTHS.
 - 3.4 THE END CAP SHALL HAVE SAW GUIDES TO ALLOW EASY CUTTING FOR VARIOUS DIAMETERS OF PIPE THAT MAY BE USED TO INLET THE SYSTEM.
 - 3.5 THE END CAP SHALL HAVE EXCESS STRUCTURAL ADEQUACIES TO ALLOW CUTTING AN ORIFICE OF ANY SIZE AT ANY INVERT ELEVATION.
 - 3.6 THE PRIMARY FACE OF AN END CAP SHALL BE CURVED OUTWARD TO RESIST HORIZONTAL LOADS GENERATED NEAR THE EDGES OF BEDS.
 - 3.7 THE END CAP SHALL BE MANUFACTURED IN AN ISO 9001:2000 CERTIFIED FACILITY.

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Signature *Scott T. Stempihar*
Typed Name SCOTT T. STEMPIHAR
Date 08/18/09 Reg. No. 47565

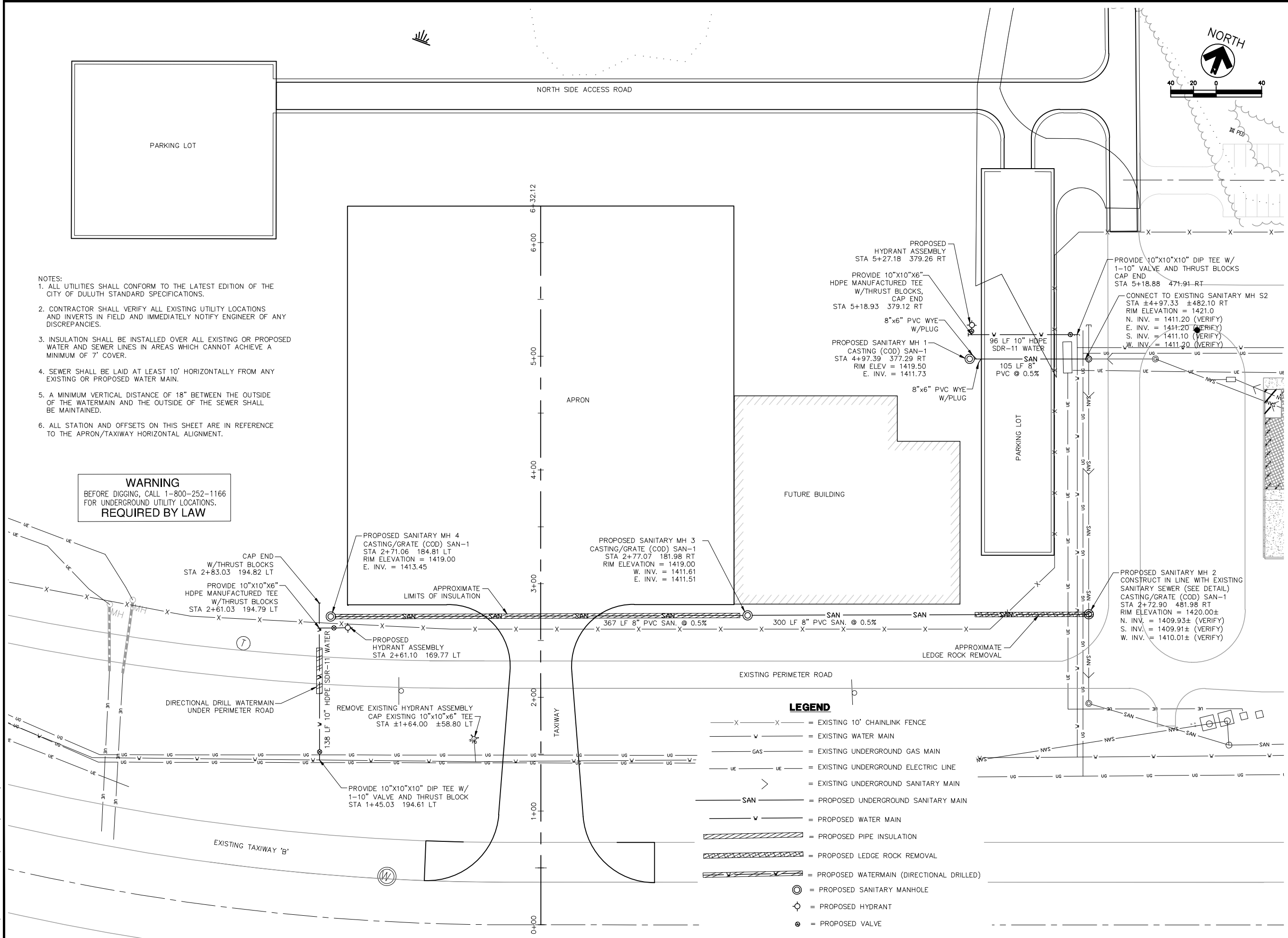
REVISIONS

NO.	DESCRIPTION	DATE

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DRAWN BY: SCA
DESIGNED BY: STS
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SHEET TITLE
**STORM CHAMBER
SYSTEM DETAILS
AND NOTES**
SHEET NUMBER
C507
BID
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Aug 18, 2009 - 3:28pm
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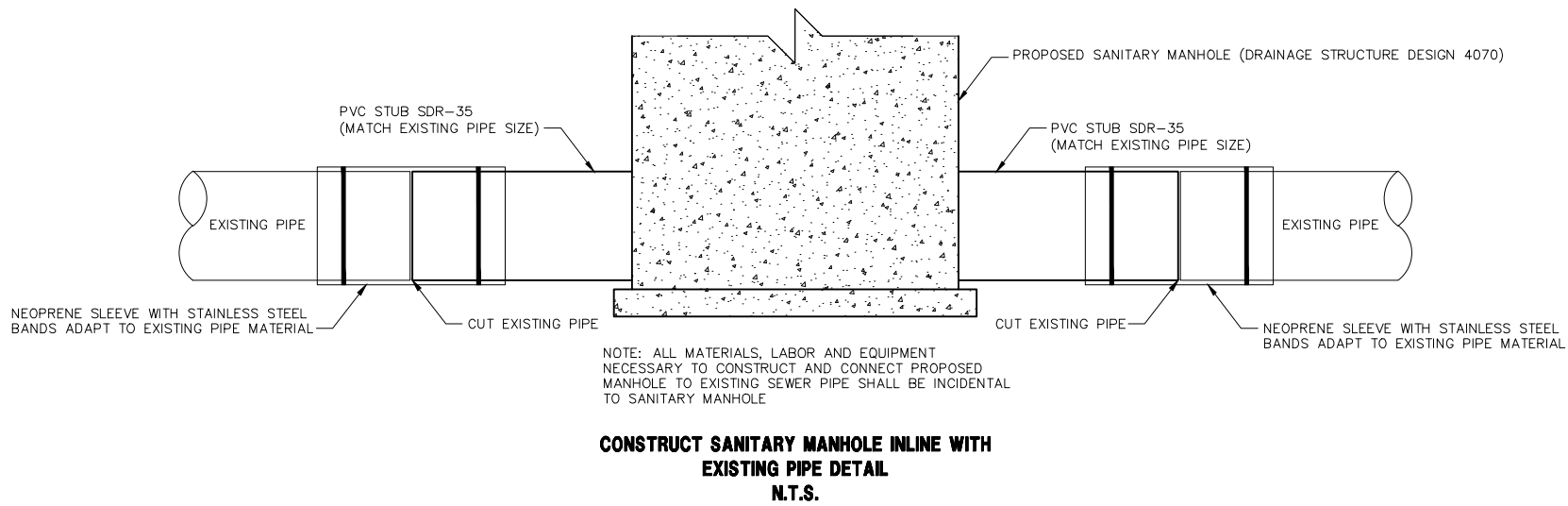
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Date 08/18/09 Reg. No. 47565

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**UTILITY
PLAN**
SHEET NUMBER
C600
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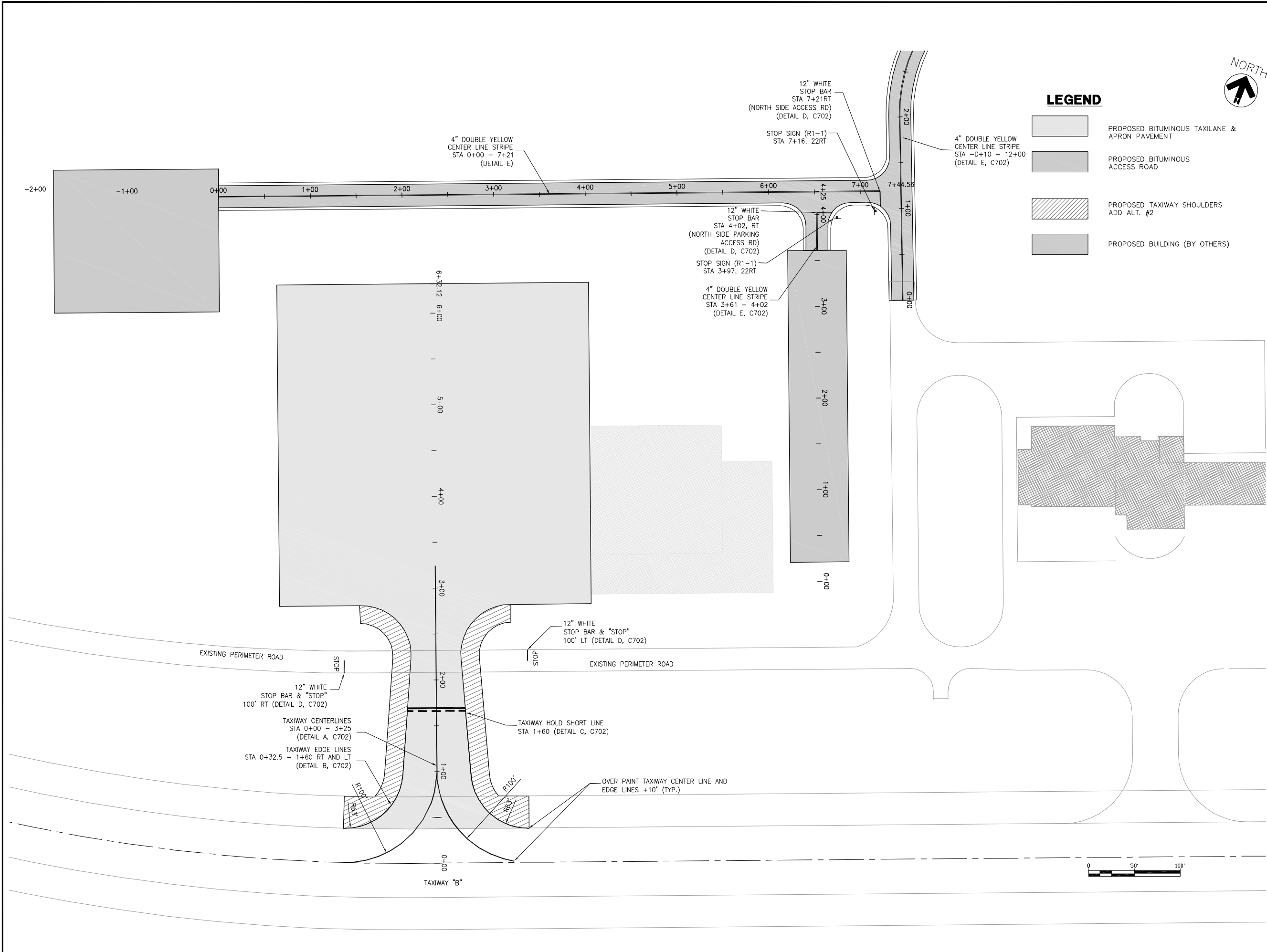
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AND
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LEGEND

- PROPOSED BITUMINOUS TAXILANE & APRON PAVEMENT
- PROPOSED BITUMINOUS ACCESS ROAD
- PROPOSED TAXIWAY SHOULDERS ADD ALT. #2
- PROPOSED BUILDING (BY OTHERS)

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Signature *Darren K. Christopher*
Typed Name DARREN K. CHRISTOPHER
Date 08/18/2009 Reg. No. 45052

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NO.	DESCRIPTION	DATE

DATE ISSUED: 08-18-2009
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DESIGNED BY: DKC

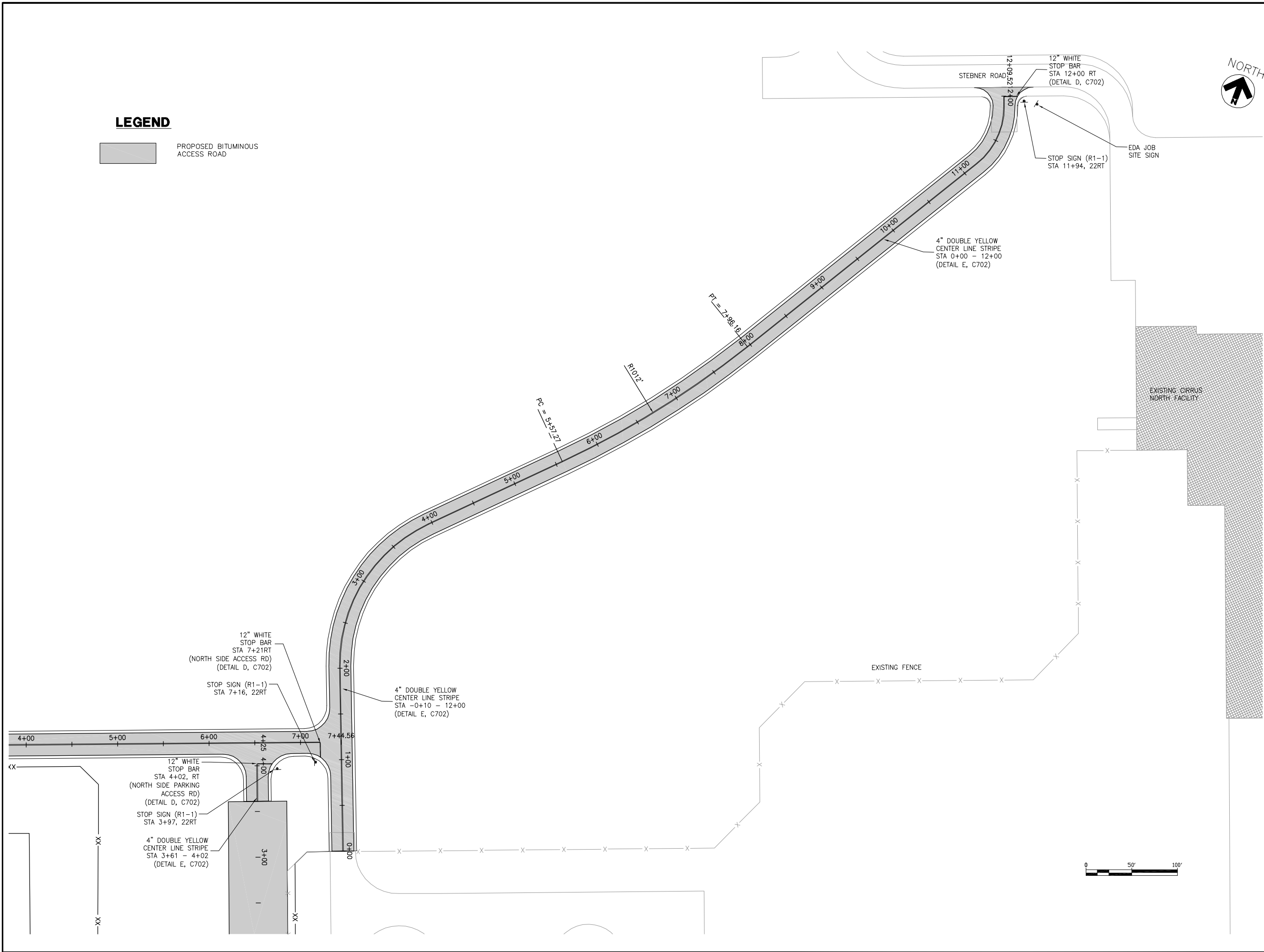
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SHEET TITLE
**PAVEMENT
MARKING &
SIGNAGE PLAN
SHEET
1 OF 2**

SHEET NUMBER
C700

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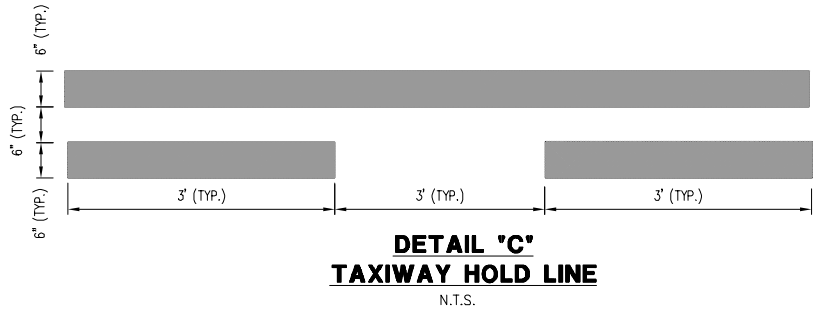
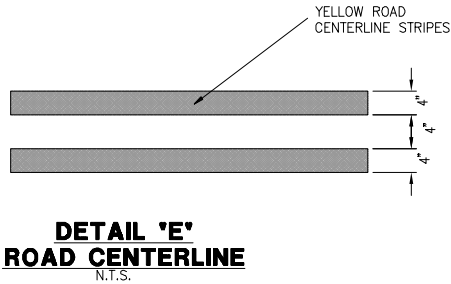
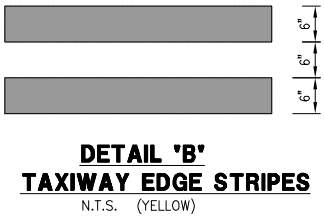
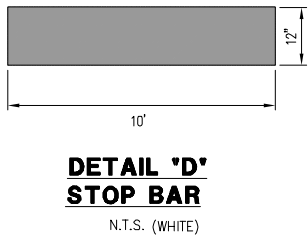
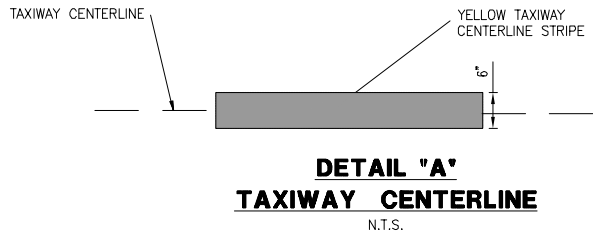
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SHEET TITLE
**PAVEMENT
MARKING &
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SHEET
2 OF 2**

SHEET NUMBER
C701
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DOCUMENTS**

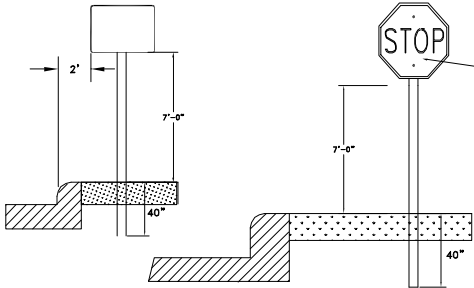
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SIGN INSTALLATION DETAIL

SPEC. 2564.602, REMOVE AND REINSTALL SIGN, EACH

NOTE: ALL DIMENSIONS ARE MINIMUMS.
A TWO PIECE POST MAY BE USED, WITH
1.0' OVERLAP AND APPROVED CONNECTOR.



STAINLESS STEEL WASHER &
NYLON WASHER (T=1/16" MIN.,
I.D.=3/8" MAX., O.D.=7/8" MAX.)

SIGN PANEL

POST

5/16" STAINLESS STEEL
BOLT, WITH NYLON
INSERT LOCK NUT.

NOTE: SEE SPECIAL PROVISIONS FOR SIGN AND
AND POST SPECIFICATIONS.

SIGN PANEL TO
POST CONNECTION

ALL MATERIALS AND LABOR USED TO RELOCATE
EXISTING SIGN AS SHOWN, SHALL BE INCLUDED
IN THIS PAY ITEM:

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AEP PROJECT NUMBER

214-1882-077

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SHEET TITLE

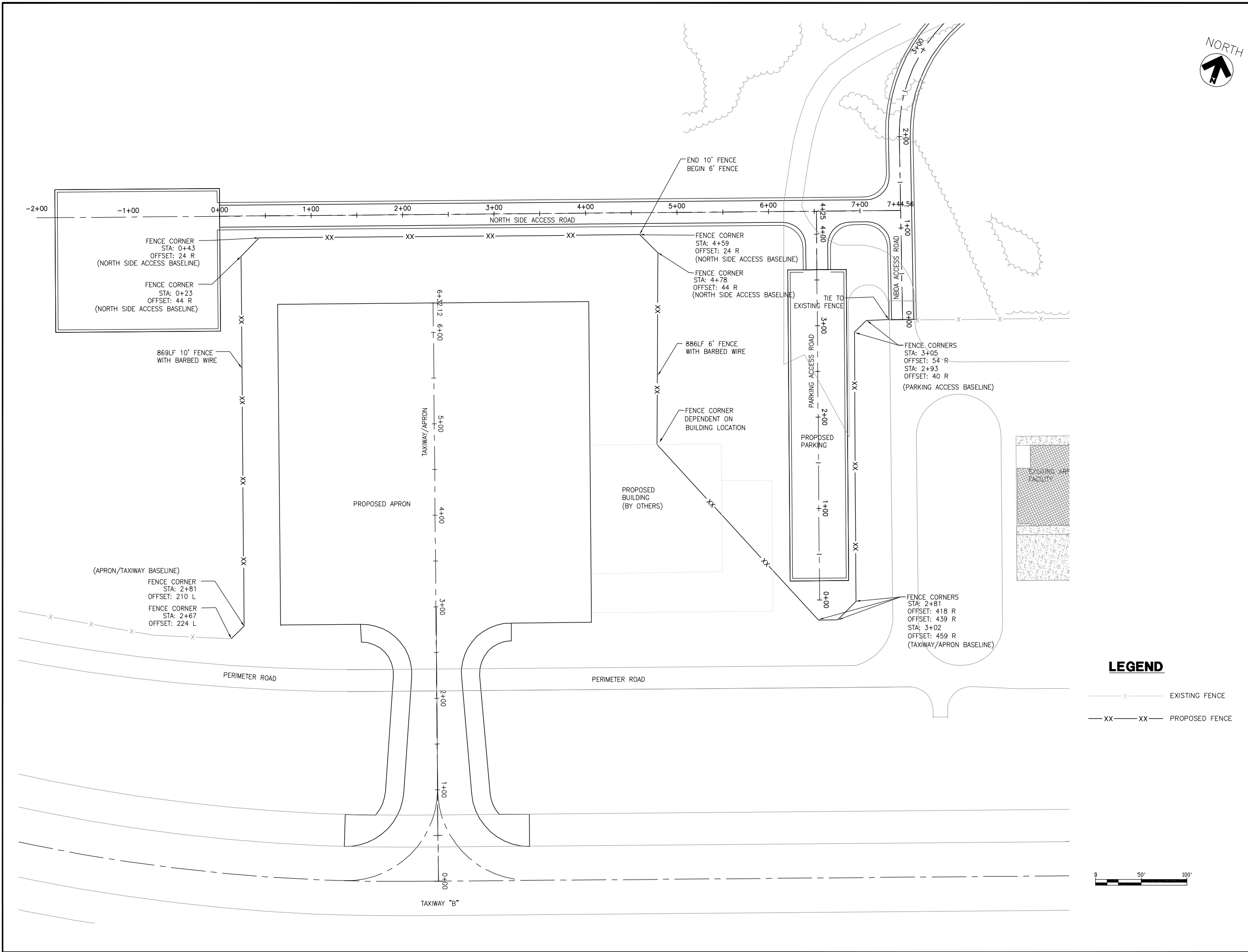
**PAVEMENT
MARKING
AND
SIGNAGE
DETAILS**

SHEET NUMBER

C702

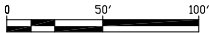
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LEGEND

- X — EXISTING FENCE
- XX — XX — PROPOSED FENCE



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NORTH BUSINESS DEVELOPMENT AREA

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 Professional Engineer under the laws of the State of Minnesota.

Signature *Darren K. Christopher*

Typed Name DARREN K. CHRISTOPHER

Date 08/18/2009 Reg. No. 45052

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: 08-18-2009

REVIEWED BY: MLS

DRAWN BY: JKE

DESIGNED BY: DKC

AEP PROJECT NUMBER

214-1882-077

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SHEET TITLE FENCING SITE PLAN

SHEET NUMBER
C800

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Signature Darren K Christopher
Typed Name DARREN K. CHRISTOPHER
Date 08/18/2009 Reg. No. 45052

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ROLL-FORMED SECTIONS SHALL BE FABRICATED FROM MATERIAL MEETING THE REQUIREMENTS OF ASTM A 570, GRADE 45, AND SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A 123, OR COATED WITH ZINC-5% ALUMINUM MISC. METAL ALLOY IN ACCORDANCE WITH ASTM F 1234, TYPE C.



SAFETY LOOP NOTES

THE FOLLOWING CHART MUST BE UTILIZED WHEN INSTALLING A LOOP USED FOR VEHICLE DETECTION. THIS CHART LISTS THE PREDETERMINED NUMBER OF TURNS THAT MUST BE MADE BY THE ACTUAL LOOP WIRES IN ORDER TO CREATE AN ACCEPTABLE INDUCTANCE RANGE.

LOOP DIMENSION	NUMBER OF TURNS	LOOP AREA
A) 2' X 6'	6	A) 6 - 12
B) 2'-6" X 6'	5	B) 12 - 20
C) 4' X 8'	4	C) 20 - 60
D) 6' X 9'	3	D) 60 - 240
E) 12' X 20'	2	E) 240 & UP

DUE TO THE LOSS OF INDUCTANCE CAUSED BY A DISTANCE GREATER THAN 490 FEET FROM THE LOOP TO THE GATE DEVICE, AN ADDITIONAL TURN OF LOOP WIRE IS RECOMMENDED DURING INSTALLATION.

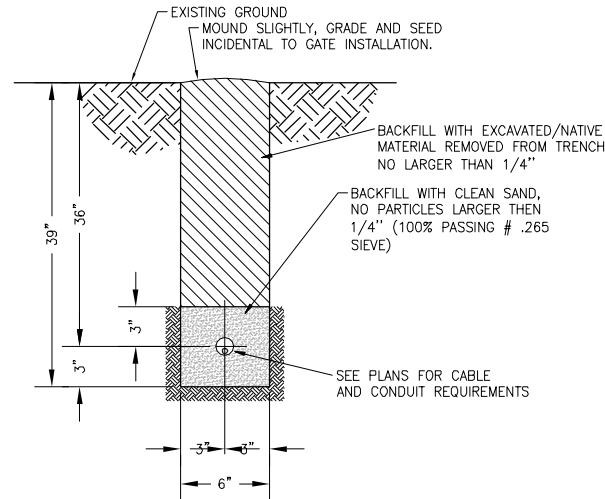
A CLEAN, SMOOTH SAW SLOT MUST BE CUT INTO THE PAVEMENT WHERE THE LOOP IS TO BE INSTALLED. THE INDUSTRY STANDARD REQUIRES THIS SLOT TO BE A MINIMUM OF 1-1/2" AND A MAXIMUM OF 3-1/2" DEEP AS A GENERAL RULE. WHEN A SOFTER PAVEMENT MATERIAL IS PRESENT, THE GREATER SAW CUT DEPTH IS PREFERRED. THIS PROTECTS THE LOOP WIRES FOR A LONGER PERIOD OF TIME.

AFTER THE LOOP SAW SLOTS HAVE BEEN CLEARED OUT, PROCEED TO TUCK THE WIRE IN THE SLOTS WITH AN OBJECT THAT WILL NOT INJURE THE WIRE INSULATION. WIND THE ACTUAL LOOP WITH #14 THHN STRANDED WIRE OR EQUIVALENT. THE WIRE MUST BE RATED FOR DIRECT BURIAL AND IMPERVIOUS TO MOISTURE. THIS WILL AVOID CHANGES IN THE DIELECTRIC CONSTANT OF THE WIRE INSULATION WHICH MAY CAUSE EXCESSIVE INDUCTANCE DRIFT. IT IS EXTREMELY IMPORTANT THAT THE LOOP BE WOUND WITH ONE CONTINUOUS LENGTH OF WIRE. THERE ARE ABSOLUTELY NO SPLICES PERMITTED!

THE TWO WIRES THAT LEAVE THE LOOP AT THE CURB OR PAVEMENT AFTER THE LOOP HAS BEEN PROPERLY WOUND, MUST BE TWISTED AT A MINIMUM OF 5 TURNS PER FOOT AND TAPED TOGETHER WITH (UL) APPROVED ELECTRICAL TAPE TO PREVENT THE WIRES FROM MOVING. FAILURE TO TWIST AND SECURE THESE WIRES MAY PRODUCE A FALSE SIGNAL FROM THE LOOP.

WHEN THE LOOP INSTALLATION HAS BEEN COMPLETED, CHOOSE A SEALANT THAT CLOSELY MATCHES THE TYPE OF PAVEMENT MATERIAL PRESENT. INDUSTRY RECOMMENDS (3M) LOOP DETECTOR SEALANT. HARD SETTING EPOXIES SHOULD NOT BE USED WITH ASPHALT. AVOID HIGH TEMPERATURE SEALANTS.

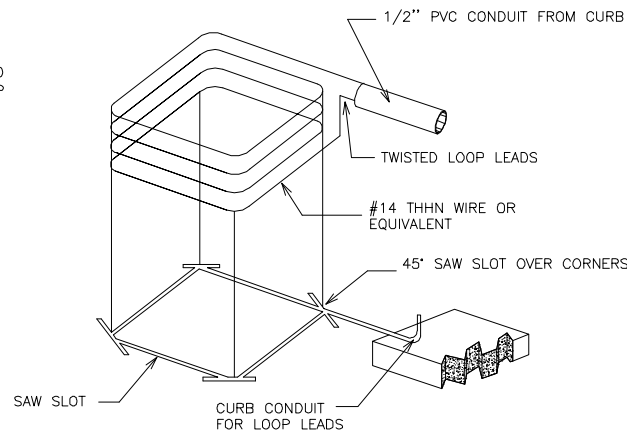
VEHICLE DETECTION LOOPS SHALL BE TWO PER GATE) AND BE CONFIGURED FOR SAFETY ONLY. ALL LOOPS SHALL BE INSTALLED TO MANUFACTURE'S SPECIFICATIONS AND FIELD LOCATED BY CONTRACTOR AND ENGINEER. LOOPS SHALL BE SAWCUT INTO SOUND PAVEMENT. WHERE PAVEMENT IS CRACKED, BROKEN OR OTHERWISE UNSOUND, LOOPS SHALL BE INSTALLED IN SCHEDULE 80 PVC AND LOCATED IN THE GRANULAR BASE PRIOR TO NEW PAVING BY OTHERS.



CONDUIT TRENCH DETAIL
NTS

NOTE:

WARNING DO NOT INSTALL LOOP WITHIN 12 INCHES OF ANY CABLES OR CONDUITS.
DO NOT INSTALL LOOP WITHIN 2 INCHES OF ANY STEEL REINFORCEMENTS

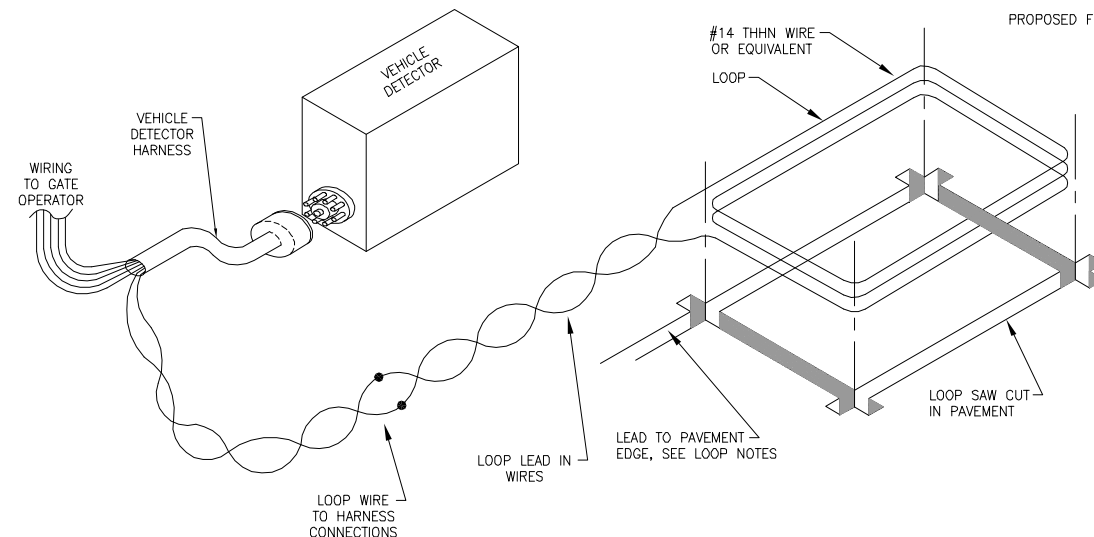


SAFETY LOOP INSTALLATION DETAIL

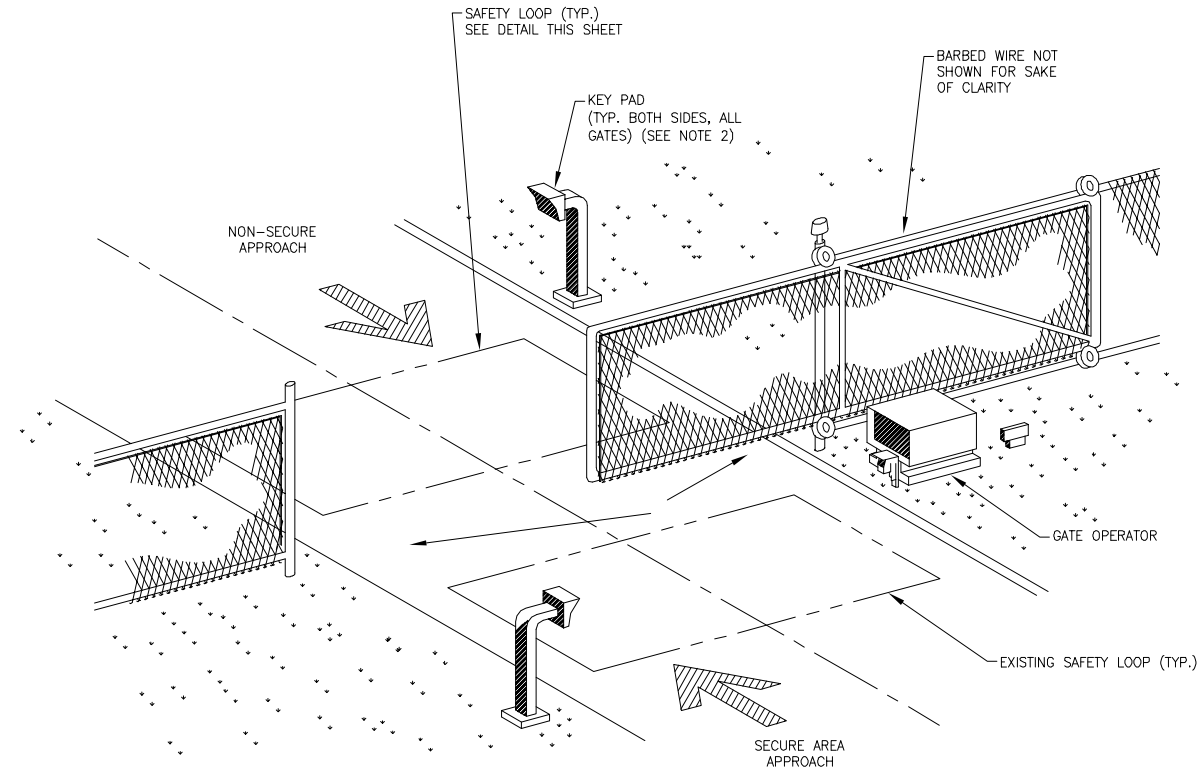
NOTE:

WHERE BITUMINOUS PAVEMENT IS NOT PRESENT THE DETECTOR LOOP SHALL BE PLACED IN 1/2" SCHEDULE 80 PVC.
DO NOT INSTALL LOOP WITHIN 2 INCHES OF ANY STEEL REINFORCEMENTS

FOR INFORMATION PUROSES ONLY.
NO NEW GATE, CONTRACT TO REPLACE
DETECTOR LOOP ON NORTH SIDE OF GATE ONLY.

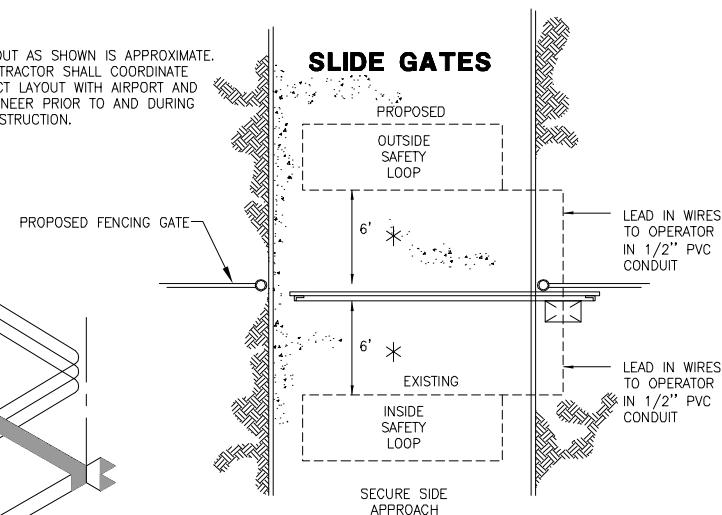


PROPOSED SAFETY LOOP DETECTOR INSTALLATION DETAIL



TYPICAL ELECTRIC GATE LAYOUT DETAIL

* LAYOUT AS SHOWN IS APPROXIMATE. CONTRACTOR SHALL COORDINATE EXACT LAYOUT WITH AIRPORT AND ENGINEER PRIOR TO AND DURING CONSTRUCTION.



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DULUTH INTERNATIONAL AIRPORT

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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 Professional Engineer under the laws of the State of Minnesota.

Signature *Darren K. Christopher*

Typed Name DARREN K. CHRISTOPHER

Date 08/18/2009 Reg. No. 45052

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SHEET TITLE
**FENCING
NOTES
AND
DETAILS**

SHEET NUMBER
C802

**BID
DOCUMENTS**

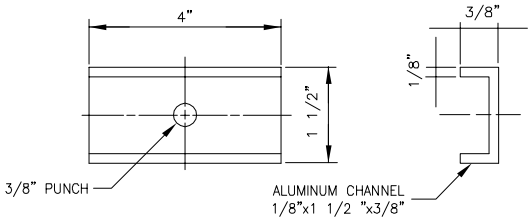
SIGN DETAILS

SIGNS TO BE ALUMINUM OR GALVANIZED STEEL
WITH A MINIMUM THICKNESS OF 0.08".

REFLECTORIZED MEDIA TO BE USED.

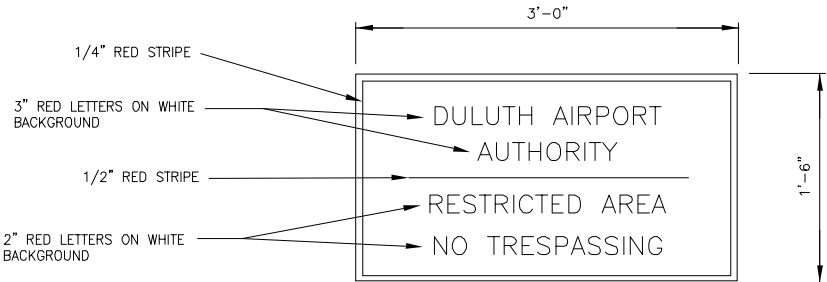
COST OF SIGNS SHALL BE CONSIDERED
INCIDENTAL TO ASSOCIATED ITEMS
REQUIRING SIGNS.

ALL SIGNS TO BE MOUNTED USING A MINIMUM
OF 2 BRACKETS.



MOUNTING BRACKET

2 REQ'D EACH SIGN



NO TRESPASSING SIGN

N.T.S.
REQUIRED EVERY 200' ALONG NEW FENCE
AND AT EACH SIDE OF A CORNER
COST INCIDENTAL TO PROPOSED FENCE
(FACING NON-AOA SIDE)



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GENERAL ELECTRICAL NOTES

A. GENERAL

1. THE ELECTRICAL INSTALLATION, AS A MINIMUM, SHALL MEET ALL FAA STANDARDS, THE NATIONAL ELECTRICAL CODE AND LOCAL REGULATIONS.
2. THE CONTRACTOR SHALL ASCERTAIN THAT ALL LIGHTING SYSTEM COMPONENTS FURNISHED BY HIM (INCLUDING FAA APPROVED EQUIPMENT) ARE COMPATIBLE IN ALL RESPECTS WITH EACH OTHER AND THE REMAINDER OF THE NEW/ EXISTING SYSTEM. ANY NONCOMPATIBLE COMPONENTS FURNISHED BY THIS CONTRACTOR SHALL BE REPLACED BY HIM AT NO ADDITIONAL COST TO THE AIRPORT SPONSOR WITH A SIMILAR UNIT, APPROVED BY THE ENGINEER (DIFFERENT MODEL OR DIFFERENT MANUFACTURER) THAT IS COMPATIBLE WITH THE REMAINDER OF THE AIRPORT LIGHTING SYSTEM.
3. IN CASE THE CONTRACTOR SELECTS TO FURNISH AND INSTALL AIRPORT LIGHTING EQUIPMENT REQUIRING ADDITIONAL WIRING, TRANSFORMERS, ADAPTERS, MOUNTINGS, ETC., TO THOSE SHOWN ON THE DRAWINGS AND/OR LISTED IN THE SPECIFICATIONS, ANY COST FOR THESE ITEMS SHALL BE INCIDENTAL TO THE EQUIPMENT COST.
4. THE CONTRACTOR INSTALLED EQUIPMENT (INCLUDING FAA APPROVED) SHALL NOT GENERATE ANY ELECTROMAGNETIC INTERFERENCE IN THE EXISTING AND/OR NEW COMMUNICATIONS, WEATHER, AIR NAVIGATION, AND AIR TRAFFIC CONTROL EQUIPMENT. ANY EQUIPMENT GENERATING SUCH INTERFERENCE SHALL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST WITH EQUIPMENT MEETING THE APPLICABLE SPECIFICATIONS AND NOT GENERATING ANY INTERFERENCE.
5. WHEN A SPECIFIC TYPE, STYLE, CLASS, ETC. OF FAA APPROVED EQUIPMENT IS SPECIFIED ONLY THAT TYPE, STYLE, CLASS, ETC. WILL BE ACCEPTABLE, EVEN THOUGH EQUIPMENT OF OTHER TYPES, STYLES, CLASS, ETC. MAY BE FAA APPROVED.
6. ANY AND ALL INSTRUCTIONS FROM THE ENGINEER TO THE CONTRACTOR REGARDING CHANGES IN, OR DEVIATIONS FROM THE PLANS AND SPECIFICATIONS SHALL BE IN WRITING WITH COPIES SENT TO THE AIRPORT SPONSOR AND THE FAA FIELD OFFICE (ADO/AFO). THE CONTRACTOR SHALL NOT ACCEPT ANY VERBAL INSTRUCTIONS FROM THE ENGINEER OR OWNER REGARDING ANY CHANGES FROM THE PLANS AND SPECIFICATIONS.
7. A MINIMUM OF THREE COPIES OF INSTRUCTION BOOK SHALL BE SUPPLIED WITH EACH DIFFERENT TYPE OF EQUIPMENT. THE BOOKS DESCRIBING A MORE SOPHISTICATED TYPE OF EQUIPMENT, SUCH AS REGULATORS, PAPI, ETC. AS A MINIMUM SHALL CONTAIN THE FOLLOWING:
- (A) A DETAILED DESCRIPTION OF THE OVERALL EQUIPMENT AND ITS INDIVIDUAL COMPONENTS.
- (B) THEORY OF OPERATION INCLUDING THE FUNCTION OF EACH COMPONENT.
- (C) INSTALLATION INSTRUCTIONS.
- (D) START-UP INSTRUCTIONS.
- (E) PREVENTATIVE MAINTENANCE REQUIREMENTS.
- (F) CHART FOR TROUBLESHOOTING.
- (G) COMPLETE POWER AND CONTROL DETAILED WIRING DIAGRAM(S), SHOWING EACH CONDUCTOR/CONNECTION/ COMPONENT- "BLACK" BOXES ARE NOT ACCEPTABLE. THE DIAGRAM OR THE NARRATIVE SHALL SHOW VOLTAGES/ CURRENTS/WAVE SHAPES AT STRATEGIC LOCATIONS TO BE USED WHEN CHECKING AND/OR TROUBLE SHOOTING THE EQUIPMENT. WHEN THE EQUIPMENT HAS SEVERAL MODES OF OPERATION, SUCH AS SEVERAL BRIGHTNESS STEPS, THESE PARAMETERS SHALL BE INDICATED FOR ALL THE DIFFERENT MODES.
- (H) PARTS LIST WHICH WILL INCLUDE ALL MAJOR AND MINOR COMPONENTS, SUCH AS RESISTORS, DIODES, ETC. IT SHALL INCLUDE A COMPLETE NOMENCLATURE OF EACH COMPONENT AND, IF APPLICABLE, THE NAME OF ITS MANUFACTURER AND THE CATALOG NUMBER.
- (I) SAFETY INSTRUCTIONS.
8. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS, INSPECTIONS AND APPROVALS.
9. ALL MATERIALS SCHEDULED FOR REMOVAL SUCH AS EXISTING RUNWAY AND TAXIWAY LIGHTS WHICH ARE DEEMED SALVAGABLE BY THE AIRPORT SHALL BE DELIVERED TO THE LOCATION ON AIRPORT PROPERTY AS INDICATED BY THE AIRPORT. ALL NONSALVAGABLE MATERIALS REMOVED SUCH AS CONCRETE FOUNDATIONS, CONDUIT, CONDUCTORS, ETC. SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR.
10. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE DULUTH INTERNATIONAL AIRPORT MANAGEMENT, FEDERAL AVIATION ADMINISTRATION (FAA) AND THE RESIDENT PROJECT REPRESENTATIVE (RPR) PRIOR TO AND DURING ALL CONSTRUCTION TO ENSURE THAT ALL ELECTRICAL CIRCUITS AND FACILITIES HAVE BEEN LOCATED, FLAGGED AND ACCOUNTED FOR AND THAT ALL NECESSARY CIRCUITS HAVE BEEN DETERMINED PRIOR TO INITIATING CONSTRUCTION IN ANY LOCATIONS.
11. DEWATERING FOR THE INSTALLATION OF MANHOLES AND/OR DUCTBANKS IS INCIDENTAL TO THE RESPECTIVE PAY ITEM. THE CONTRACTOR SHALL BE RESPONSIBLE TO PAY FOR AND OBTAIN ANY AND ALL PERMITS REQUIRED FOR DEWATERING.
12. THE DULUTH INTERNATIONAL AIRPORT "LOCK/TAG/TRY" PROCEDURE SHALL BE COMPLIED WITH BY THE CONTRACTOR. THE AIRPORT WILL PROVIDE TRAINING TO THE CONTRACTOR FOR THIS SAFETY PROCEDURE.
13. AIRFIELD SIGNS PROVIDING DIRECTIONS TO CLOSED AREAS SHALL BE COVERED. ALL AREAS CLOSED TO AIRCRAFT SHALL NOT BE LIGHTED. ADEQUATE LIGHTING IN THE OPINION OF THE RESIDENT ENGINEER SHALL BE PROVIDED TO DELINEATE THE ACTIVE AND CLOSED AREAS OF THE AOA.

B. POWER AND CONTROL

1. LEGEND PLATES SHALL BE FURNISHED AND INSTALLED ON ALL PANELBOARDS, JUNCTION BOXES, REGULATORS, POWER DISTRIBUTION EQUIPMENT, CONTROL PANELS AND ANY OTHER ITEMS AS REQUIRED OR DIRECTED BY THE ENGINEER. LEGEND PLATES SHALL BE WEATHERPROOF AND ABRASION RESISTANT PHENOLIC MATERIALS. LETTERING SHALL BE BLACK ON WHITE BACKGROUND. LEGEND PLATES SHALL BE INSTALLED USING DOUBLE SIDED TAPE OR ADHESIVE WITH PEAL OFF BACKING.
2. COLOR CODE ALL PHASE WIRING BY THE USE OF COLORED WIRE INSULATION AND/OR COLORED TAPE. WHERE TAPE IS USED, THE WIRE INSULATION SHALL BE BLACK. BLACK AND RED SHALL BE USED FOR SINGLE-PHASE, THREE WIRE SYSTEMS AND BLACK, RED AND BLUE SHALL BE USED FOR THREE-PHASE SYSTEMS. NEUTRAL CONDUCTORS, SIZE NO. 6 AWG OR SMALLER, SHALL BE IDENTIFIED BY A CONTINUOUS WHITE OR NATURAL GRAY OUTER FINISH ALONG ITS ENTIRE LENGTH. NEUTRAL CONDUCTORS LARGER THAN NO. 6 AWG SHALL BE IDENTIFIED EITHER BY A CONTINUOUS WHITE OR NATURAL GRAY OUTER FINISH ALONG ITS ENTIRE LENGTH OR BY THE USE OF WHITE TAPE AT ITS TERMINATION AND INSIDE ACCESSIBLE WIREWAYS.
3. ALL BRANCH CIRCUIT CONDUCTORS CONNECTED TO A PARTICULAR PHASE SHALL BE IDENTIFIED WITH THE SAME COLOR. THE COLOR CODING SHALL BE EXTENDED TO THE POINT OF UTILIZATION.
4. IN CONTROL WIRING, THE SAME COLOR SHALL BE USED THROUGHOUT THE SYSTEM FOR THE SAME FUNCTION, SUCH AS 10%, 30%, 100% BRIGHTNESS CONTROL, ETC.
5. ALL POWER AND CONTROL CIRCUIT CONDUCTORS SHALL BE COPPER; ALUMINUM SHALL NOT BE ACCEPTED. THIS INCLUDES WIRE, CABLE, BUSSES, TERMINALS, SWITCH/PANEL COMPONENTS, ETC.
6. LOW VOLTAGE (600 V.) AND HIGH VOLTAGE (5000 V.) CONDUCTORS SHALL BE INSTALLED IN SEPARATE WIREWAYS.
7. NEATLY LACE WIRING IN DISTRIBUTION PANELS, WIREWAYS, SWITCHES AND JUNCTION/PULL BOXES.
8. THE MINIMUM SIZE OF PULL/JUNCTION BOXES, REGARDLESS OF THE QUANTITY AND THE SIZE OF THE CONDUCTORS SHOWN, SHALL BE AS FOLLOWS:
- (A) IN STRAIGHT PULLS THE LENGTH OF THE BOX SHALL NOT BE LESS THAN EIGHT TIMES THE TRADE DIAMETER OF THE LARGER CONDUIT. THE TOTAL AREA (INCLUDING THE CONDUIT CROSS-SECTIONAL AREA) OF A BOX END SHALL BE AT LEAST 3 TIMES GREATER THAN THE TOTAL TRADE CROSS-SECTIONAL AREA OF THE CONDUITS TERMINATING AT THE END.
- (B) IN ANGLE OR U PULLS THE DISTANCE BETWEEN EACH CONDUIT ENTRY INSIDE THE BOX AND THE OPPOSITE WALL OF THE BOX SHALL NOT BE LESS THAN SIX TIMES THE TRADE DIAMETER OF THE LARGEST CONDUIT. THIS DISTANCE SHALL BE INCREASED FOR ADDITIONAL ENTRIES BY THE AMOUNT OF THE SUM OF THE DIAMETERS OF ALL OTHER CONDUIT ENTRIES ON THE SAME WALL OF THE BOX. THE DISTANCE BETWEEN CONDUIT ENTRIES ENCLOSING THE SAME CONDUCTOR SHALL NOT BE LESS THAN SIX TIMES THE TRADE DIAMETER OF THE LARGEST CONDUIT.
9. A RUN OF CONDUIT BETWEEN TERMINATIONS AT EQUIPMENT ENCLOSURES, SQUARE DUCTS AND PULL/JUNCTION BOXES, SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF FOUR QUARTER BENDS (360 DEGREES TOTAL), INCLUDING THOSE BENDS LOCATED IMMEDIATELY AT THE TERMINATIONS. CAST, CONDULET TYPE OUTLETS SHALL NOT BE TREATED AS PULL/JUNCTION BOXES.
10. EQUIPMENT CABINETS SHALL NOT BE USED AS PULL/JUNCTION BOXES. ONLY WIRING TERMINATING AT THE EQUIPMENT SHALL BE BROUGHT INTO THESE ENCLOSURES.

11. SPLICES AND JUNCTION POINTS SHALL BE PERMITTED ONLY IN JUNCTION BOXES, DUCTS EQUIPPED WITH REMOVABLE COVERS, AND AT EASILY ACCESSIBLE LOCATIONS.
12. CIRCUIT BREAKERS IN POWER DISTRIBUTION PANEL(S) SHALL BE THERMAL-MAGNETIC, MOLDED CASE, PERMANENT TRIP WITH 100 AMPERE, MINIMUM, FRAME.
13. DUAL LUGS SHALL BE USED WHERE TWO WIRES, SIZE NO.6 OR LARGER, ARE TO BE CONNECTED TO THE SAME TERMINAL.
14. RIGID STEEL CONDUIT SHALL BE USED THROUGHOUT THE INSTALLATION UNLESS OTHERWISE SPECIFIED. THE MINIMUM TRADE SIZE SHALL BE 3/4 INCH.
15. ALL RIGID CONDUIT SHALL BE TERMINATED AT CONSTANT CURRENT REGULATORS WITH A SECTION (36" MINIMUM) OF FLEXIBLE CONDUIT.
16. UNLESS OTHERWISE SHOWN ALL EXPOSED CONDUITS SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES WITH THE LINES OF THE STRUCTURE.
17. ALL STEEL CONDUITS, FITTINGS, NUTS, BOLTS, ETC. SHALL BE GALVANIZED.
18. USE CONDUIT BUSHINGS AT EACH CONDUIT TERMINATION. WHERE NO. 4 AWG OR LARGER UNGROUNDED WIRE IS INSTALLED, USE INSULATED BUSHINGS.
19. USE DOUBLE LOCK NUTS AT EACH CONDUIT TERMINATION.
20. WRAP ALL PRIMARY AND SECONDARY POWER TRANSFORMER CONNECTIONS WITH SUFFICIENT LAYERS OF INSULATING TAPE AND COVER WITH INSULATING VARNISH FOR FULL VALUE OF CABLE INSULATION VOLTAGE.
21. UNLESS OTHERWISE NOTED, ALL INDOOR SINGLE CONDUCTOR CONTROL WIRING SHALL BE NO. 12 AWG. (MIN.).
22. BOTH ENDS OF EACH CONTROL CONDUCTOR SHALL BE TERMINATED AT A TERMINAL BLOCK. THE TERMINAL BLOCKS SHALL BE OF PROPER RATING AND SIZE FOR THE FUNCTION INTENDED AND THEY SHALL BE LOCATED IN EQUIPMENT ENCLOSURES OR SPECIAL TERMINAL CABINETS.
23. ALL CONTROL CONDUCTOR TERMINATIONS SHALL BE OF THE OPEN-EYE CONNECTOR/SCREW TYPE. SOLDERED, CLOSED-EYE TERMINATIONS, OR TERMINATIONS WITHOUT CONNECTORS ARE NOT ACCEPTABLE.
24. IN TERMINAL BLOCK CABINETS THE MINIMUM SPACING BETWEEN PARALLEL TERMINAL BLOCKS SHALL BE 6 INCHES. THE MINIMUM SPACING BETWEEN TERMINAL BLOCK SIDES/ENDS AND CABINET SIDES/BOTTOM/TOP SHALL BE 5 INCHES. THE MINIMUM SPACING WILL BE INCREASED AS REQUIRED BY THE NUMBER OF CONDUCTORS. ADDITIONAL SPACING SHALL BE PROVIDED AT CONDUCTOR ENTRANCES.
25. BOTH ENDS OF ALL CONTROL CONDUCTORS SHALL BE IDENTIFIED AS TO THE CIRCUIT, TERMINAL BLOCK, AND TERMINAL NUMBER. ONLY STICK-ON LABELS SHALL BE USED.
26. A SEPARATE AND CONTINUOUS NEUTRAL CONDUCTOR SHALL BE INSTALLED AND CONNECTED FOR EACH BREAKER CIRCUIT IN THE POWER PANEL(S) FROM THE NEUTRAL BAR TO EACH POWER/CONTROL CIRCUIT.
27. THE FOLLOWING SHALL APPLY TO RELAY/CONTACTOR PANELS/ENCLOSURES:
- (A) ALL COMPONENTS SHALL BE MOUNTED IN DUST PROOF ENCLOSURE(S) WITH VERTICALLY HINGED COVERS.
- (B) THE ENCLOSURE(S) SHALL HAVE AMPLE SPACE FOR THE CIRCUIT COMPONENTS, TERMINAL BLOCKS, AND INCOMING AND INTERNAL WIRING.
- (C) ALL INCOMING/OUTGOING WIRING SHALL BE TERMINATED AT TERMINAL BLOCKS.
- (D) EACH TERMINAL ON TERMINAL BLOCKS AND ON CIRCUIT COMPONENTS SHALL BE CLEARLY IDENTIFIED.
- (E) ALL CONTROL CONDUCTOR TERMINATIONS SHALL BE OF THE OPEN-EYE CONNECTOR/SCREW TYPE. SOLDERED, CLOSED-EYE TERMINATIONS, OR TERMINATIONS WITHOUT CONNECTORS ARE NOT ACCEPTABLE.
- (F) WHEN THE ENCLOSURE COVER IS OPENED, ALL CIRCUIT COMPONENTS, WIRING, AND TERMINALS SHALL BE EXPOSED AND ACCESSIBLE WITHOUT REMOVAL OF ANY PANELS, COVERS, ETC., EXCEPT THOSE COVERING HIGH VOLTAGE COMPONENTS.
- (G) ACCESS TO, OR REMOVAL OF A CIRCUIT COMPONENT OR TERMINAL BLOCK WILL NOT REQUIRE THE REMOVAL OF ANY OTHER CIRCUIT COMPONENT OR TERMINAL BLOCK.
- (H) EACH CIRCUIT COMPONENT SHALL BE CLEARLY IDENTIFIED INDICATING ITS CORRESPONDING NUMBER SHOWN IN THE DRAWINGS AND ITS FUNCTION.
- (I) A COMPLETE WIRING DIAGRAM (NOT A SCHEMATIC DIAGRAM) SHALL BE MOUNTED ON THE INSIDE OF THE COVER. THE DIAGRAM SHALL REPRESENT EACH CONDUCTOR BY A SEPARATE LINE.
- (J) THE DIAGRAM SHALL IDENTIFY EACH CIRCUIT COMPONENT AND NUMBERING AND COLOR OF EACH INTERNAL CONDUCTOR AND TERMINAL.
- (K) ALL WIRING SHALL BE NEATLY TRAINED AND LACED.
- (L) MINIMUM WIRE SIZE SHALL BE NO.12 AWG UNLESS OTHERWISE NOTED.

C. FIELD LIGHTING

1. UNLESS OTHERWISE NOTED, ALL UNDERGROUND FIELD POWER MULTIPLE AND SERIES CIRCUIT CONDUCTORS WHETHER DIRECT BURIED OR IN DUCT/CONDUIT SHALL BE FAA APPROVED L-824 TYPE. INSULATION VOLTAGE AND SIZE SHALL BE AS SPECIFIED.
2. NO COMPONENTS OF PRIMARY CIRCUIT SUCH AS CABLE, CONNECTORS AND TRANSFORMERS SHALL BE BROUGHT ABOVE GROUND AT EDGE LIGHTS, SIGNS, REIL, PAPI, ETC.
3. THERE SHALL BE NO EXPOSED POWER/CONTROL CABLES BETWEEN THE POINT WHERE THEY LEAVE THE UNDERGROUND (DIRECT BURIED OR L-867 BASES) AND WHERE THEY ENTER THE EQUIPMENT (SUCH AS TAXIWAY SIGNS, PAPI, REIL, ETC.) ENCLOSURES. THESE CABLES SHALL BE ENCLOSED IN RIGID CONDUIT OR IN FLEXIBLE, WATER-TIGHT CONDUIT WITH BREAKABLE COUPLING(S) AT THE GRADE OR THE HOUSING COVER, AS SHOWN IN APPLICABLE DETAILS.
4. THE JOINTS OF THE L-823 PRIMARY CONNECTORS SHALL BE WRAPPED WITH AT LEAST ONE LAYER OF RUBBER OR SYNTHETIC RUBBER TAPE AND ONE LAYER OF PLASTIC TAPE, ONE-HALF LAPPED, EXTENDING AT LEAST 1/2 INCHES ON EACH SIDE OF THE JOINT.
5. THE ID OF THE PRIMARY L-823 FIELD ATTACHED CONNECTORS SHALL MATCH THE CABLE OD TO PROVIDE A WATERTIGHT CABLE ENTRANCE.
6. HEAT SHRINK WITH INTERNAL ADHESIVE SHALL BE INSTALLED OVER L-823 ASSEMBLY, AS DETAILED I N THE PLANS.
7. L-823 TYPE II, TWO-CONDUCTOR SECONDARY CONNECTORS SHALL BE CLASS "A" (FACTORY MOLDED).
8. THERE SHALL BE NO SPLICES IN THE SECONDARY CABLE(S) WITHIN THE STEMS OF A RUNWAY/TAXIWAY EDGE/THRESHOLD LIGHTING FIXTURES AND THE WIREWAYS LEADING TO TAXIWAY SIGNS AND PAPI/REIL EQUIPMENT.
9. ELECTRICAL INSULATING GREASE SHALL BE APPLIED WITHIN THE L-823, SECONDARY, TWO CONDUCTOR CONNECTORS TO PREVENT WATER ENTRANCE. THESE CONNECTORS SHALL NOT BE TAPED.
10. A SLACK OF 3 FEET, MINIMUM, SHALL BE PROVIDED IN THE PRIMARY CABLE AT EACH TRANSFORMER/CONNECTOR TERMINATION. PAYMENT SHALL BE PER LINEAR FOOT OF CABLE INSTALLED IN EACH BASE CAN.
11. DIRECTION OF PRIMARY CABLES SHALL BE IDENTIFIED BY COLOR CODING AS FOLLOWS: WHEN FACING LIGHT WITH BACK TO PAVEMENT, CABLE TO THE LEFT IS CODED RED AND CABLE TO RIGHT IS CODED BLUE. THIS APPLIES TO STAKE MOUNTED LIGHTS AND BASE MOUNTED LIGHTS WHERE THE BASE HAS ONLY ONE ENTRANCE.
12. L-867 BASES SHALL BE SIZE B, 24" DEEP, CLASS I, UNLESS OTHERWISE NOTED.
13. BASE MOUNTED BREAKABLE COUPLINGS SHALL NOT HAVE WEEP HOLES TO THE OUTSIDE. PLUGGED UP HOLES SHALL NOT BE ACCEPTABLE. IT SHALL HAVE A 1/4" DIAMETER, MINIMUM, OR EQUIVALENT OPENING FOR DRAINAGE FROM THE SPACE AROUND THE SECONDARY CONDUCTOR INTO THE L-867 BASE.
14. THE ELEVATION OF THE BREAKABLE COUPLING GROOVE SHALL NOT EXCEED 1 1/2" ABOVE THE EDGE OF THE COVER IN CASE OF BASE MOUNTED COUPLINGS, OR THE TOP OF THE STAKE IN CASE OF STAKE MOUNTED COUPLINGS.

15. WHERE THE BREAKABLE COUPLING IS NOT AN INTEGRAL PART OF THE LIGHT FIXTURE STEM OR MOUNTING LEG, A BEAD OF SILICON SEAL SHALL BE APPLIED COMPLETELY AROUND LIGHT STEM OR WIREWAY AT BREAKABLE COUPLING TO PROVIDE A WATERTIGHT SEAL.
16. PLASTIC LIGHTING FIXTURE COMPONENTS, SUCH AS LAMP HEADS, STEMS, BREAKABLE COUPLINGS, BASE COVERS, BRACKETS, STAKES, SHALL NOT BE ACCEPTABLE. L-867 PLASTIC TRANSFORMER HOUSINGS ARE ACCEPTABLE. THE METAL THREADED FITTINGS SHALL BE SET IN THE FLANGE DURING CASTING PROCESS. BASE COVER BOLTS SHALL BE FABRICATED FROM 18-8 STAINLESS STEEL.
17. EDGE LIGHT NUMBERING TAGS SHALL BE FACING THE PAVEMENT.
18. CABLE/SPLICE/DUCT MARKETS SHALL BE PRECAST CONCRETE OF THE SIZE SHOWN. LETTERS/NUMBERS/ ARROWS FOR THE LEGEND TO BE IMPRESSED INTO THE TOPS OF THE MARKERS SHALL BE PRE-ASSEMBLED AND SECURED IN THE MOLD BEFORE THE CONCRETE IS POURED. LEGEND INSCRIBED BY HAND IN WET CONCRETE SHALL NOT BE ACCEPTABLE.
19. ALL UNDERGROUND CABLE RUNS SHALL BE IDENTIFIED BY CABLE MARKERS AT 200 FEET MAXIMUM SPACING, WITH AN ADDITIONAL MARKER AT EACH CHANGE OF DIRECTION OF THE CABLE RUN. CABLE MARKERS SHALL BE INSTALLED IMMEDIATELY ABOVE THE CABLE.
20. LOCATIONS OF ENDS OF ALL UNDERGROUND DUCTS SHALL BE IDENTIFIED BY DUCT MARKERS.
21. ALL POWER AND CONTROL CABLES IN MAN/HAND HOLES SHALL BE TAGGED. USE EMBOSSED COPPER STRIPS TO BE ATTACHED AT BOTH ENDS TO THE CABLE BY THE USE OF PLASTIC STRAPS. MINIMUM OF TWO TAGS SHALL BE PROVIDED ON EACH CABLE IN A MAN/HAND HOLE – ONE AT THE CABLE ENTRANCE AND ONE AT THE CABLE EXIT.
22. APPLY AN OXIDE INHIBITING, ANTI-SEIZING COMPOUND TO ALL SCREWS, NUTS AND BREAKAGE COUPLING THREADS.
23. THERE SHALL BE NO SPLICES BETWEEN THE ISOLATION TRANSFORMERS. L-823 CONNECTORS ARE ALLOWED AT TRANSFORMER CONNECTIONS ONLY, UNLESS OTHERWISE SHOWN.
24. CONCRETE USED FOR SLABS, FOOTINGS, BACKFILL AROUND TRANSFORMER HOUSINGS, MARKERS, ETC. SHALL BE 4000 PSI, MIN., AIR-ENTRAINED, CONSISTENT WITH THE REQUIREMENTS OF ITEM P-610.

D. CABLE PROTECTION CRITERIA

1. ALL EXISTING SYSTEMS TO REMAIN SHALL BE PROTECTED FROM DAMAGE.
2. EXISTING CONDUIT, DUCTBANK, CIRCUITING AND UTILITY INFORMATION IS BASED ON BISHOP INTERNATIONAL AIRPORT "AS BUILT" AND "RECORD" DRAWINGS AND SITE VISITS BY THE UTILITIES AND THE ENGINEER. THE EXISTING UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND SHALL NOT BE SCALED FOR EXACT LOCATIONS. NOT ALL UTILITIES MAY BE SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE APPROPRIATE UTILITY/AGENCY, PRIOR TO STARTING WORK, FOR THE LOCATION OF EXISTING UTILITIES. ANY INTERPRETATION OF AN EXISTING SYSTEM OR UTILITY SERVICE SHALL BE COORDINATED AND APPROVED BY THE AUTHORITY, AGENCY OR UTILITY HAVING JURISDICTION. PRIOR TO THE START OF WORK THE CONTRACTOR SHALL CONTACT ALL LOCAL UTILITIES.
3. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT THE APPROPRIATE UTILITY COMPANIES, AGENCY ETC. PRIOR TO ANY EXCAVATION/CONSTRUCTION TO LOCATE THE UTILITY, AGENCIES, UNDERGROUND CABLES, PIPES, CONDUITS, DUCTBANKS, ETC.. REPLACEMENT OF EXISTING CABLES OR UTILITIES DAMAGED BY THE CONTRACTOR DURING CONSTRUCTION SHALL BE AT THE CONTRACTORS EXPENSE.
4. EXISTING DIRECT BURIED CABLE THAT IS TO REMAIN INTACT, FUNCTIONAL AND OPERATIONAL SHALL BE ENCLOSED IN A CARLON SPLIT-DUCT OR APPROVED EQUAL AND ENCASED IN A 3" MIN. ENVELOPE OF P-610 CONCRETE UNDER THE FOLLOWING CONDITIONS.
- A. WHEN WITHIN 20' OF EXCAVATION, TRENCHING ETC..
- B. WHEN THE PAVEMENT WIDENING OR EXTENSIONS WILL BE ROUTED OVER THE EXISTING CABLE. THE DUCT BANK SHALL BE EXTENDED 10' BEYOND THE EDGE OF THE PAVEMENT.
- C. WHEN ENCOUNTERED DURING CONSTRUCTION.
- D. WHEN SUBJECT TO DAMAGE FROM CONSTRUCTION ACTIVITIES.
5. EXISTING CABLES SHALL BE EXCAVATED BY HAND.
6. THE CARLON SPLIT-DUCT SHALL EXTEND 10' BEYOND THE EDGE OF THE PAVEMENT INTO THE GRASSED AREA AND BE MARKED WITH AN END OF DUCT MARKER.
7. THE CABLE ELEVATION SHALL BE ADJUSTED SO THAT THE TOP OF THE DUCT CONCRETE ENCASEMENT IS 36" MINIMUM BELOW THE FINISHED GRADE OR TOP SUBGRADE WHICHEVER IS DEEPER. (UNLESS OTHERWISE NOTED)
8. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THAT ALL AIRFIELD LIGHTING CIRCUITS, EXCEPT THOSE THAT ARE SERVING CLOSED TAXIWAYS OR RUNWAYS, ARE COMPLETELY OPERATIONAL, USING THE EXISTING CONTROLS, AT THE TERMINATION OF WORK EACH DAY AND SHALL SO CERTIFY TO THE OWNERS AUTHORIZED REPRESENTATIVE BEFORE LEAVING THE SITE.
9. MULTIPLE CABLES SHALL BE PROTECTED WITH MULTIPLE SPLIT-DUCT WITH A MINIMUM SEPARATION OF 2" BETWEEN DUCTS. REFER TO DUCT BANK DETAILS FOR MULTIPLE DUCT CONFIGURATIONS. POWER AND LOW-VOLTAGE (ANALOG OR DIGITAL) CONTROL SHALL NOT BE GROUPED TOGETHER. EXISTING SEPARATIONS SHALL BE MAINTAINED.
10. INSTALL A PLASTIC, DETECTABLE, MAGNETIC THREE INCH (3") WIDE TAPE EIGHT INCHES (8") BELOW GRADE ABOVE ALL PORTIONS OF EXISTING UNDERGROUND UTILITIES EXPOSED FOR ANY REASON. THIS INCLUDES ALL CABLING INSTALLED IN SPLIT-DUCT. THE DETECTABLE TAPE SHALL BE OMITTED WHERE THE UNDERGROUND UTILITY IS UNDER AIRFIELD PAVEMENT.

E. GROUNDING

1. GROUND ALL NON-CURRENT-CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT BY USING NO. 6 AWG BARE COPPER. WIRE TO BE RUN INSIDE CABINETS AND IN CONDUITS TOGETHER WITH OTHER WIRES. WHERE THIS IS NOT FEASIBLE, RUN THE EXPOSED GROUNDING WIRE PARALLEL OR AT RIGHT ANGLES TO THE BUILDING LINES AND SECURE IT AT LEAST EVERY 24 INCHES AND WITHIN 6 INCHES FROM BEND OR JUNCTION. THE EXPOSED WIRE MAY BE NO. 6 AWG IF IT IS NOT SUBJECTED TO PHYSICAL ABUSE, OTHERWISE NO. 4 AWG SHALL BE USED.
2. ALL GROUND CONNECTIONS TO BUSSES, PANELS, ETC. SHALL BE MADE WITH PRESSURE TYPE SOLDERLESS LUGS AND GROUND CLAMPS. SOLDERED OR BOLT AND WASHER TYPE CONNECTIONS ARE NOT ACCEPTABLE. CLEAN ALL METAL SURFACES BEFORE MAKING GROUND CONNECTIONS. ALL GROUND CONNECTIONS AT GROUND RODS SHALL BE EXOTHERMIC TYPE (CAWELD OR EQUAL).
3. TOPS OF GROUND RODS SHALL BE A MINIMUM OF 12 INCHES BELOW GRADE AND A MAXIMUM OF 16" BELOW GRADE.
4. THE RESISTANCE TO GROUND OF THE VAULT GROUNDING SYSTEM WITH THE COMMERCIAL POWER LINE NEUTRAL DISCONNECTED SHALL NOT EXCEED 10 OHMS.
5. THE RESISTANCE TO GROUND OF THE COUNTERPOISE SYSTEM, OR AT ISOLATED LOCATIONS, SUCH AS AIRPORT BEACON SHALL NOT EXCEED 25 OHMS.



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Signature *Darren K. Christopher*
Typed Name DARREN K. CHRISTOPHER
Date 08/18/2009 Reg. No. 45052

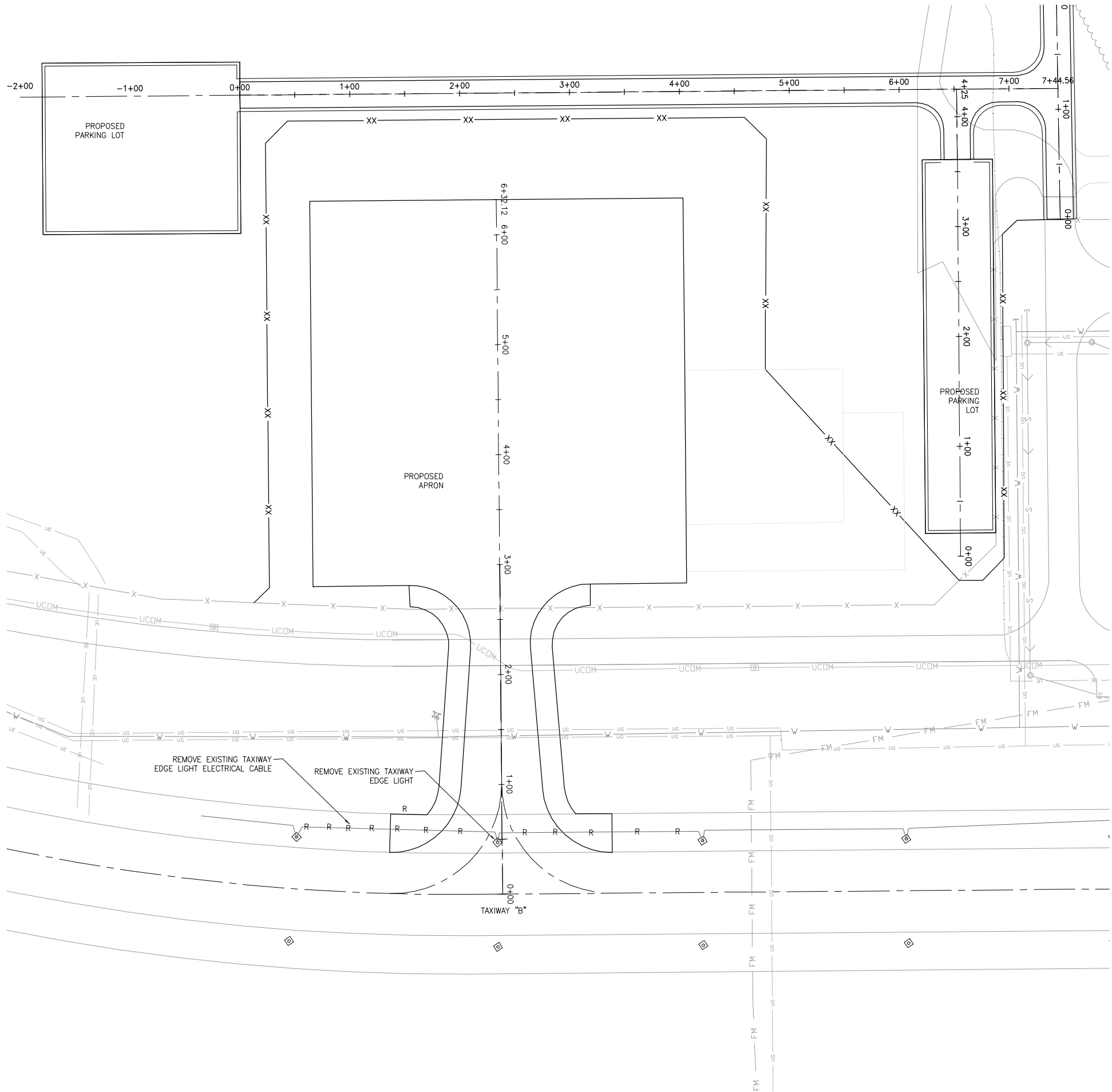
REVISIONS		
NO.	DESCRIPTION	DATE

DATE ISSUED: 08-18-2009
REVIEWED BY: MLS
DRAWN BY: JKE
DESIGNED BY: DKC
AEP PROJECT NUMBER
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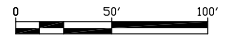
SHEET TITLE
AIRFIELD LIGHTING NOTES

SHEET NUMBER
E001
BID DOCUMENTS

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- LEGEND**
- EXISTING BASE MOUNTED TAXIWAY EDGE LIGHT
 - AIRFIELD LIGHTING CIRCUIT "B"
 - WATER MAIN
 - SANITARY FORCE MAIN
 - UNDERGROUND ELECTRIC
 - SANITARY SEWER
 - HP GAS
 - UNDERGROUND COMMUNICATION



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214-1882-077
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SHEET TITLE
**AIRFIELD
ELECTRICAL
DEMOLITION
PLAN**

SHEET NUMBER
ED100
**BID
DOCUMENTS**

PROPOSED SIGNAGE

SIGN	SHEET #	CIRCUIT	MODULES	SIDE A LEGEND					SIDE B LEGEND					SIDE A COLOR					SIDE B COLOR					COMMENTS	ACTION
				1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
128	E100	TW B	2	←AP	RON				⊗	⊗	⊗			B/Y	B/Y				B	B					N
129	E100	TW B	2	APR	ON→				⊗	⊗	⊗			B/Y	B/Y				B	B					N
130	E100	TW B	2	←	B→				⊗	⊗	⊗			B/Y	B/Y				B	B					N

SIGN SCHEDULE LEGEND

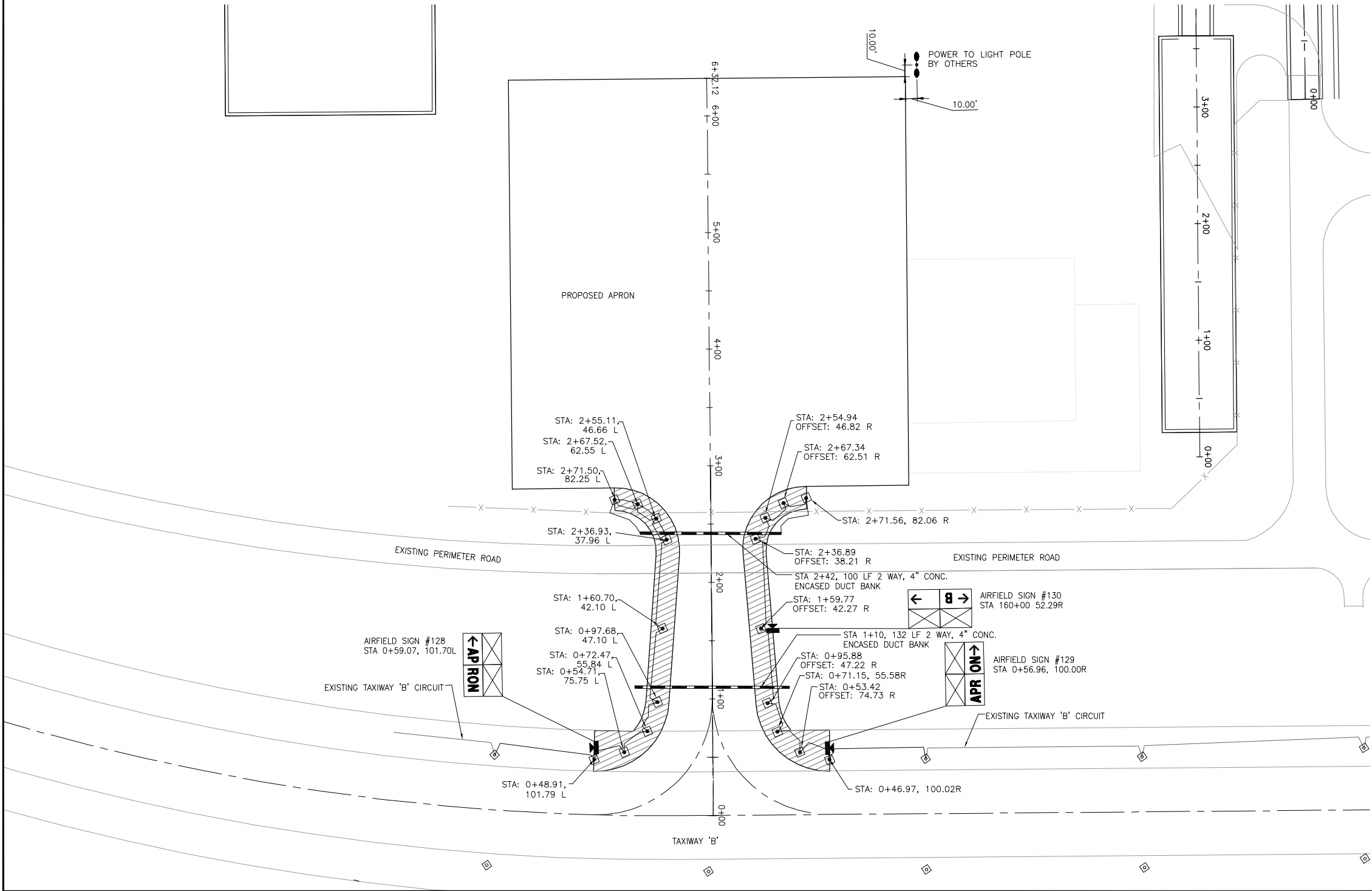
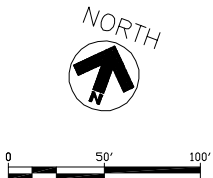
Y/B = LOCATION SIGN YELLOW IN BLACK BACKGROUND
W/R = WHITE ON RED BACKGROUND
B/Y = BLACK ON YELLOW BACKGROUND
B = BLACK
X = BLANK
W/B = WHITE ON BLACK BACKGROUND

KEY

N - NEW
R - TO BE REMOVED
NP - EXISTING SIGN WITH NEW PANEL

NOTES:

- ALL NEW SIGNS ARE SIZE 1, STYLE 2 AND CLASS 2.
- ALL SIGNS READ LEFT TO RIGHT WHILE FACING THE SIGN.
- ALL SIGNS SHALL BE MANUFACTURED AND INSTALLED IN ACCORDANCE WITH THE LATEST VERSION F.A.A. ADVISORY CIRCULAR 150/5340-18E AND 150/5345-44H.
-
- SIGNAGE LOCATION AND CIRCUIT NUMBERS ARE PROVIDED FOR INFORMATION PURPOSES ONLY. CONTRACTOR SHALL FIELD VERIFY.
- SIGN NUMBERS ON PROPOSED SIGNAGE SHALL BE PLACED ON THE SIGN.



LEGEND

- EXISTING BASE MOUNTED TAXIWAY EDGE LIGHT
- PROPOSED BASE MOUNTED TAXIWAY EDGE LIGHT
- PROPOSED AIRFIELD GUIDANCE SIGN
- POLE MOUNTED LIGHTING
- AIRFIELD LIGHTING CIRCUIT "B"
- CONCRETE ENCASED DUCT BANK

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SHEET TITLE

LIGHTING
& SIGNAGE PLAN

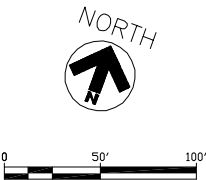
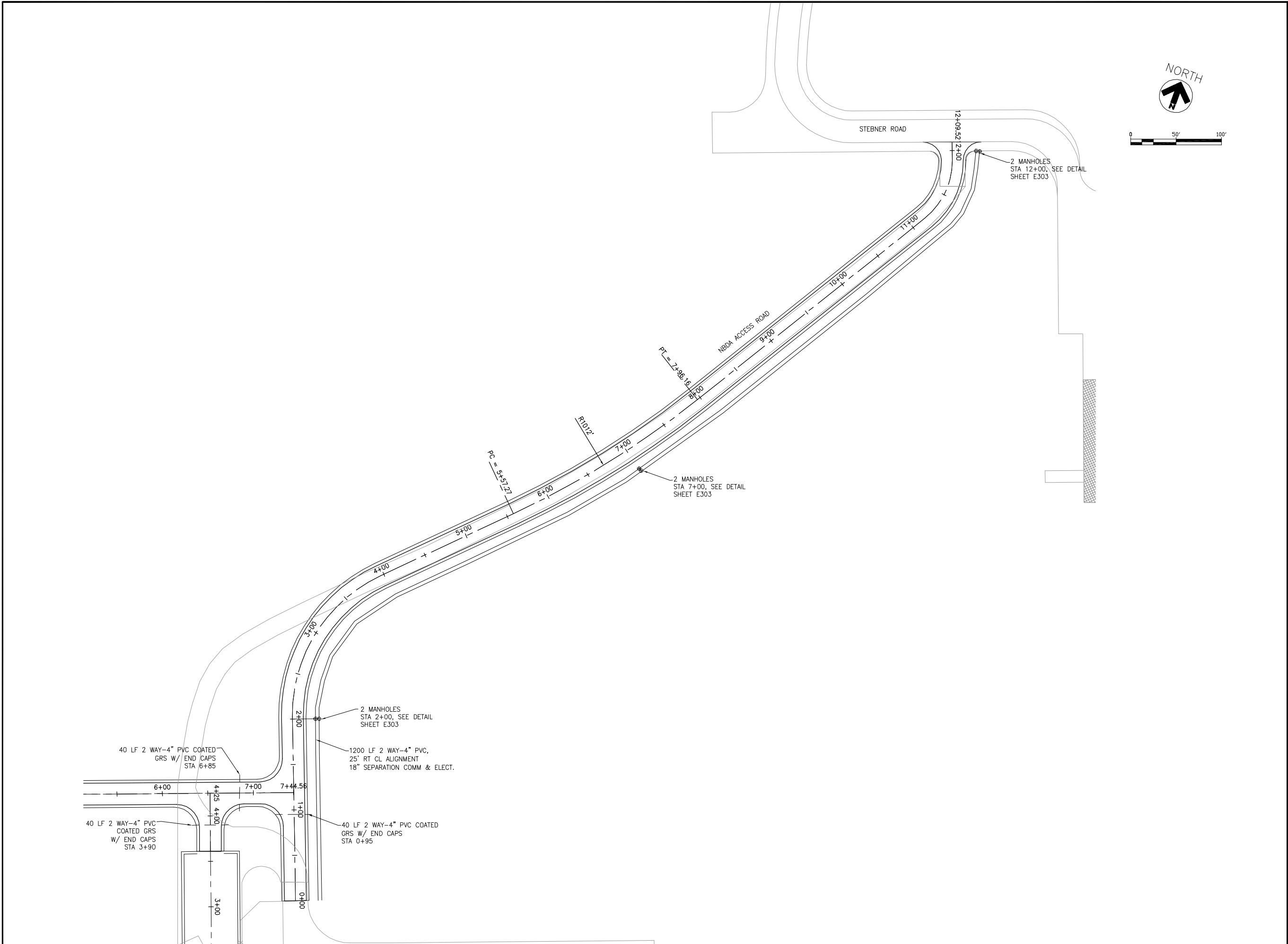
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1 OF 2

SHEET NUMBER

E100

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**LIGHTING
& SIGNAGE PLAN**

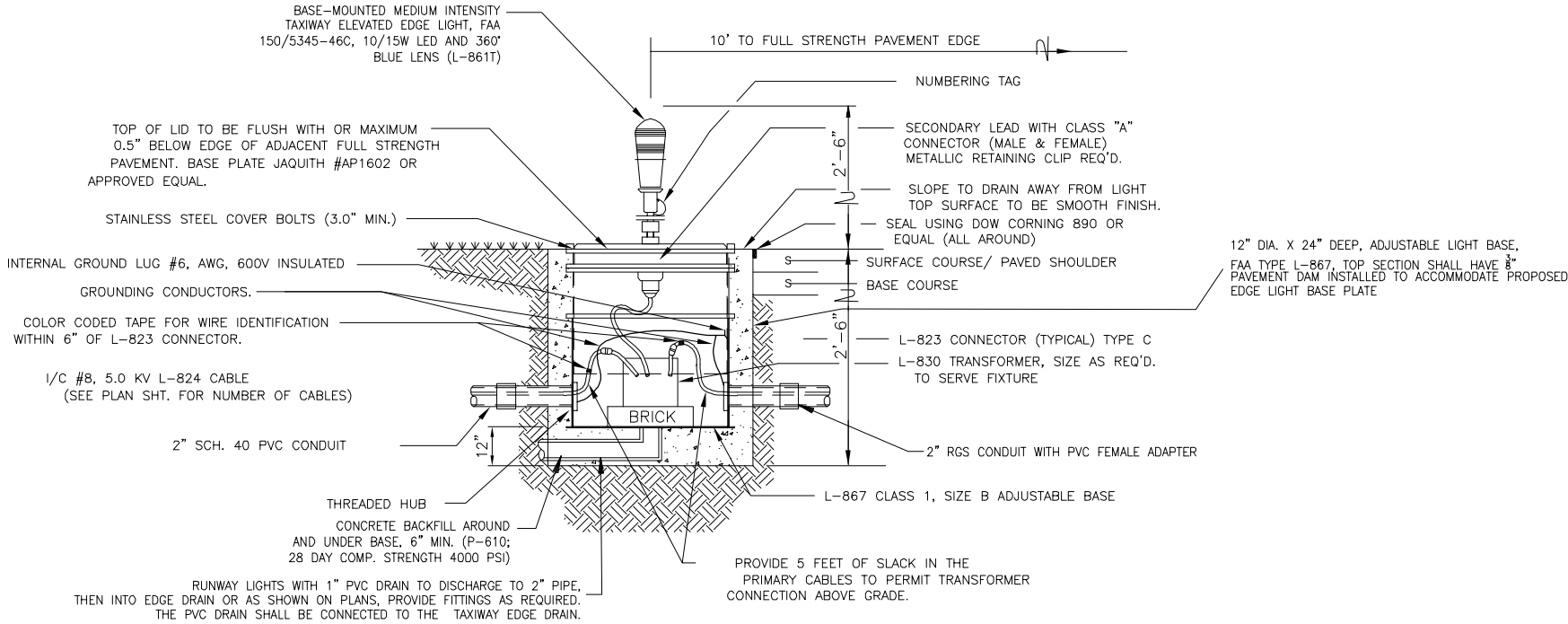
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E101

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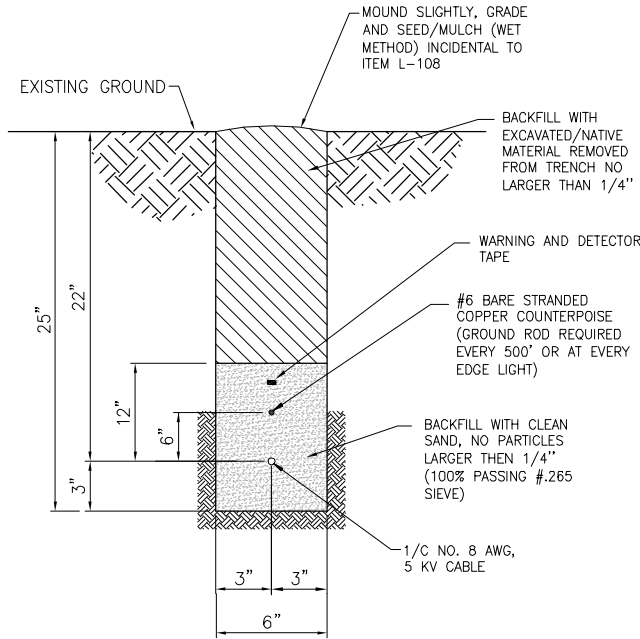
EDGE LIGHT NOTES

1. ALL TYPE "C" CABLE TO BE MEGGERED BETWEEN BASE MOUNTED UNITS WITH RESISTANCE TO GROUND OF ANY SUCH SECTION BEING INFINITY.
2. BREAKABLE COUPLING LOCATED 1 1/2" MAX. ABOVE COVER. MANUFACTURER SHALL PROVIDE AT LEAST A 1/4" DIA. OPENING OR EQUAL FOR DRAINAGE INTO L-867 BASE. WEEP HOLES IN THE COUPLING SHALL BE TO THE OUTSIDE.
3. ALL CONCRETE SHALL COMPLY WITH ITEM P-610 OF 28 DAY STRENGTH NOTED.
4. FOR LIGHTS INSTALLED IN PAVED SHOULDER AREAS, ADJUSTABLE BAS CANS SHALL BE INSTALLED PRIOR TO PAVING. UPON COMPLETION OF PAVING, THE BITUMINOUS PAVEMENT SHALL BE NEATLY CORED AND REMOVED TO ALLOW FOR ADJUSTMENT OF THE CAN TO FINISH GRADE AND PLACING TOP SECTION OF CONCRETE (MINIMUM TOP SECTION OF CONCRETE TIE BARS AND ONE #3 HOOP REQUIRED).



BASE MOUNTED EDGE LIGHT

NTS (SEE PLANS FOR LOCATION)



CONDUIT TRENCH DETAIL
DIRECT EARTH-BURIED

NTS

NOTE:
FOR MULTIPLE CABLE TRENCHES, CABLES SHALL BE SEPARATED 3" MIN WIDEN TRENCH ACCORDINGLY.

THE DULUTH AIRPORT AUTHORITY (DAA) DESIGN STANDARD FOR HIGH INTENSITY RUNWAY LIGHTS AND MEDIUM INTENSITY TAXIWAY LIGHTS IS COOPER-CROUSE-HINDS. THE CONTRACTOR MAY SUBMIT FAA APPROVED EQUAL ALTERNATIVES FOR CONSIDERATION, HOWEVER THE EVALUATION AND ACCEPTANCE OF ALTERNATIVE MANUFACTURERS MAY BE CONTINGENT UPON A DETERMINATION OF COMPATIBILITY WITH EXISTING SIGNS AND THE PROVISION OF IN-HOUSE TRAINING SESSIONS BY THE MANUFACTURER FOR DAA SUPERVISORY AND MAINTENANCE PERSONNEL.

NOTES

1. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND APPROVAL A CABLE PHASING PLAN A MINIMUM OF 21 DAYS PRIOR TO THE STARTING CONSTRUCTION WITHIN 50 FEET OF ANY FAA RADAR, CONTROL OR COMMUNICATIONS CABLE. THE PLAN SHALL OUTLINE HOW THE CABLE WILL BE PROTECTED DURING CONSTRUCTION/EXCAVATION IN ORDER TO PREVENT DAMAGE AND MEASURES TAKEN IN THE EVENT RADAR, CONTROL OR COMMUNICATIONS CABLES ARE DAMAGED OR CUT AND SHOULD ALSO INCLUDE SCHEDULE, LABOR, MATERIALS AND EQUIPMENT TO BE USED WHEN WORKING WITHIN 50 FEET OF THE RADAR, CONTROL OR COMMUNICATIONS CABLES.
2. THE FAA CABLES INCLUDE ASR RADAR COAX CABLES, 100 PAIR AND 50 PAIR CONTROL/COMMUNICATIONS CABLES. EVERY EFFORT HAS BEEN MADE TO SHOW THE APPROXIMATE LOCATION OF THE CABLES. FAA SHALL LOCATE THE CABLES ON ONE OCCASION AND IT SHALL REMAIN THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THE CABLES LOCATED ARE PROTECTED. IN THE EVENT OF ANY DAME TO THE CABLES, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY AND SHALL BE PREPARED TO REPAIR THEM IMMEDIATELY.
3. FAA TECHNICIANS MAY BE AVAILABLE DURING NORMAL FAA WORKING HOURS FOR MONITORING AND MARKING THE CABLE DURING ANY CONSTRUCTION ADJACENT TO ANY FAA CABLE TO HELP ENSURE THE FAA CABLES ARE NOT DAMAGED OR DESTROYED, BUT THE CONTRACTOR SHALL NOT EXPECT FAA TO MONITOR CONTINUOUSLY OR MARK THE CABLES ON NUMEROUS OCCASIONS.
4. THE INTENT OF THIS PROJECT IS TO PROTECT THE CABLES FROM DAMAGE. NO ADDITIONAL PAYMENT WILL BE MADE TO THE CONTRACTOR FOR REPAIR OF CABLES DAMAGED AS PART OF THIS CONTRACT.
5. CONTRACTOR SHALL FURNISH AND INSTALL TEMPORARY RUNWAY LIGHTING AS REQUIRED TO KEEP RUNWAY OPEN. REFER TO THE SPECIFICATIONS FOR DISTANCE OF RUNWAY REQUIRING LIGHTS AND DURATION.
6. REFER TO SHEET C200-C201 AND C700-C701 FOR PAVEMENT GEOMETRY AND MARKINGS.
7. PROVIDE 4" PVC DRAIN FROM ALL HANDHOLES AND 1" PVC DRAIN FROM EACH LIGHT BASE CAN TO THE SUB-DRAIN SYSTEM.

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214-1882-077

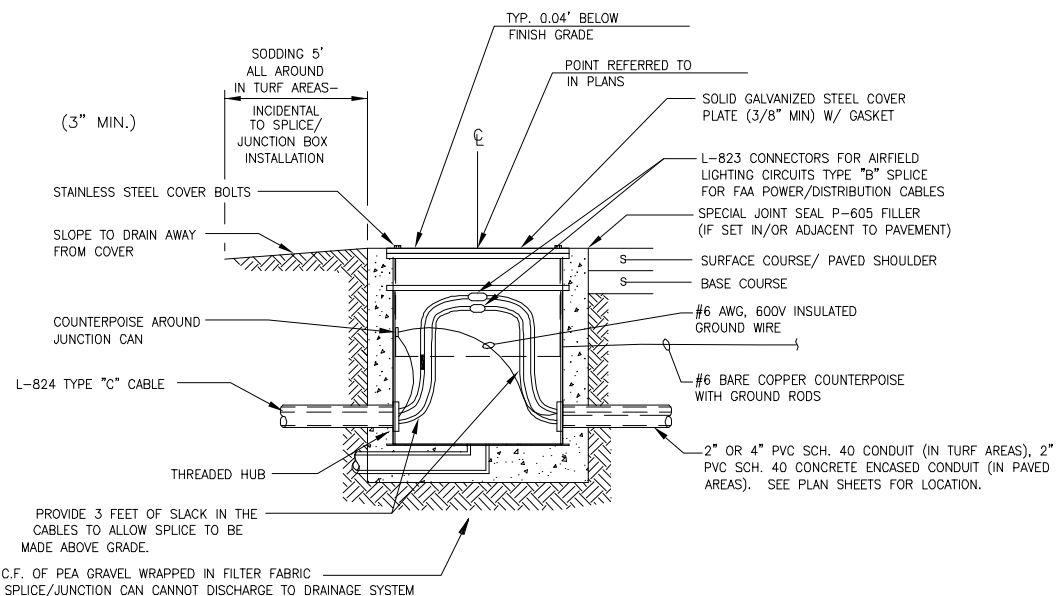
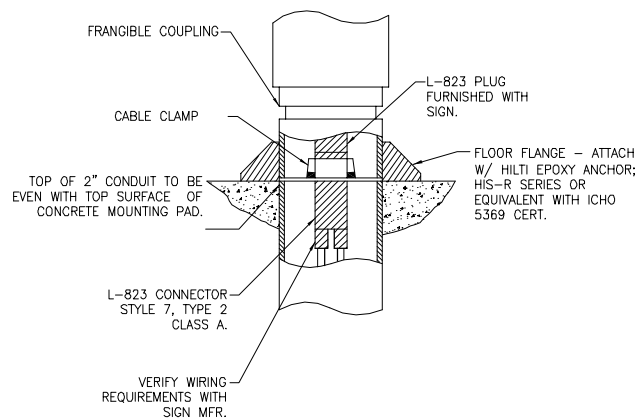
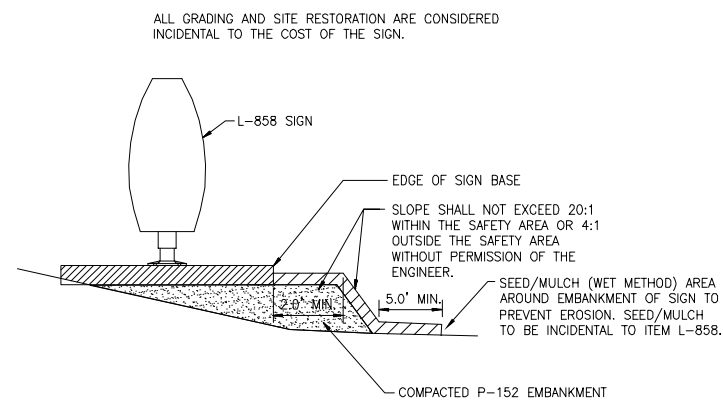
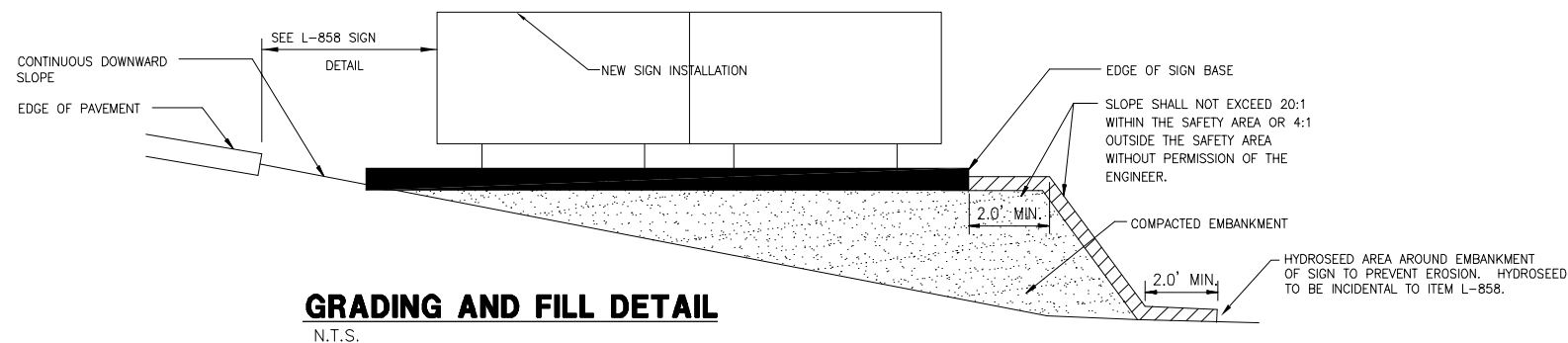
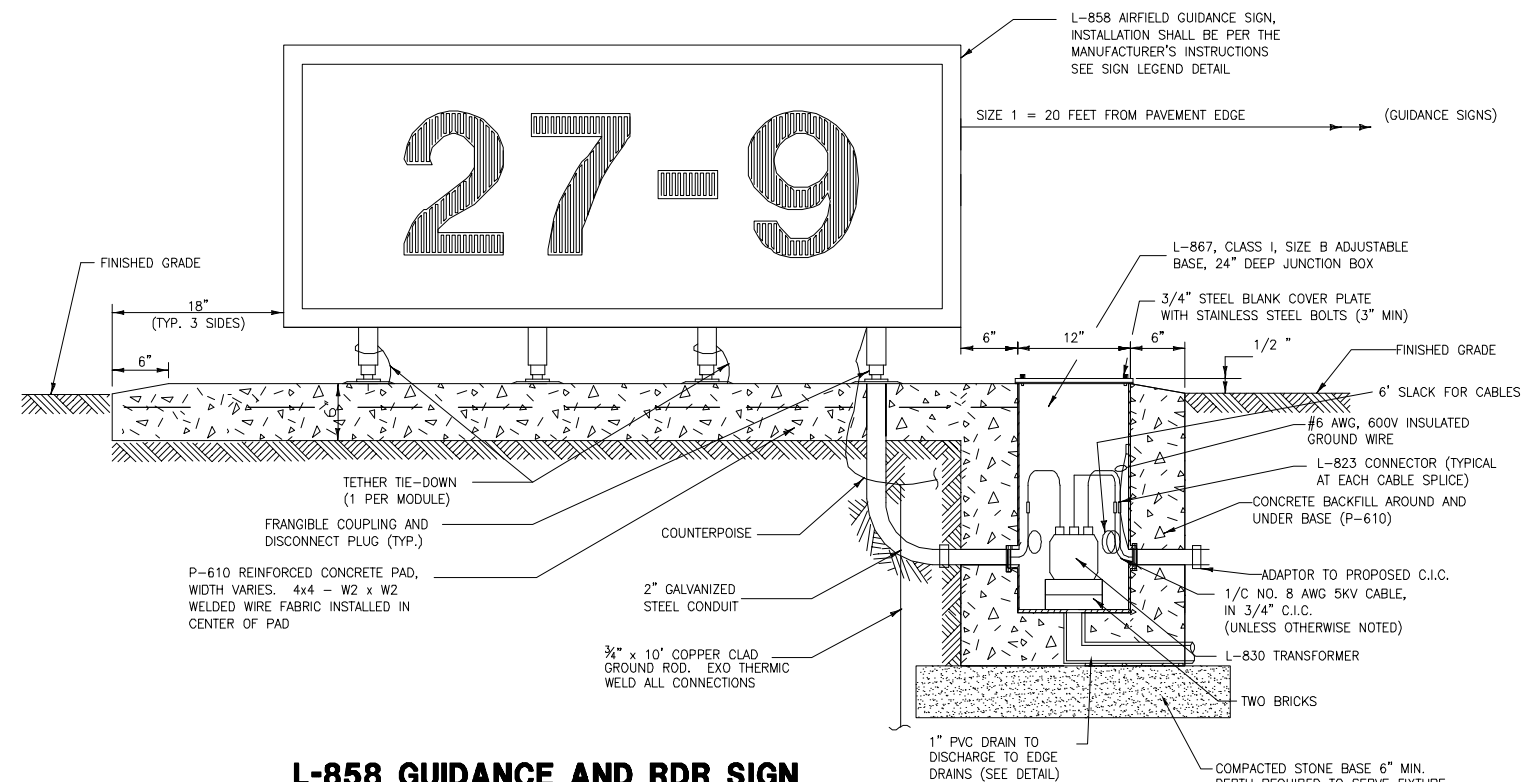
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SHEET TITLE
ELECTRICAL
DETAILS

SHEET NUMBER

E301

BID
DOCUMENTS



GENERAL SIGNAGE NOTES:

1. THE CONTRACTOR SHALL FIELD STAKE ALL SIGNS PRIOR TO INSTALLATION. ANY DISCREPANCIES IN ALIGNMENT OR LOCATIONS SHOULD BE RESOLVED PRIOR TO INSTALLATION.
2. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR TO INSTALL, RELOCATE OR MODIFY, AND INSTALL THE AIRFIELD GUIDANCE SIGNAGE AS INDICATED ON THE DRAWINGS. ITEMS NOT SHOWN BUT OBVIOUSLY NECESSARY FOR COMPLETION OF THE WORK SHALL BE INCLUDED.
3. THE ACTUAL SIGN DIMENSIONS WILL VARY PER MANUFACTURER. THE BASE SIZE AS SHOWN SHALL BE ADJUSTED TO MATCH THE SIGN SUBMITTED. THE SUBMITTAL SHALL INCLUDE NEW BASE DIMENSIONS, LAYOUT, ETC.
4. THE CONCRETE SHALL COMPLY WITH P-610 SPECIFICATION.
5. THE ORIENTATION, INSTALLATION, AND DEPTH OF THE 2" CONDUIT SHALL BE COORDINATED WITH THE PLANS. EXISTING SLEEVES MAY BE USED FOR ENTRY TO MANHOLES.
6. THE DETAILS SHOWN IN THE PLANS PROVIDE THE MINIMUM REQUIREMENTS FOR SIGN INSTALLATIONS. THE CONTRACTOR SHALL USE STANDARDS APPLICABLE FOR THE PARTICULAR SIGN MANUFACTURER. THE BOLT PATTERN, METHOD OF ANCHORING, ETC., SHALL BE PER SIGN MANUFACTURER'S RECOMMENDATIONS AND APPROVED BY THE ENGINEER.
7. ALL SIGNS SHALL BE FURNISHED WITH TETHERS ON EACH LEG. TETHERS SHALL BE $\frac{1}{8}$ " STAINLESS STEEL AIRCRAFT CABLE WITH A FORMED EYE ON BOTH ENDS. THE TETHER SHALL BE OF SUFFICIENT LENGTH TO HAVE A MINIMUM OF 2" OF SLACK WHEN ATTACHED BETWEEN THE SIGN AND THE FIXTURE PLATE. THE TETHERS AND BONDING CONDUCTORS SHALL BE OF SUFFICIENT LENGTH TO ALLOW THE FRANGIBLE COUPLINGS TO OPERATE WITHOUT RESTRICTIONS AND TO ALLOW POWER CABLE TO DISCONNECT IF THE SIGN FALLS OVER.
8. THE SIGN TETHER AND BONDING CONDUCTOR SHALL NOT BE ATTACHED AT THE SAME ANCHOR BOLT. AN APPROVED MECHANICAL OR COMPRESSION LUG SHALL BE USED TO CONNECT THE BONDING CONDUCTOR TO THE SIGN FLANGE AND SIGN.
9. ALL AREAS FOR THE LEG FLANGE SHALL BE IN THE SAME PLANE.
10. THE ANCHOR BOLTS SHALL BE A-36 STEEL. HOT DIPPED GALVANIZED STEEL WHEN CAST INTEGRALLY WITH THE CONCRETE PAD OR STAINLESS STEEL EXTENSION ANCHORS WHEN USED ON EXISTING OR DRILLED INTO NEW CONCRETE PADS. THE SIZE AND LENGTH SHALL BE SPECIFIED BY THE SIGN MANUFACTURER.
11. EACH NEW SIGN SHALL BE FURNISHED WITH AN ON-OFF TOGGLE SWITCH WITH WATERPROOF COVER. THE SWITCH SHALL BE USED BY MAINTENANCE PERSONNEL TO DE-ENERGIZE THE SIGN SO MAINTENANCE WORK CAN BE PERFORMED. THE SWITCH SHALL DISCONNECT POWER IMMEDIATELY ADJACENT TO THE SECONDARY CONNECTOR IN THE FRANGIBLE COUPLING. THE WEATHERPROOF COVER SHALL PROVIDE PROTECTION FROM DRIVING RAIN, SNOW AND ICE, AND SHALL HAVE A SPRING OPERATED CLOSING DEVICE. THE WEATHERPROOF COVER SHALL ALSO PROVIDE PHYSICAL PROTECTION FOR THE SWITCH HANDLE.
12. ALL SIGNS SHALL BE ORIENTED SUCH THAT THE LONGITUDINAL CENTERLINE OF THE SIGN IS PERPENDICULAR TO THE RESPECTIVE TAXIWAY/RUNWAY CENTERLINE.
13. FOR SIGNS INSTALLED IN PAVED SHOULDER AREAS, ADJUSTABLE BASE CANS SHALL BE INSTALLED PRIOR TO PAVING. UPON COMPLETION OF PAVING THE BITUMINOUS SHALL BE NEATLY SAWCUT AND REMOVED TO ALLOW FOR ADJUSTMENT TO THE CAN TO FINISH GRADE AND PLACING THE REINFORCED CONCRETE SIGN PAD.
14. PROVIDE BRASS IDENTIFICATION LABEL FOR SIGN. LABEL SHALL BE STAMPED WITH TYPICAL MANUFACTURER DATA AND ATTACHED ON NEAR SIDE TO RUNWAY OR TAXIWAY.

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Signature Dorsey K Christopher

Typed Name DARREN K. CHRISTOPHER

Date 08/18/2009 Reg. No. 45052

REVISIONS

[illegible]

DATE ISSUED: 08-18-2009

REVIEWED BY: MLS

DRAWN BY: JKE

DESIGNED BY: DKC

AEP PROJECT NUMBER

214-1882-077

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SHEET TITLE
ELECTRICAL
DETAILS

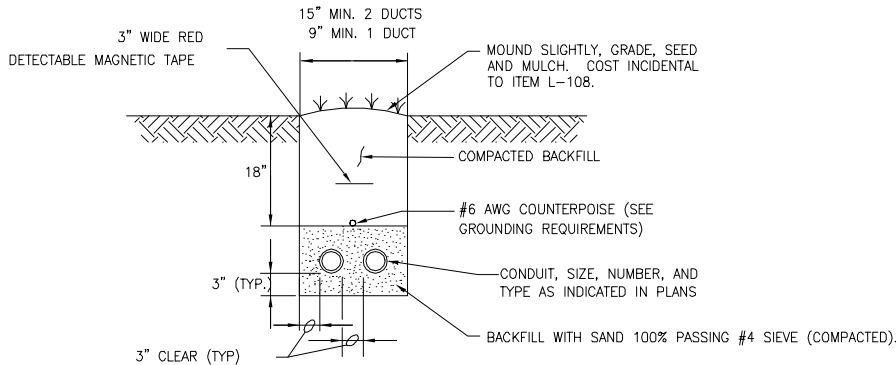
SHEET NUMBER

E302

BID DOCUMENTS

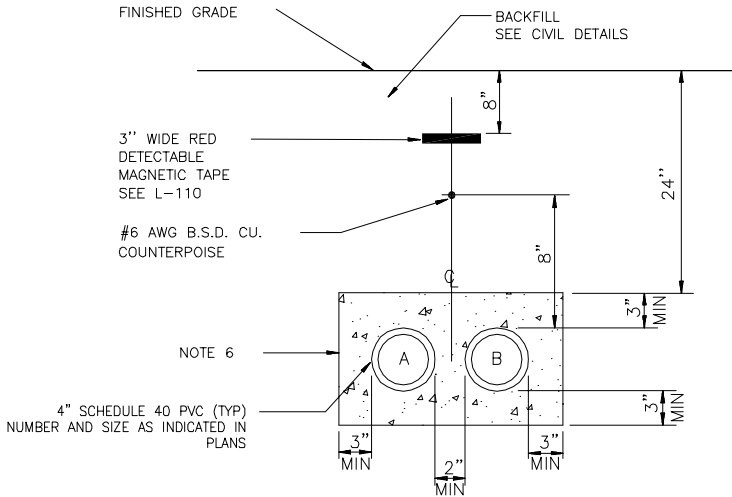
DUCT BANK NOTES:

- 1) THE #6 AWG BSD COPPER COUNTERPOISE WIRE SHALL BE CENTERED ON THE DUCT BANK.
- 2) THE MINIMUM DISTANCE BETWEEN TOP OF CONDUIT IN DUCT BANK AND COUNTERPOISE SHALL BE 3".
- 3) THE CONTRACTOR SHALL INSTALL A NYLON PULL WIRE IN EACH UNUSED DUCT OR CONDUIT INSTALLED AND PLUG OR CAP THE DUCT. THE WIRE SHALL BE SECURELY ATTACHED TO THE PLUG/CAP AT EACH END OF THE DUCT OR CONDUIT. NEW PULL WIRES SHALL BE INSTALLED IN EACH UNUSED DUCT OR CONDUIT IN DUCT BANK EXTENSIONS.
- 4) THE CONTRACTOR SHALL INSTALL A PLASTIC COATED, DETECTABLE MAGNETIC TWO (2) INCH WIDE TAPE EIGHT (8) INCHES BELOW TURF GRADE ABOVE ALL DUCTBANKS OR CONDUITS NOT INSTALLED UNDER AIRFIELD PAVEMENT.
- 5) DUCTBANKS SHALL DRAIN TOWARD THE MANHOLES WITH THE CROWN OF THE DUCT BANK MIDWAY BETWEEN MANHOLES. THE DUCT SLOPE SHALL BE 3" PER 100'.
- 6) ALL CONDUITS, DUCT AND DUCT BANKS SHOWN AS CONCRETE ENCASED SHALL BE ENCASED IN 4000 PSI CONCRETE COMPRESSIVE STRENGTH, WITH NOT LESS THAN 3" OF COVER AT TOP.



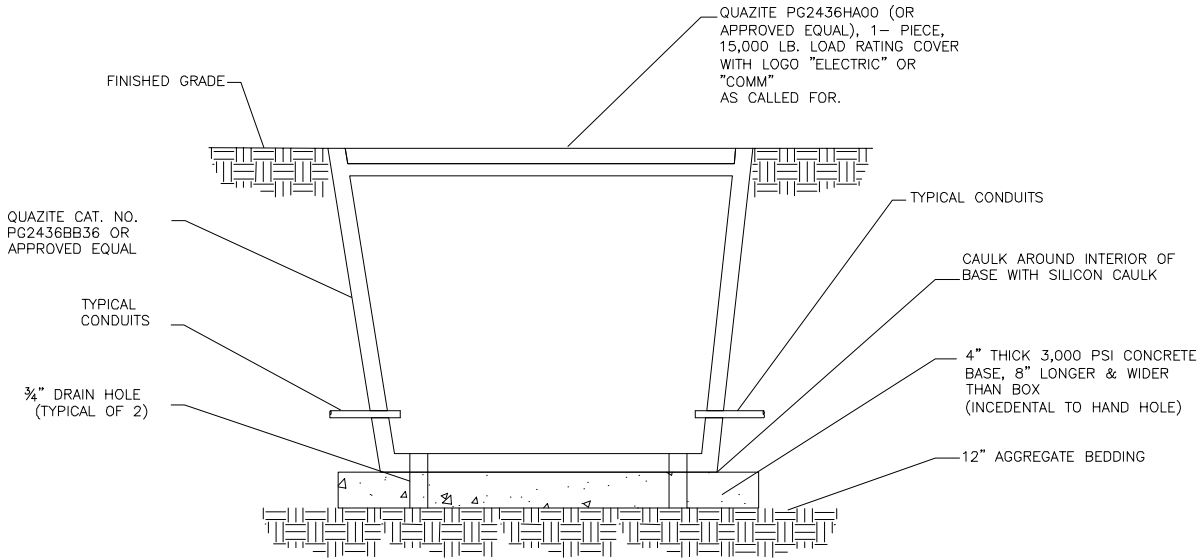
TYPICAL TRENCH AND CONDUIT PLACEMENT DETAIL

N.T.S.



TYPICAL DUCT BANK IN PAVED AREAS

N.T.S.



ELECTRICAL HANDHOLE (IN TURF) DETAIL

N.T.S.

NOTES SITE ELECTRICAL:

- 1 NEW HAND HOLE: QUAZITE PG2436HA00, 1 PIECE, 15,000 LBS/25,000LBS LOAD RATED COVER WITH LOGO "COMMUNICATION" AND QUAZITE PG2436BB36 BOX OR EQUAL.
- 2 NEW HAND HOLE: QUAZITE PG2436HA00, 1 PIECE, 15,000 LBS/25,000LBS LOAD RATED COVER WITH LOGO "ELECTRIC" AND QUAZITE PG2436BB36 BOX OR EQUAL.



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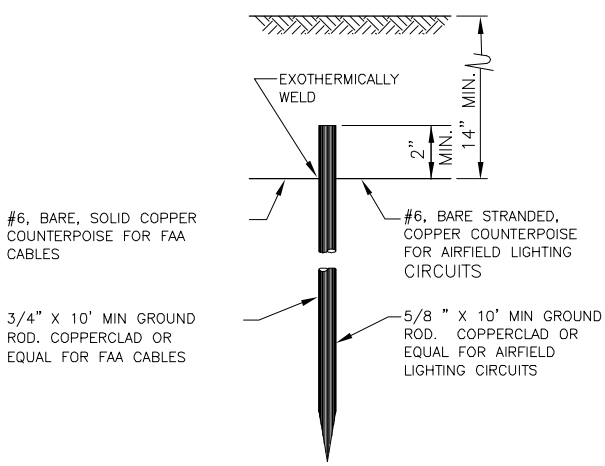
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SHEET TITLE
ELECTRICAL DETAILS

SHEET NUMBER
E303

BID DOCUMENTS

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GROUND ROD DETAIL

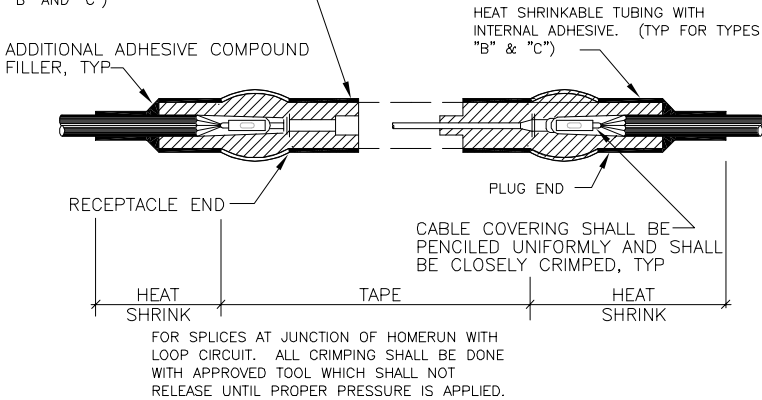
NTS

ALL GROUND RODS ARE
INSTALLED VERTICALLY

NOTES:

1. THE RESISTANCE TO GROUND OF ANY GROUNDING SYSTEM SHALL NOT EXCEED 10 OHMS. (VAULT GROUNDING - 10 OHMS)
2. COST OF GROUND RODS AND CONNECTIONS TO COUNTERPOISE IS INCIDENTAL TO ASSOCIATED ITEMS OF WORK REQUIRING GROUNDING AND NO SEPARATE PAYMENT WILL BE MADE.
3. MAXIMUM SPACING OF GROUND RODS FOR AUTHORITY LIGHTING SYSTEMS SHALL NOT EXCEED 400 FEET.
4. MAXIMUM SPACING OF GROUND RODS FOR FAA CABLE PROTECTION SHALL NOT EXCEED 200 FEET.
5. EACH ROD TO BE TESTED INDIVIDUALLY TO ENSURE RESISTANCE TO GROUND OF 5 OHMS OR LESS. ADD ADDITIONAL SECTIONS UNTIL THIS REQUIREMENT IS MET.

ALL CONNECTIONS SHALL HAVE ONE LAYER, HALF-LAPPED RUBBER OR SYNTHETIC RUBBER INSULATING TAPE COVERED WITH TWO LAYERS OF HALF-LAPPED PLASTIC TAPE TO A DISTANCE OF 1 1/2" FROM JOINT. COVER CABLE ENTRANCES TO SPLICE KIT WITH HEAT SHRINKABLE TUBING WITH INTERNAL ADHESIVE. (TYP, TYPE "B" AND "C")



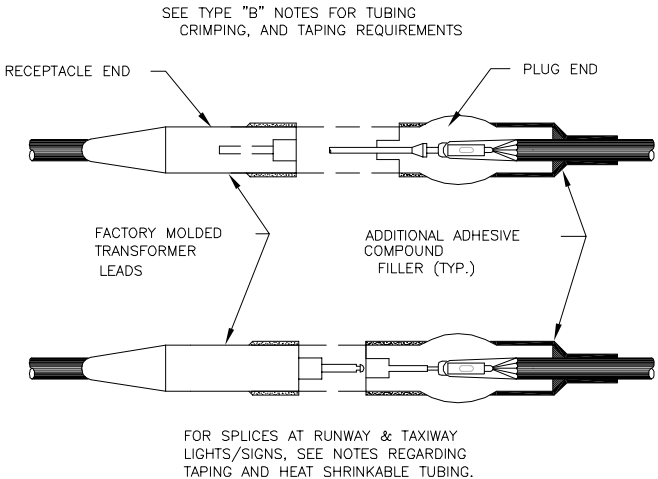
TYPE "B"

NOTES:

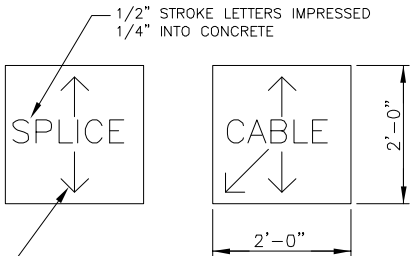
1. INSIDE DIAMETER OF CONNECTOR KITS SHALL PROPERLY MATCH THE OUTSIDE DIAMETER OF CABLE.
2. ALL CABLES SHALL BE CLEANED OF ALL OILS, GREASE, DIRT OR OTHER MATERIALS WHICH COULD CONTAMINATE OR ADVERSELY AFFECT THE SPLICE.
3. NO CAST SPLICES TO BE USED ON THIS PROJECT. WITHOUT WRITTEN AUTHORIZATION OF ENGINEER.
4. NO SEPARATE PAYMENT FOR SPLICES OR CONNECTORS, COST TO BE INCLUDED IN PRICE FOR CABLE.
5. ALL SPLICES SHALL BE PLACED IN JUNCTION BOX.

CABLE SPLICES - TYPES 'A','B' & 'C'

NTS



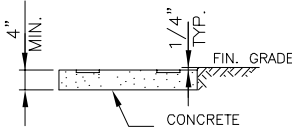
TYPE "C"



PLAN VIEW

NOTES:

1. MARKERS SHALL BE PLACED AT ALL DUCT CROSSINGS, END OF STUB OUTS, AND ANY CHANGE IN CABLE DIRECTION.
2. CONCRETE FOR PADS SHALL COMPLY WITH ITEM P-610, 3000 PSI.
3. EDGE EXPOSED CONCRETE WITH A 1/4" RADIUS TOOL.
4. LEGEND INSCRIBED BY HAND IN WET CONCRETE WILL NOT BE ACCEPTABLE.
5. CABLE AND DUCT MARKERS ARE INCIDENTAL TO OTHER ITEMS OF WORK NO SEPARATE PAYMENT WILL BE MADE.

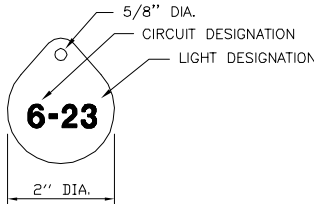


SECTION VIEW

CABLE AND DUCT MARKERS

NTS

(IN TURFED AREAS)



NOTES:

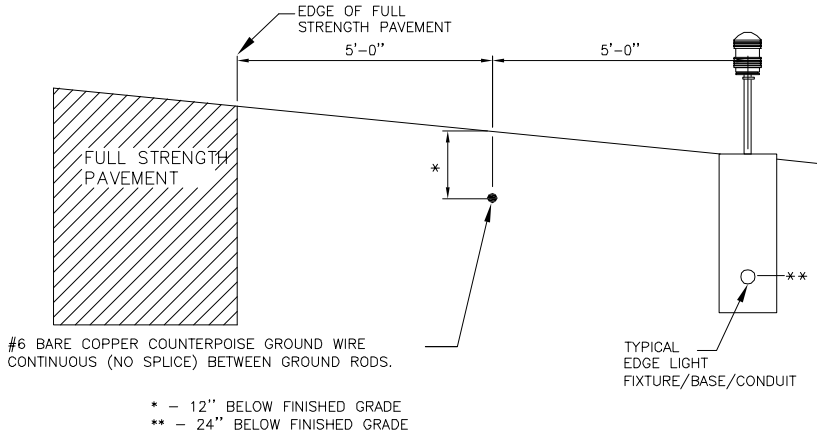
1. INSTALL A NONCORROSIVE DISC OF 2 INCH MINIMUM DIAMETER WITH NUMBER PERMANENTLY STAMPED, CUTOUT, OR ENGRAVED UNDER THE HEAD OF THE BASE PLATE BOLT OR ATTACHED TO LIGHT FLANGE WITH SET SCREW.
2. NUMBERS SHOWN ARE FOR ILLUSTRATIVE PURPOSES ONLY ALL EXISTING AND PROPOSED EDGE LIGHTS SHALL BE TAGGED AS DIRECTED BY THE ENGINEER. COST OF TAGGING LIGHTS SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE CONSIDERED INCIDENTAL.

LIGHT IDENTIFICATION TAG DETAIL

NTS

NOTES:

1. INSTALL 3/4"Ø X 10' LONG COPPER CLAD GROUND RODS ALONG COUNTERPOISE SYSTEM AT 400' INTERVALS. CONNECTIONS OF GROUND RODS TO COUNTERPOISE CABLE SHALL BE EXOTHERMIC TYPE (CAD WELD OR EQUAL).
2. DO NOT CONNECT COUNTERPOISE WIRING TO EDGE LIGHTS.



COUNTERPOISE INSTALLATION SECTION DETAIL

NTS

FOR TURF AREAS WITHOUT PAVED SHOULDERS

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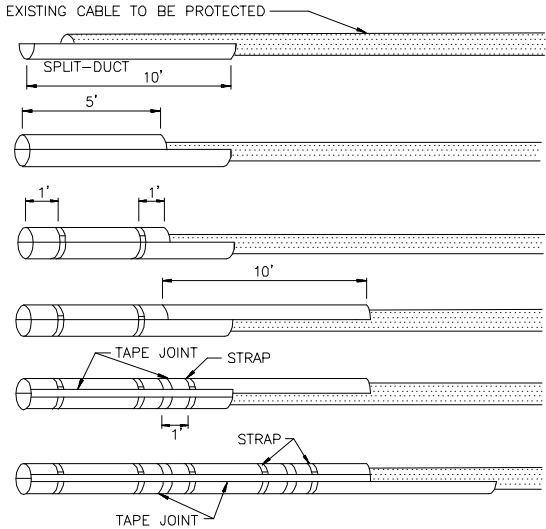
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**ELECTRICAL
DETAILS**

SHEET NUMBER

E304

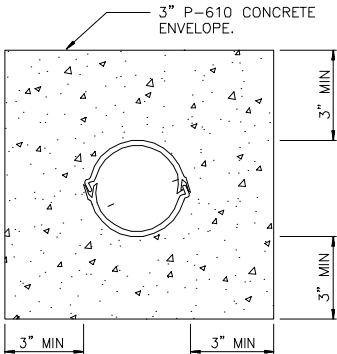
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DOCUMENTS**



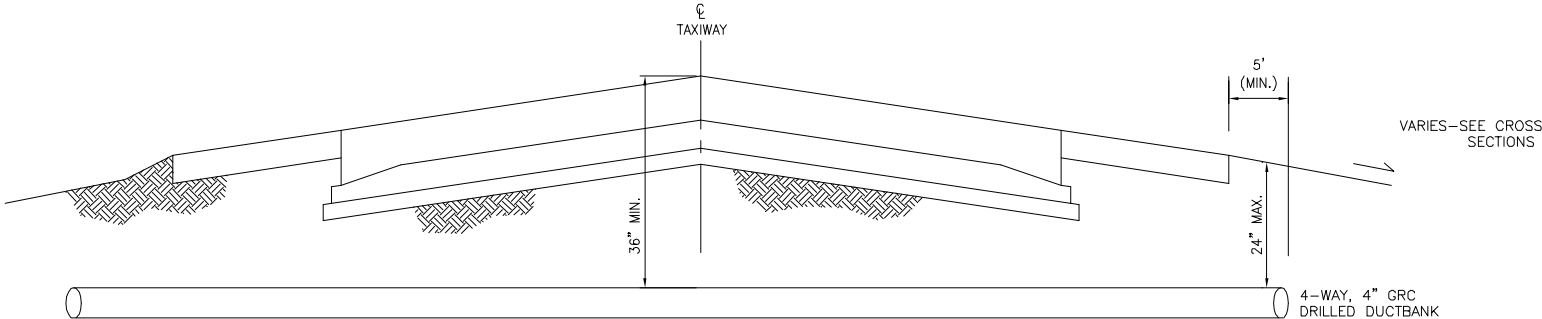
SPLIT DUCT INSTALLATION DETAIL
N.T.S.

RECOMMENDED SPLIT DUCT
INSTALLATION PROCEDURE:

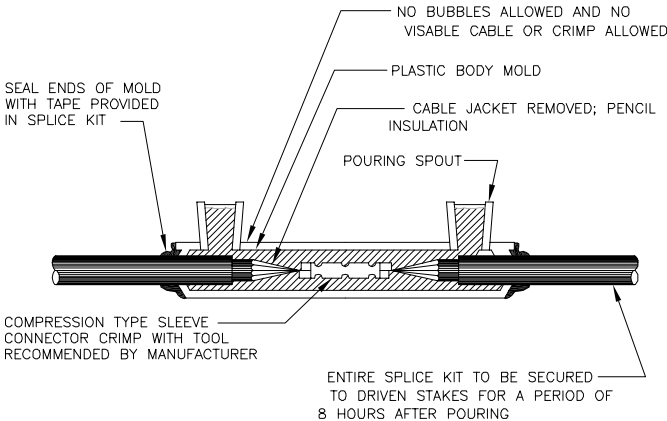
1. PLACE ONE 10' SPLIT-DUCT SECTION UNDER CABLE.
2. IN ORDER TO STAGGER JOINTS, SAW ANOTHER SECTION IN HALF (ABOUT 5' FEET LONG).
3. PLACE 5' SECTION OVER CABLE AND SNAP THE TWO SECTIONS TOGETHER.
4. PLACE STRAP ABOUT 1' FROM THE END AND STRAP ANOTHER ABOUT 1' FROM THE JOINT WHERE THE ENDS OF THE TOP SECTIONS WILL BUTT.
5. PLACE ANOTHER 10' SPLIT-DUCT SECTION OVER THE OPEN HALF OF THE BOTTOM SECTION, BUTT THE ENDS TIGHTLY TOGETHER AND SNAP THE SECTION TOGETHER.
6. PLACE A LENGTH OF DUCT TAPE AROUND BOTH SECTIONS OF THE SPLIT-DUCT TO COVER THE BUTTED JOINT AND THE LONGITUDINAL JOINTS.
7. PLACE A STRAP ABOUT 1' BEYOND THE TAPED JOINT.
8. LAY ANOTHER LENGTH OF SPLIT-DUCT UNDERNEATH THE CABLE, BUTT TOGETHER, TAPE THE BUTTED JOINT AND LONGITUDINAL JOINT STRAP ONE FOOT ON EACH SIDE OF THE JOINT.
9. REPEAT PROCEDURE AS REQUIRED.
10. USE APPROPRIATE FITTINGS, COUPLINGS ETC. WHEN JOINING SPLIT-DUCT TO EXISTING DUCTS ETC.



TYPICAL 1 WAY 4' SPLIT-DUCT
CONCRETE ENCASED
N.T.S.



TYPICAL CONDUIT DRILLED UNDER TAXIWAY
SCALE: N.T.S.



FOR SPLICES IN HOMERUNS AND FOR EXTENSION TO EXISTING CABLES, ONLY USE WITH WRITTEN AUTHORIZATION BY ENGINEER. SHALL NOT BE USED IN DUCT OR DIRECT BURIAL.

TYPE "A"

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Signature *Darren K. Christopher*
Typed Name DARREN K. CHRISTOPHER
Date 08/18/2009 Reg. No. 45052

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DESIGNED BY: DKC

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SHEET TITLE
ELECTRICAL
DETAILS

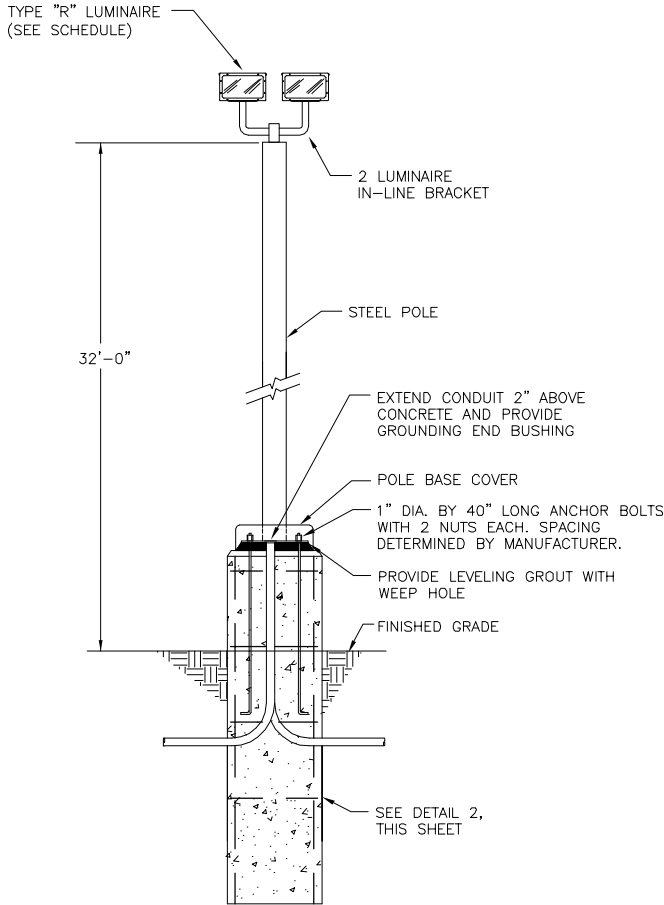
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E305
BID
DOCUMENTS

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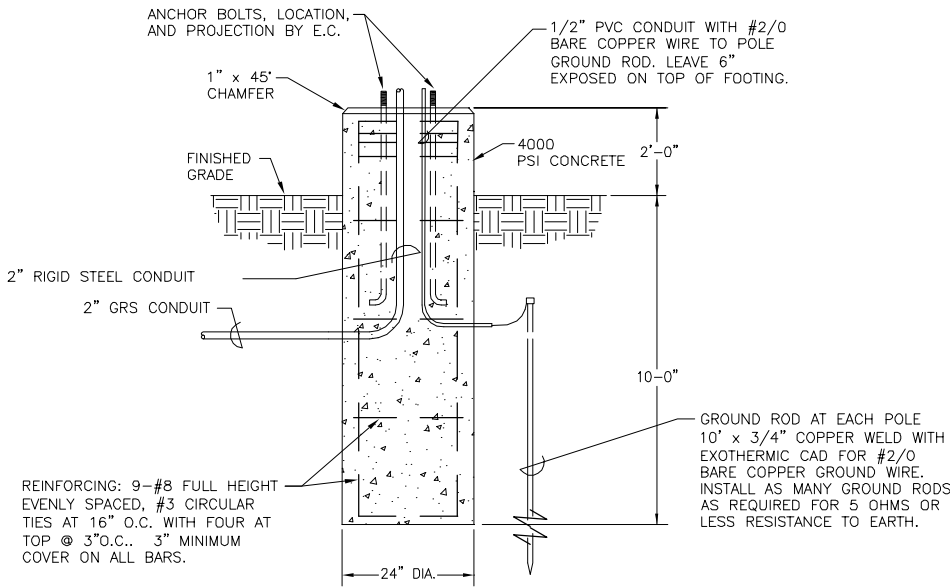
LIGHTING FIXTURE SCHEDULE (NOTES 1 THRU 8)									
MARK	DESCRIPTION	MOUNTING	LAMPS				APPROVED MANUFACTURER	CATALOG NUMBER	SEE NOTE
			QTY	TYPE	LAMP WATTS FIXT. WATTS	VOLTS			
R	AREA FLOODLIGHT, METAL HALIDE, 1000 WATT, INTEGRAL BALLAST DARK BRONZE FINISH. AIRPORT LOUVER SYSTEM. 2 PER POLE.	POLE	1	1000W MH	1000W	240	1	STERNER	INFRANOR - 876-20-AL-1000H-xxx-E

LIGHTING FIXTURE SCHEDULE NOTES.

1. THE LIGHTING FIXTURE SCHEDULE AND CATALOG NUMBERS INDICATE MAJOR REQUIREMENTS FOR THE LIGHTING FIXTURES. WHETHER SPECIFIED BY THE CATALOG NUMBERS OR NOT THE CONTRACTOR SHALL PROVIDE ALL COMPONENTS, HARDWARE AND RELATED ITEMS TO PROVIDE A COMPLETE LIGHTING FIXTURE TO MEET THE REQUIREMENTS AS SPECIFIED IN THE DRAWINGS AND SPECIFICATIONS.
2. WHERE APPROVED EQUAL OR SINGLE MANUFACTURER FIXTURE IS INDICATED, THE CONTRACTOR MAY SUBMIT A FIXTURE WHICH IS EQUAL OR BETTER TO THE A/E FOR SHOP DRAWING APPROVAL. THE A/E'S DETERMINATION FOR APPROVED EQUAL SHALL GOVERN. PROVIDE A COMPLETE DETAIL OF THE EQUAL FIXTURE WITH A COMPARISON TO THE SPECIFIED FIXTURE. PHOTOMETRIC (POINT-TO-POINT) LAYOUT OF LIGHTED AREA SHALL ALSO BE PROVIDED BY THE CONTRACTOR FROM THE MANUFACTURER.
3. PROVIDE PHOTOCELL ON FIXTURE FOR CONTROL.
4. PROVIDE COLD WEATHER BALLASTS FOR FIXTURES LOCATED OUTSIDE.
5. PROVIDE ROUND TAPERED STEEL POLE AS MANUFACTURED BY MILLERBERND "11RA8341300" (30 FEET) OR APPROVED EQUAL. POLE EPA SHALL BE EQUAL TO OR GREATER THAN FIXTURE(S) EPA (90 MPH) IN ACCORDANCE TO AASHTO WIND MAP FOR JOB SITE.
6. PROVIDE 2 LIGHT INLINE BRACKET, AS MANUFACTURED BY STERNER, OR APPROVED EQUAL.
7. PROVIDE OPTICAL SHIELDING/LOUVER TO MINIMIZE GLARE TO THE AIRFIELD.
8. PROVIDE ANCHOR BOLTS. DIAMETER AND LENGTH AS REQUIRED TO MEET EPA (90 MPH) WIND REQUIREMENTS.



1 POLE MOUNTING DETAIL
N.T.S.



2 30' LIGHT POLE FOUNDATION
DETAIL
N.T.S.



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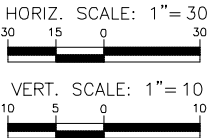
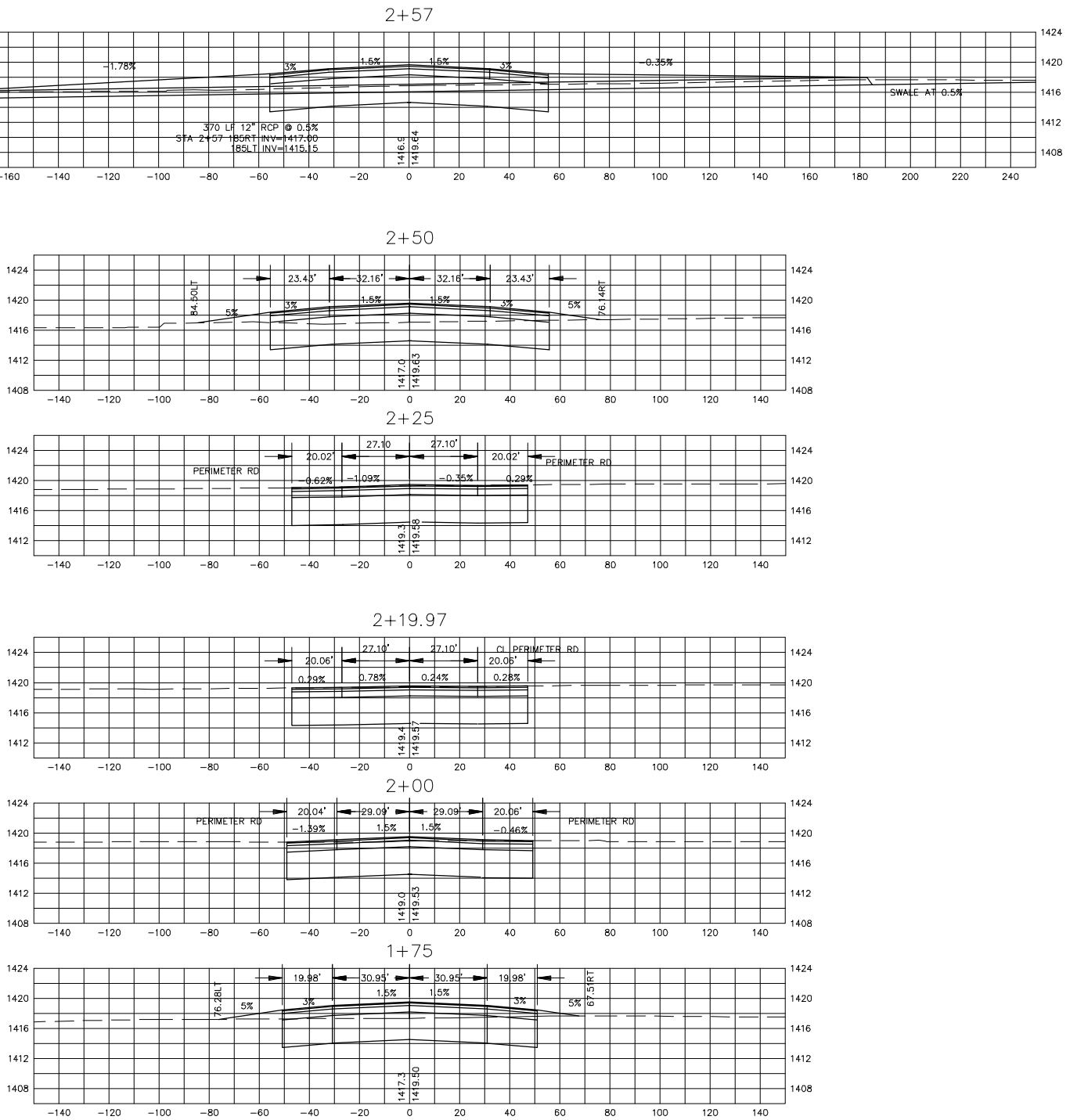
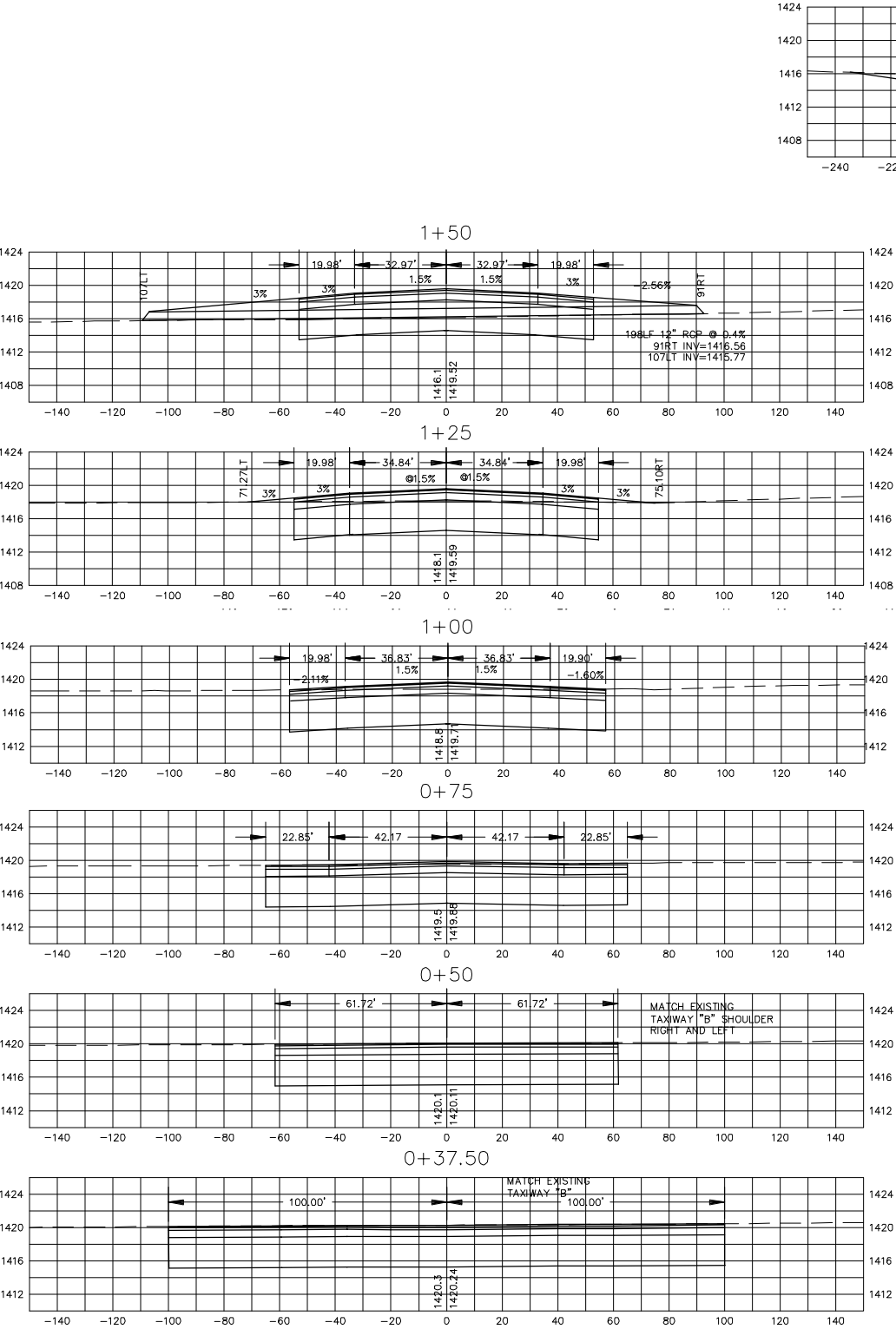
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AIRFIELD
DETAILS
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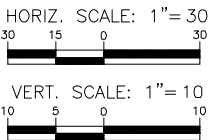
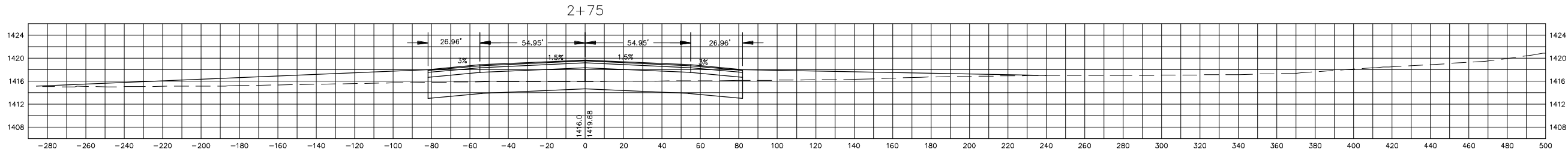
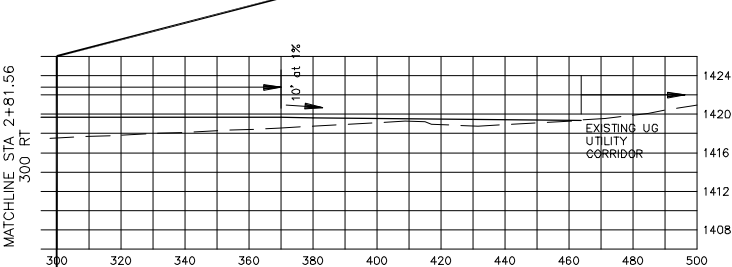
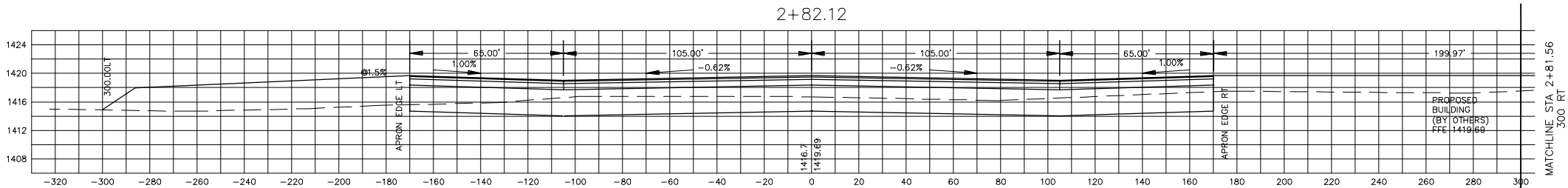
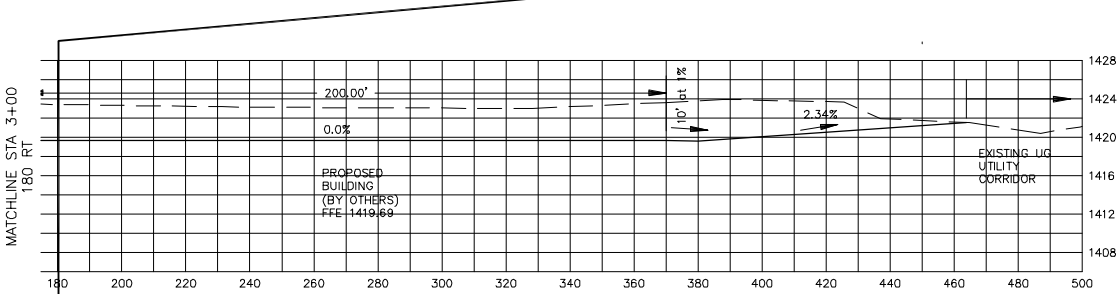
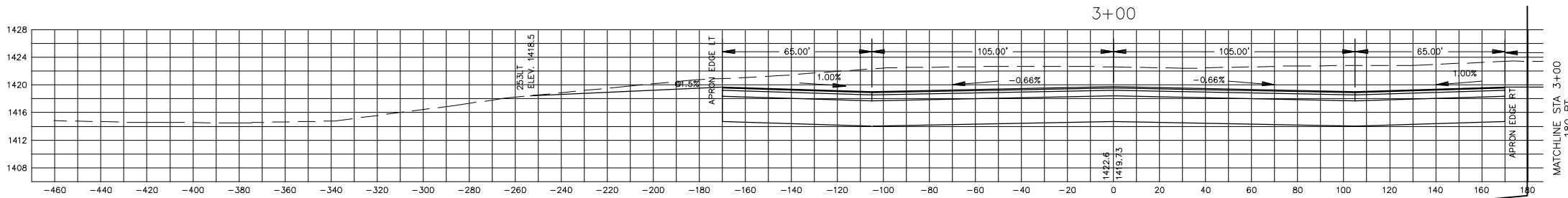
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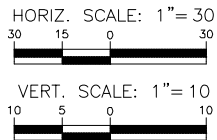
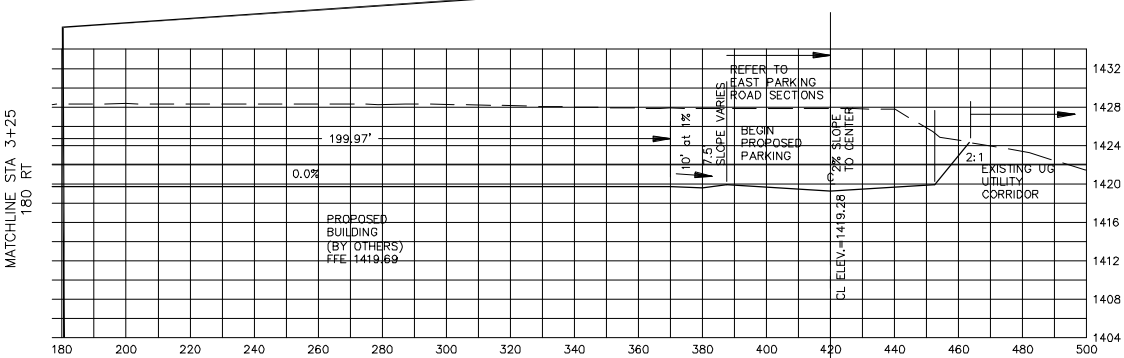
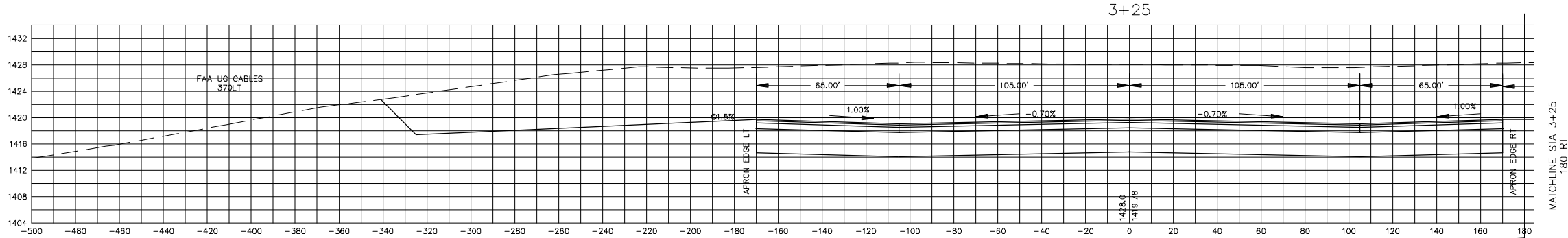
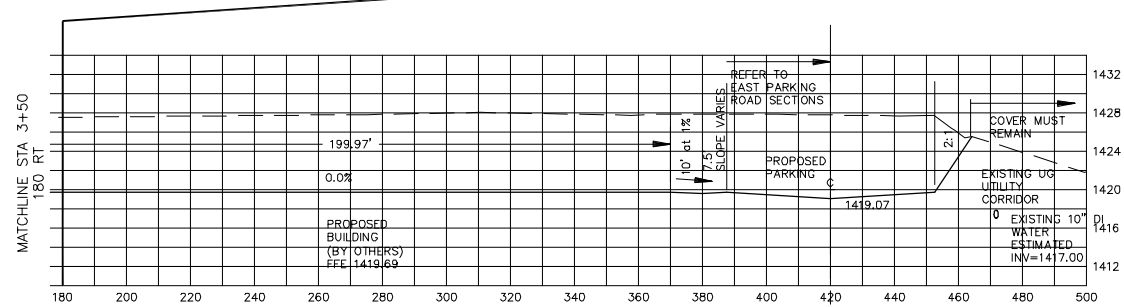
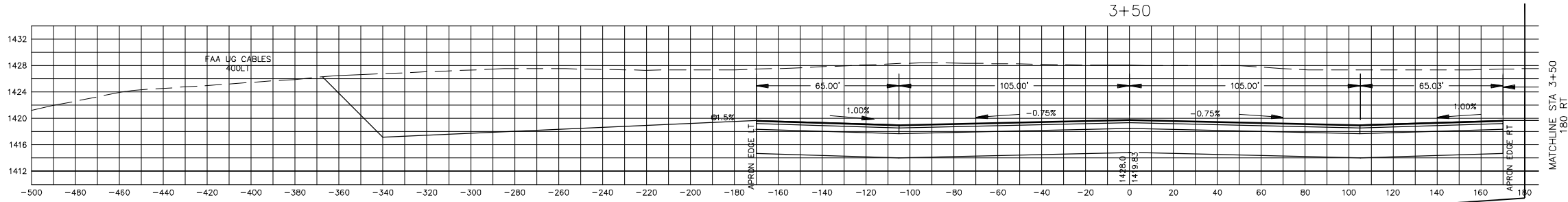
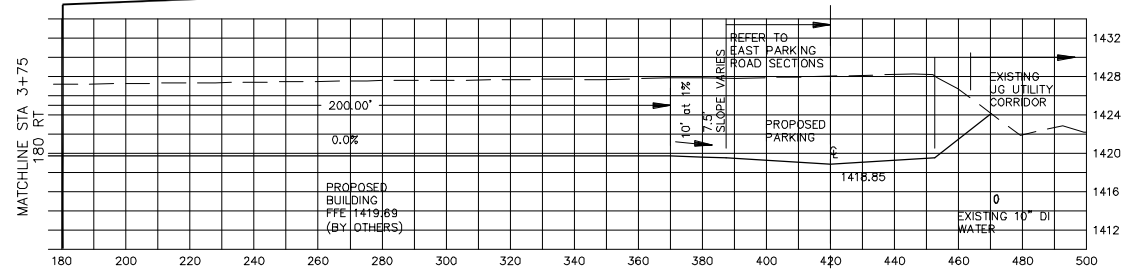
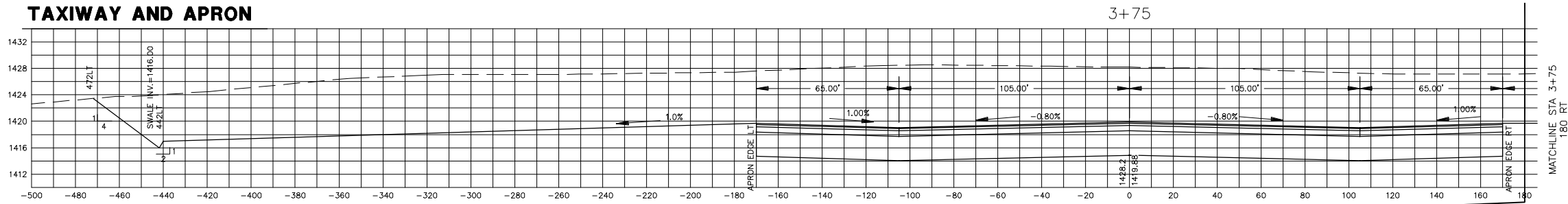
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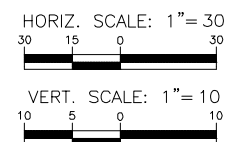
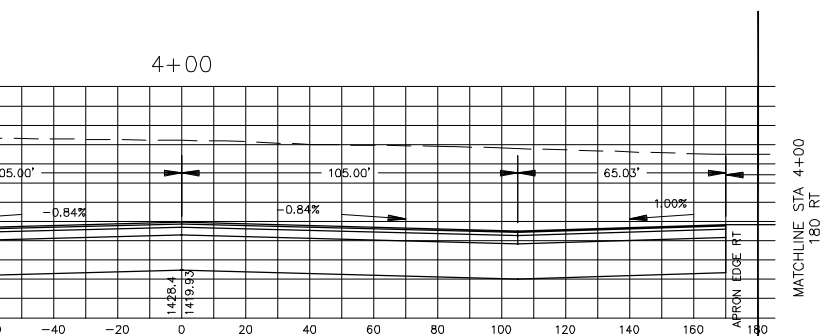
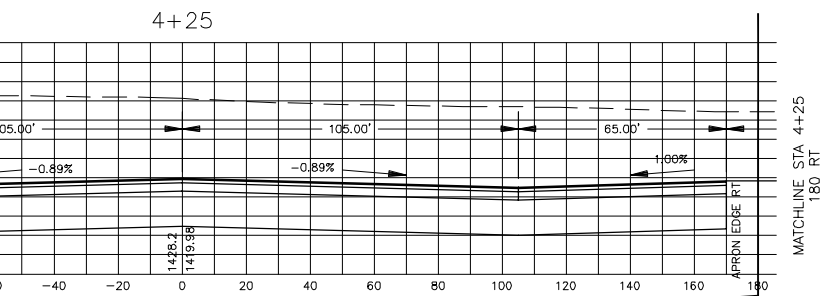
TYPICAL
CROSS
SECTIONS

SHEET NUMBER

CS3

BID
DOCUMENTS

Profile view of the proposed 4+50 bridge deck and approach. The drawing shows the bridge deck with a 4% slope, a 1% slope, and a 1.00% slope. It also shows the approach with a 1.00% slope and a 0.94% slope. The drawing includes a vertical curve with a 1421.8' length and a 1421.03' length. The drawing is labeled 'MATCHLINE STA 4+50' and '180 RT'.



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Signature Dorson K Christopher

Typed Name DARREN K. CHRISTOPHER

Date 08/18/2009 Reg. No. 45052

REVISIONS

[illegible]

DATE ISSUED: 08-18-2009

REVIEWED BY: MLS

DRAWN BY: JKE

DESIGNED BY: DKC

AEP PROJECT NUMBER

214-1882-077

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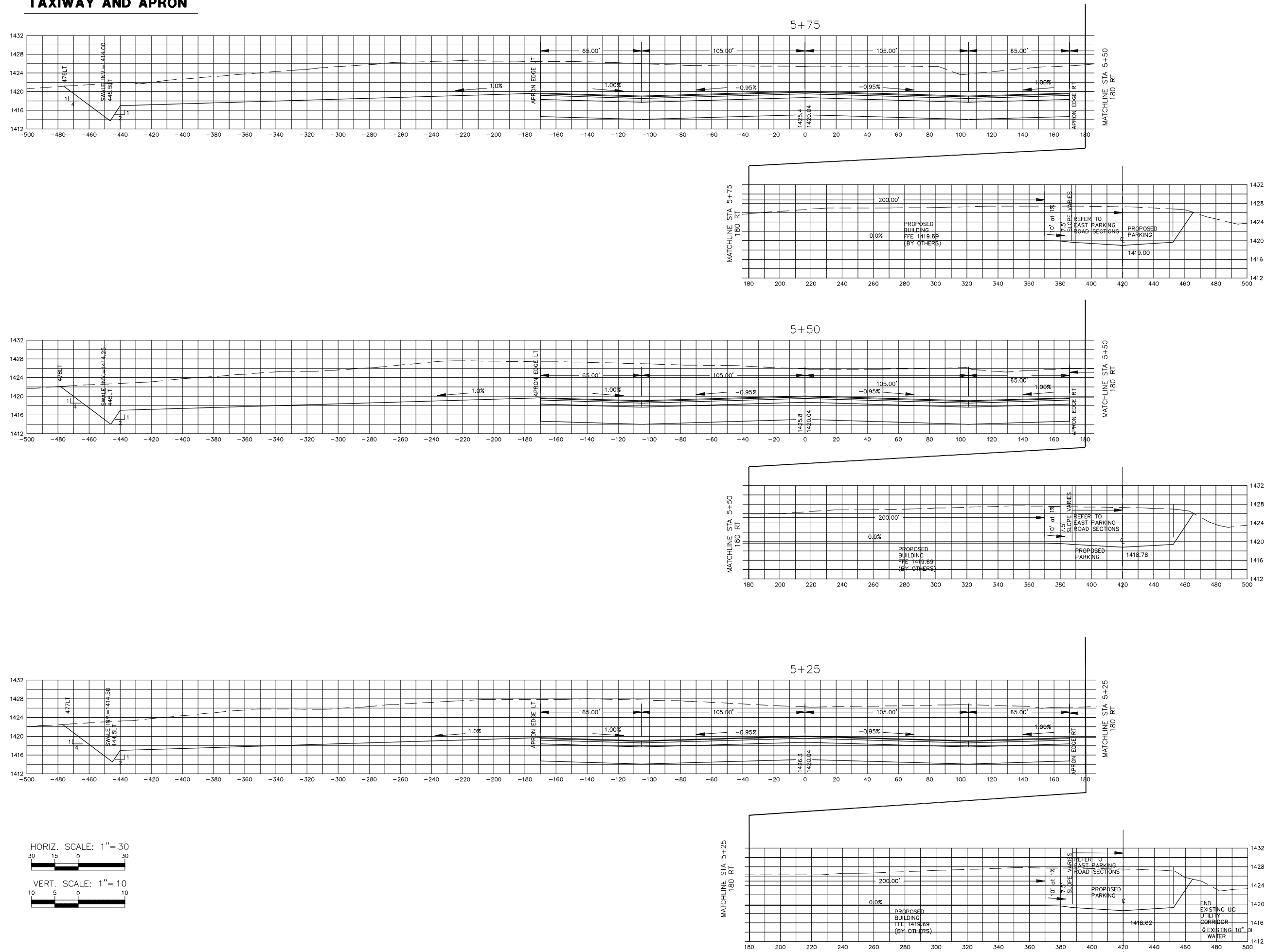
TYPICAL CROSS SECTIONS

SHEET NUMBER

CS4

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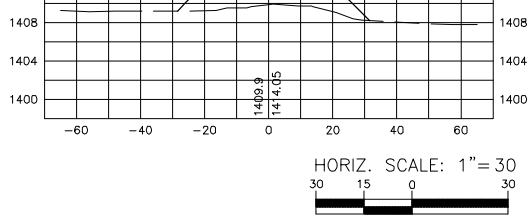
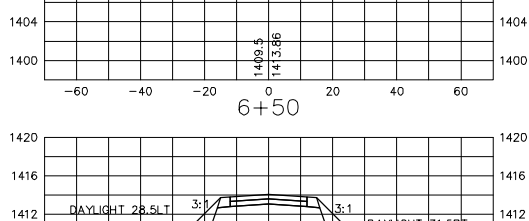
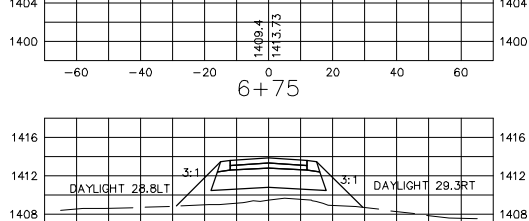
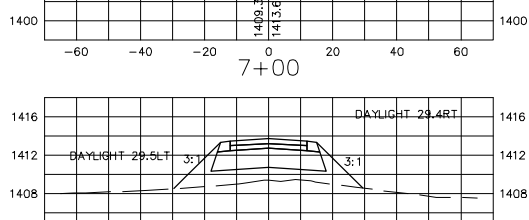
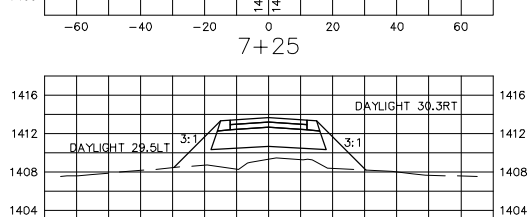
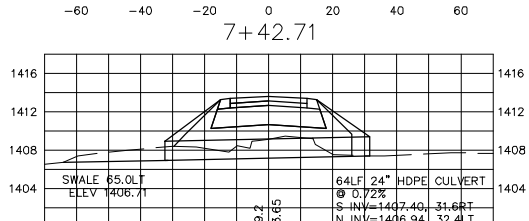
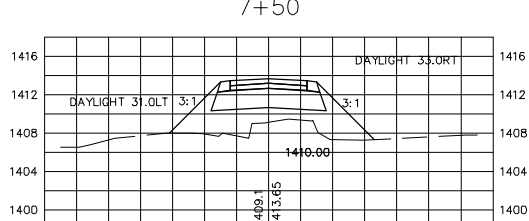
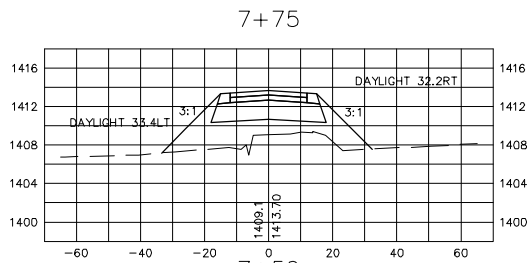
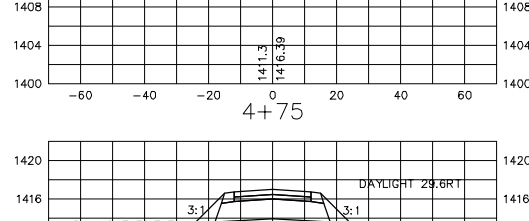
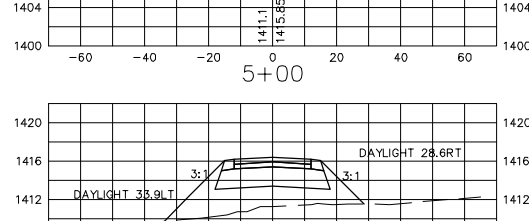
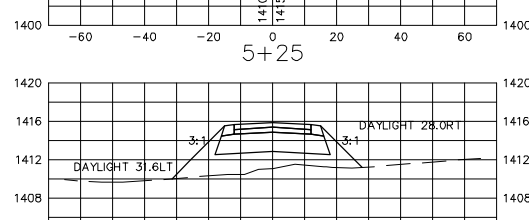
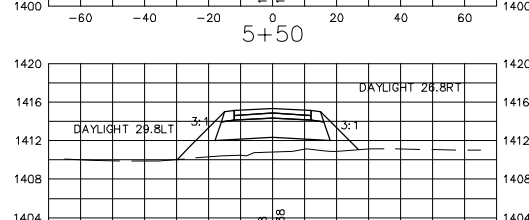
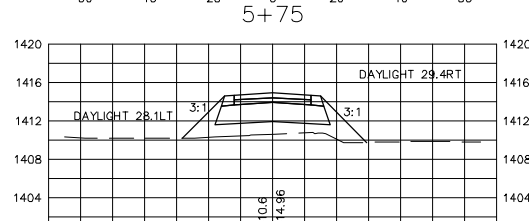
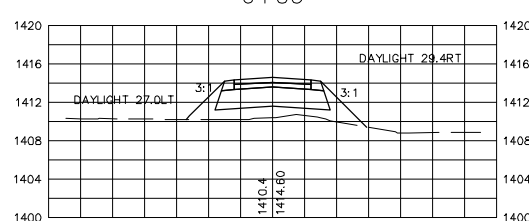
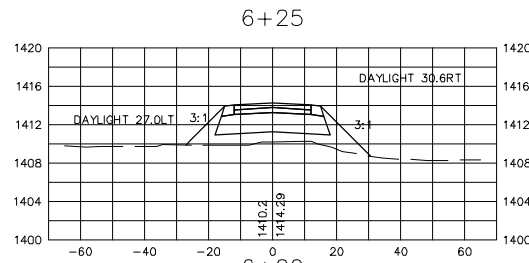
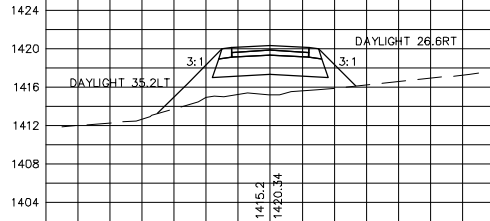
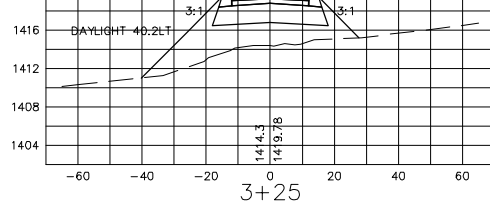
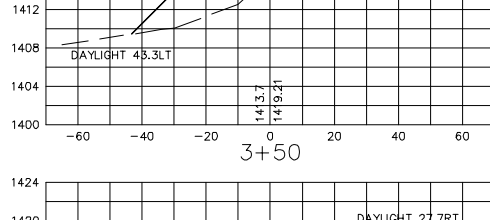
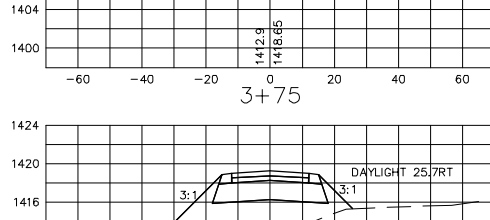
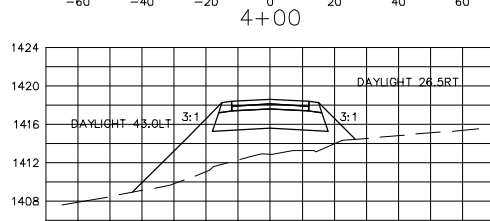
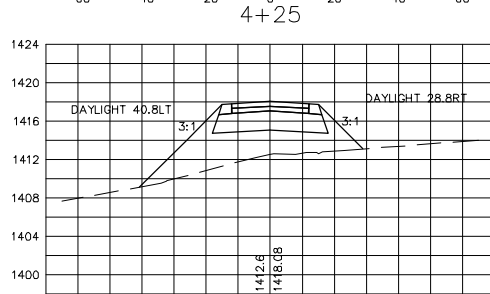
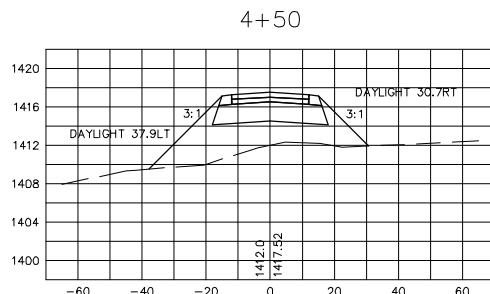
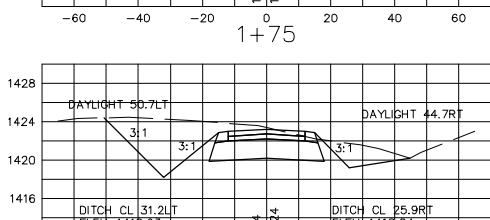
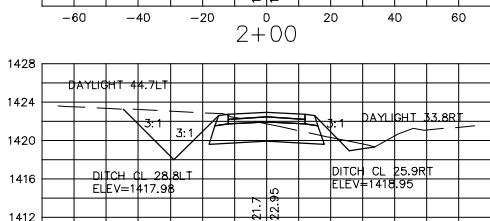
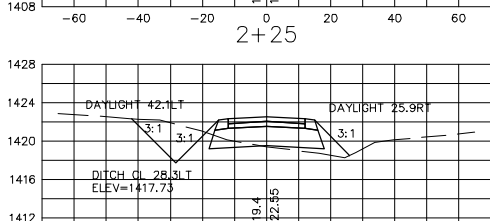
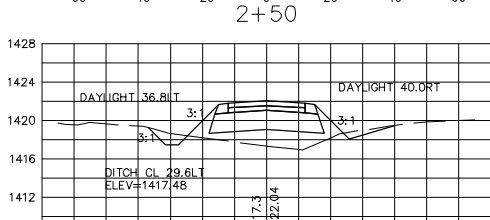
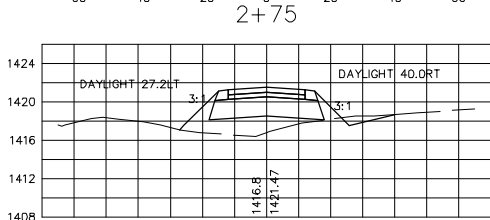
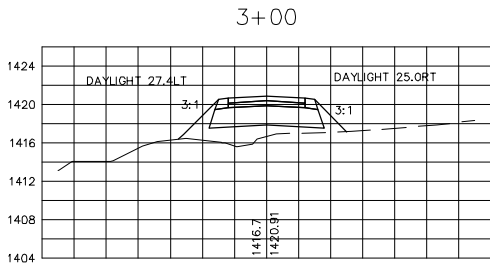
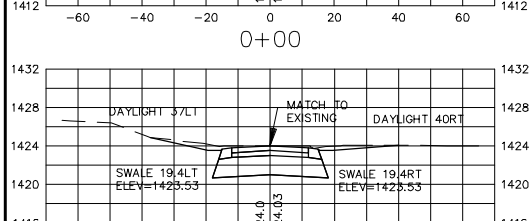
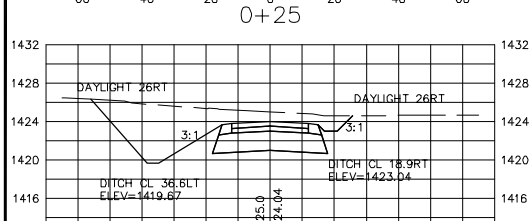
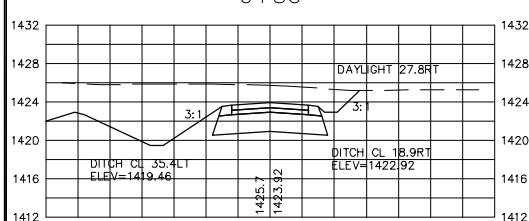
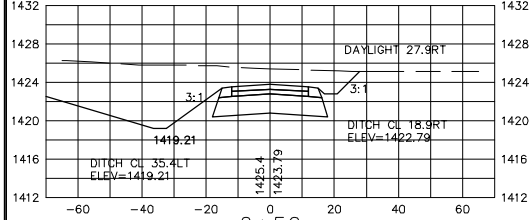
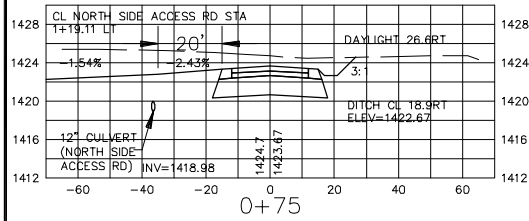
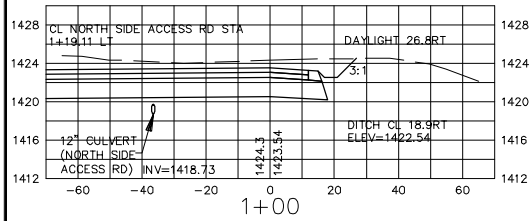
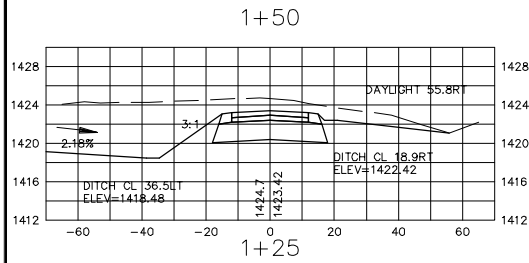
TYPICAL CROSS SECTIONS

SHEET NUMBER

CS6

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Signature *Darren K. Christopher*
Typed Name DARREN K. CHRISTOPHER

Date 08/18/2009 Reg. No. 45052

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: 08-18-2009
REVIEWED BY: MLS
DRAWN BY: JKE
DESIGNED BY: DKC

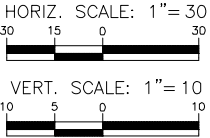
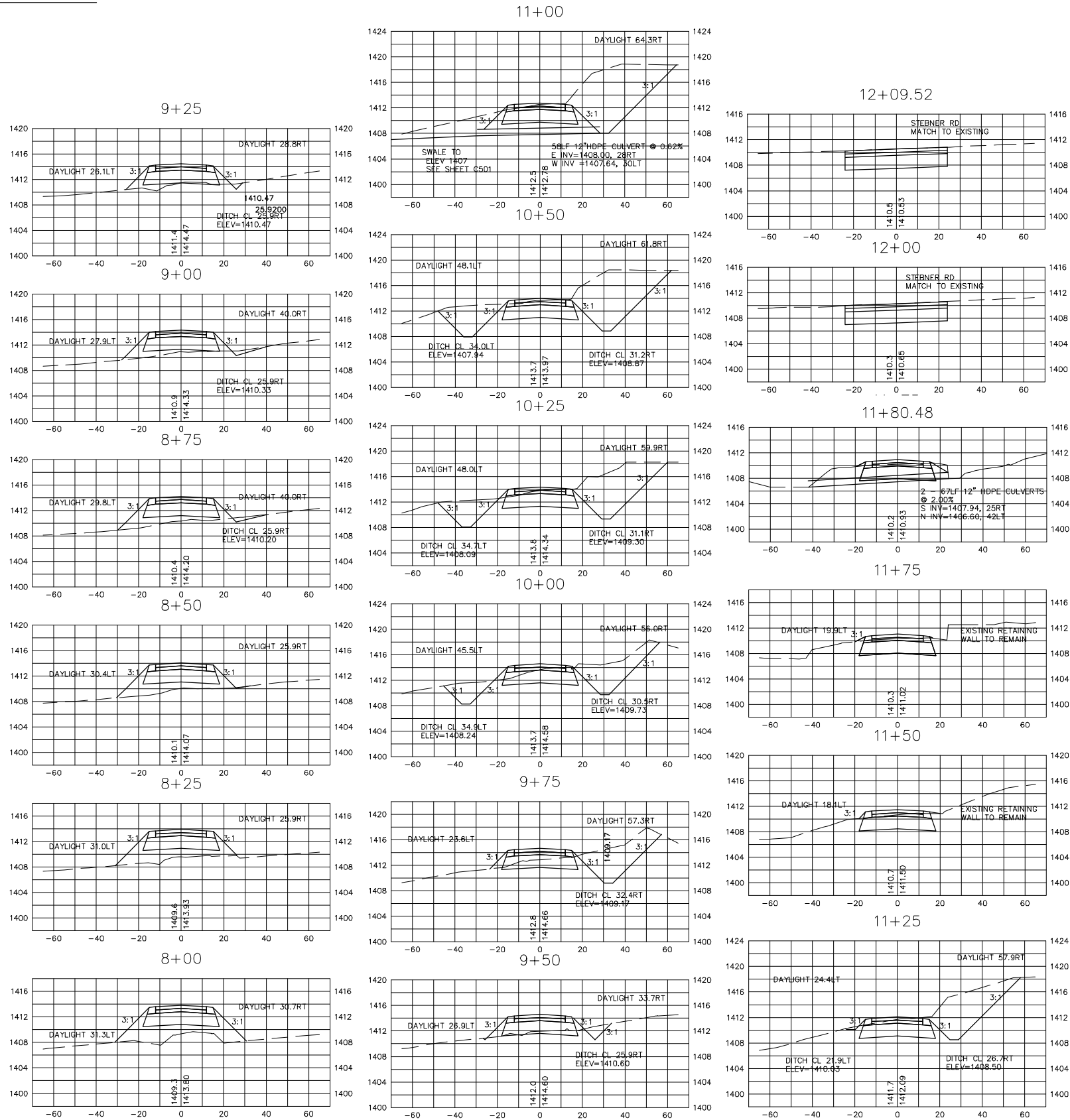
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SECTIONS**

SHEET NUMBER
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AEP PROJECT NUMBER

214-1882-077

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SHEET TITLE

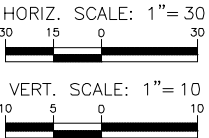
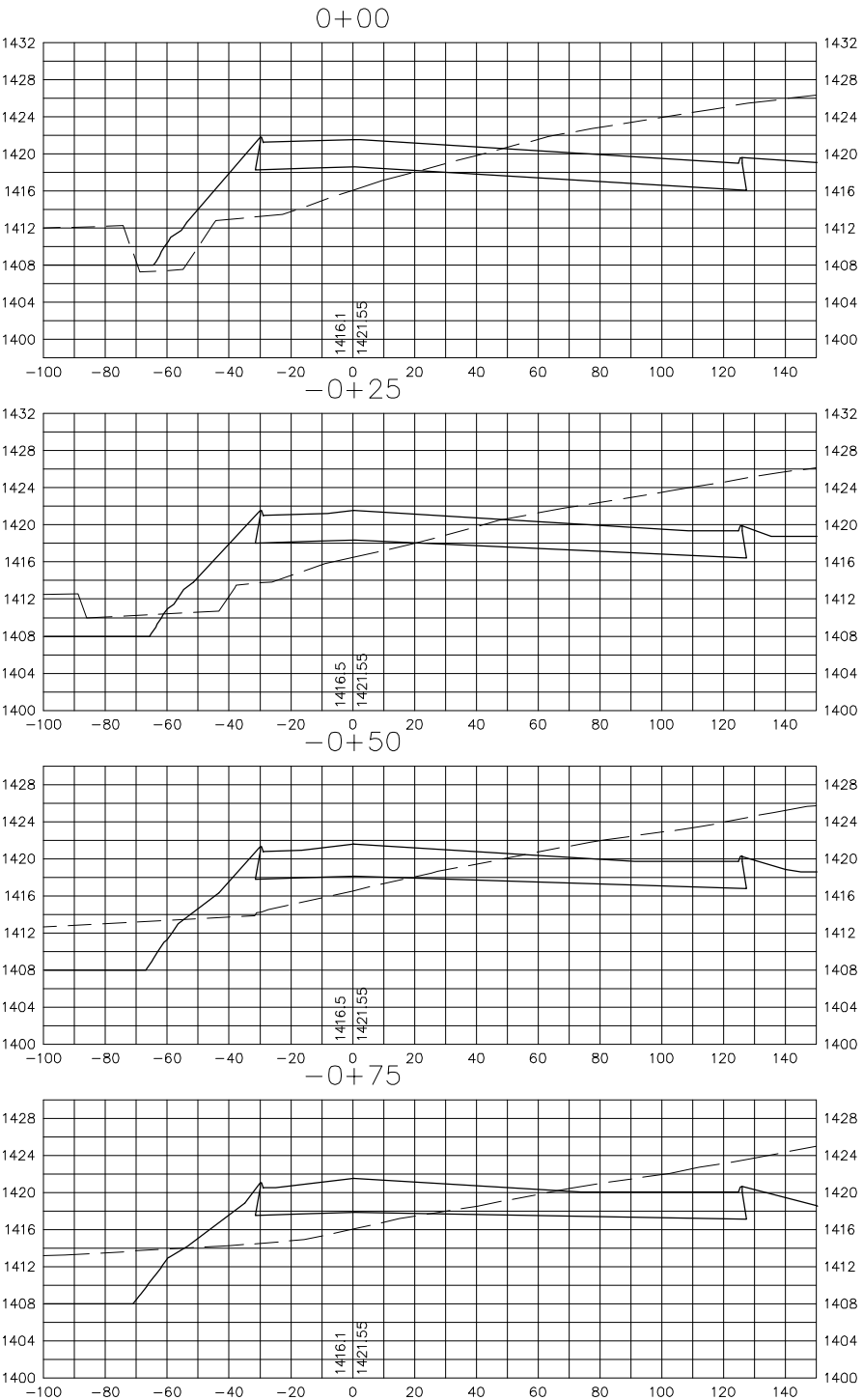
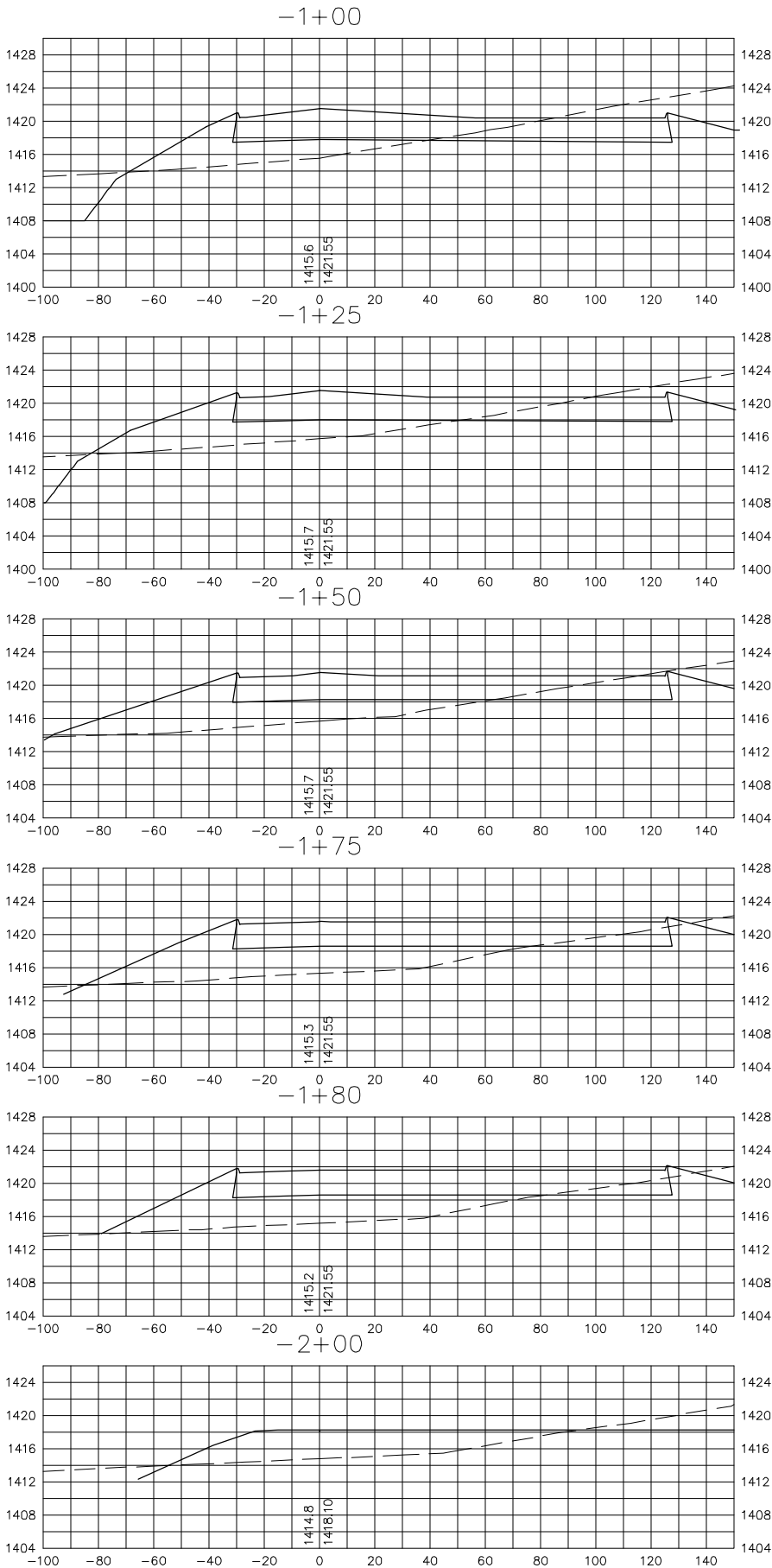
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CROSS
SECTIONS

SHEET NUMBER

CS9

BID
DOCUMENTS

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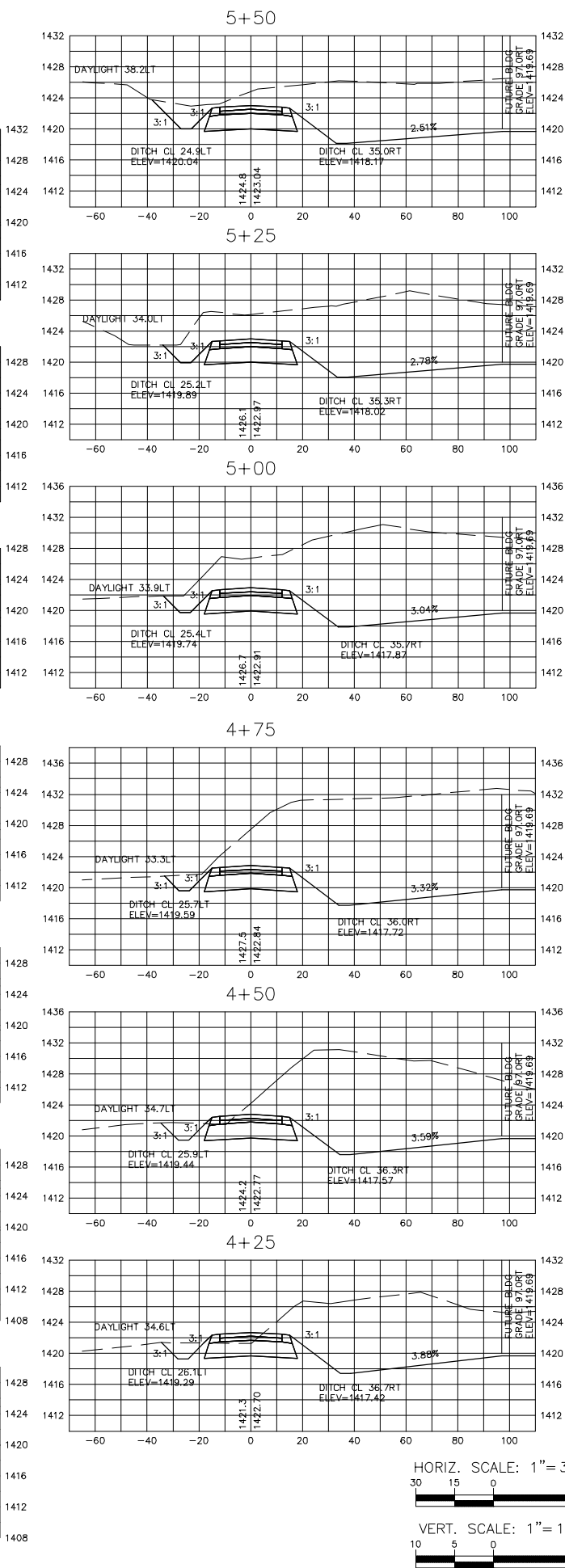
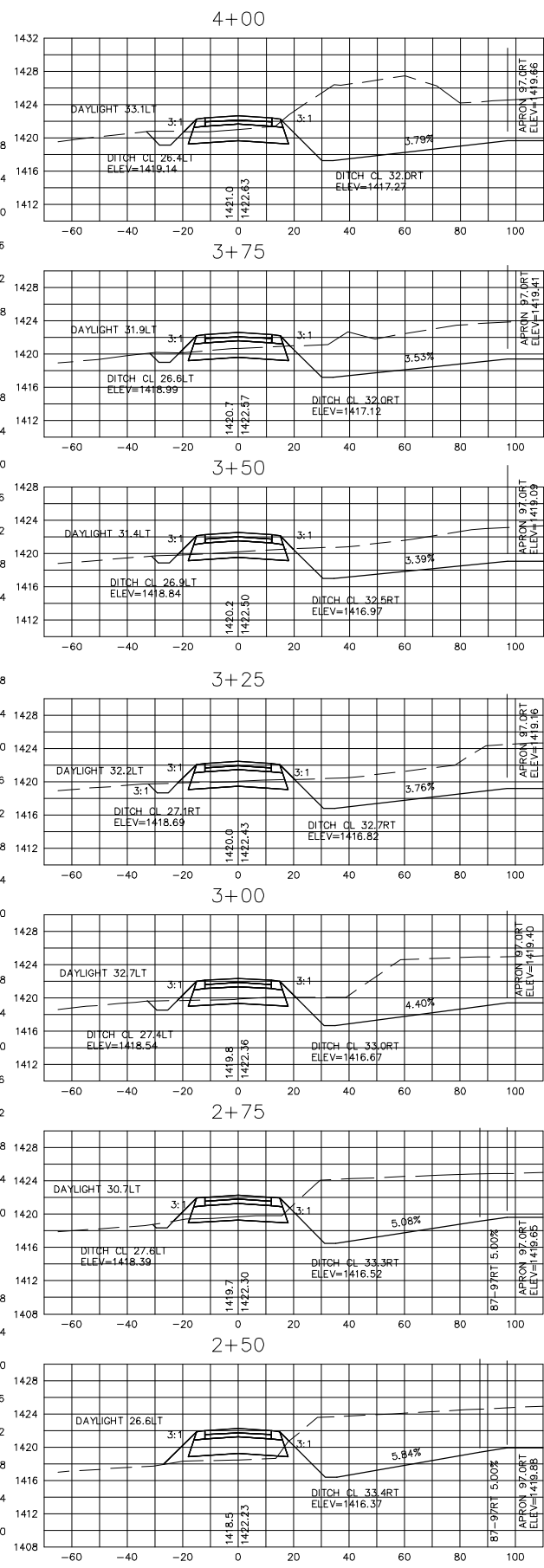
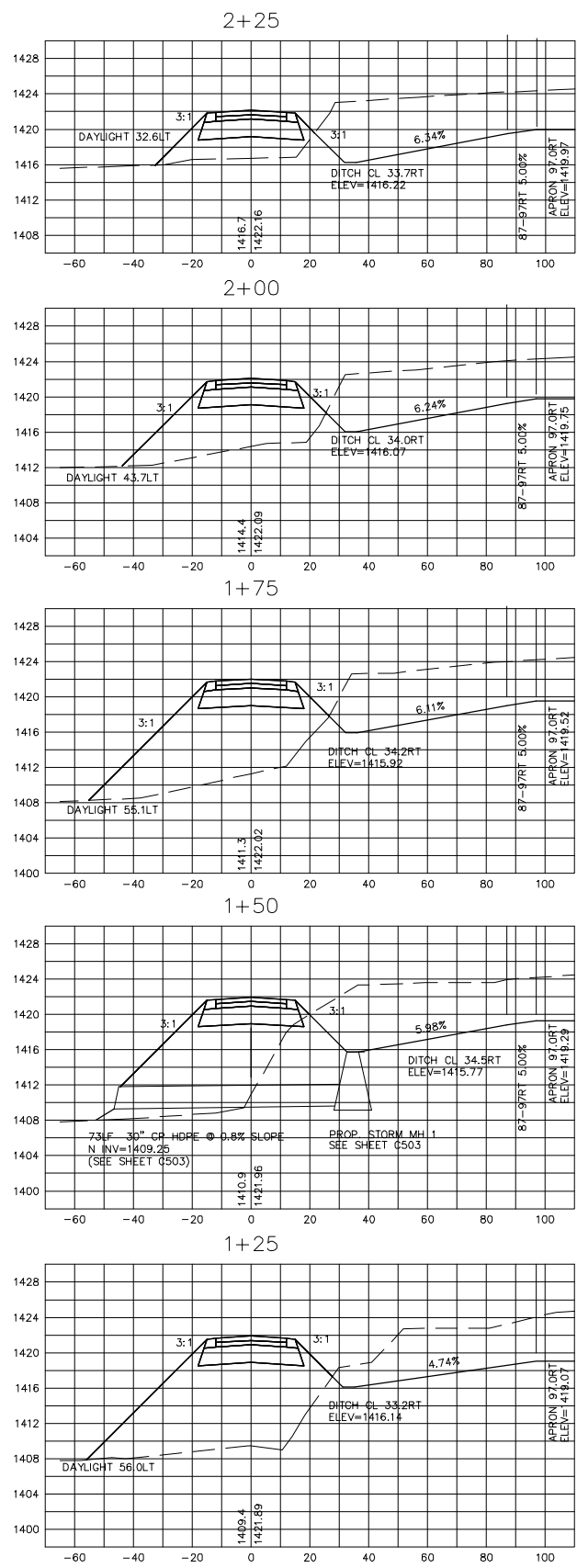
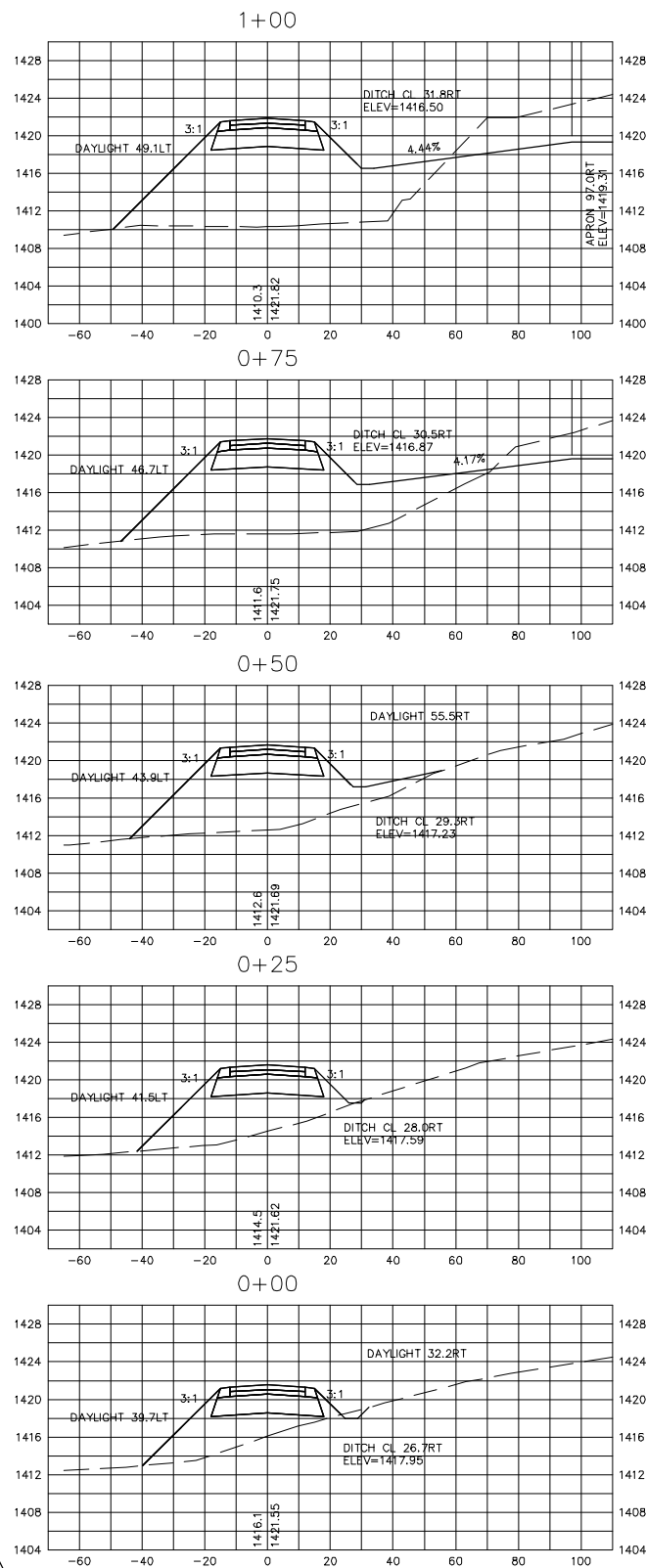
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REVISIONS

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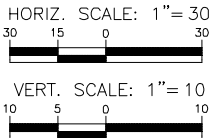
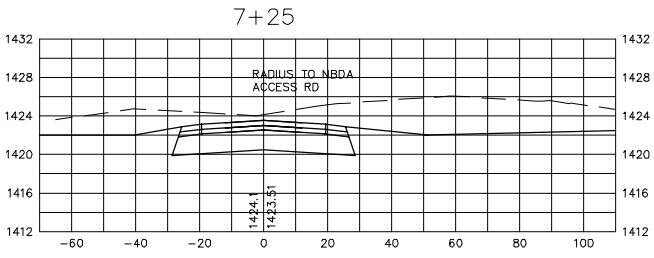
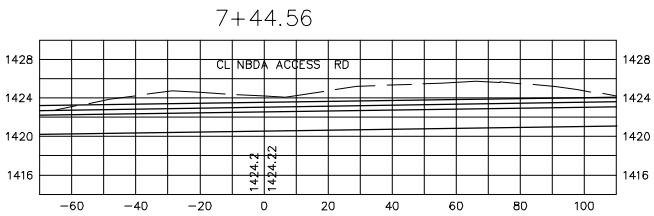
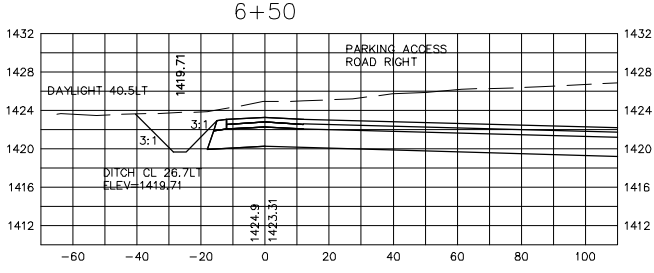
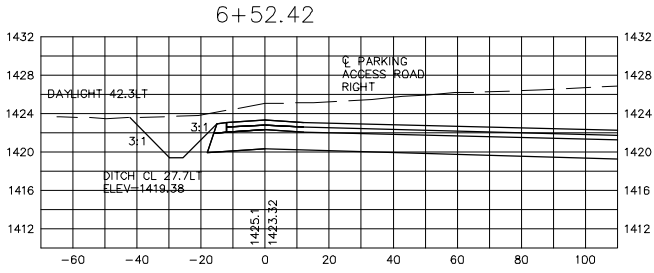
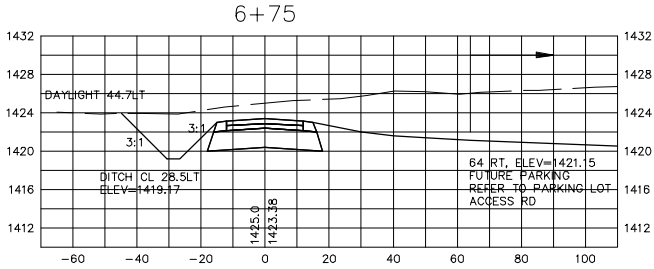
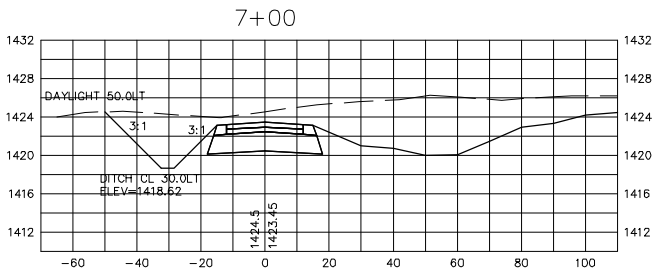
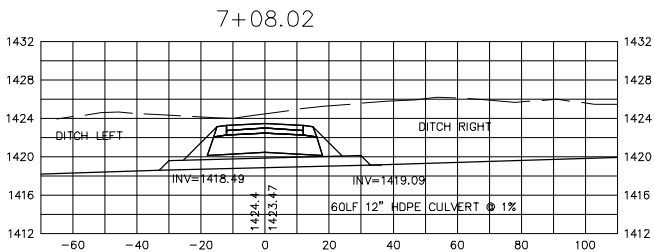
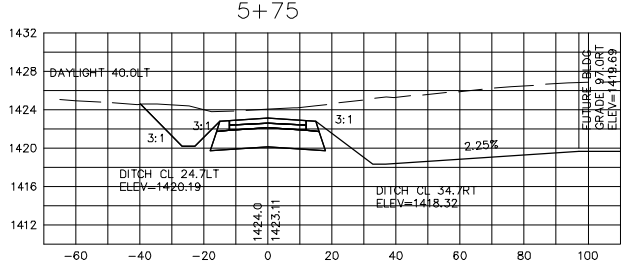
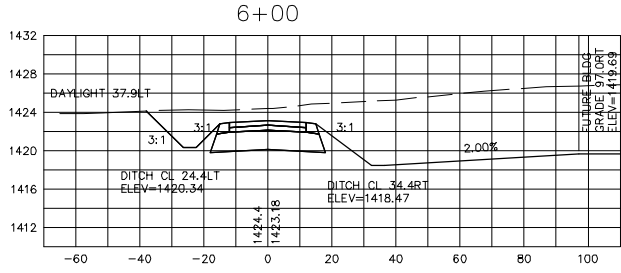
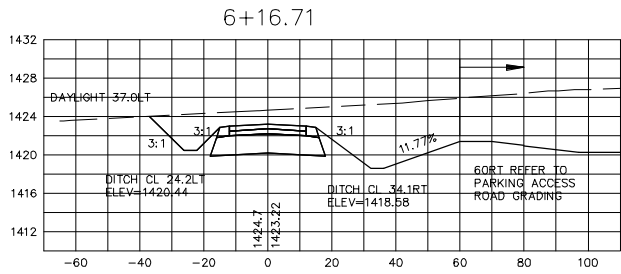
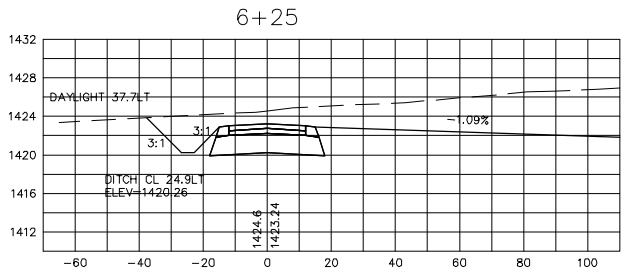
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SHEET NUMBER

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BID DOCUMENTS

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REVISIONS

NO.	DESCRIPTION	DATE

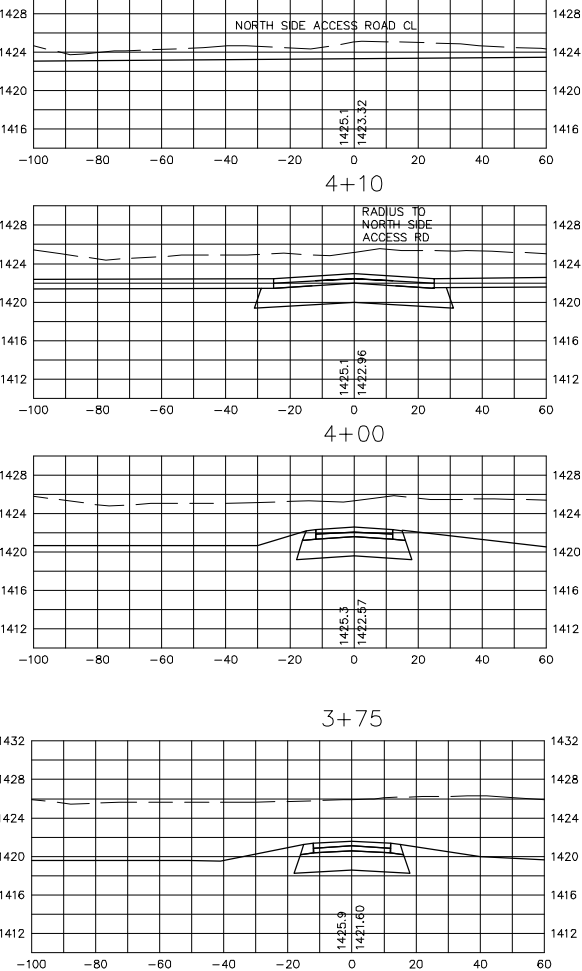
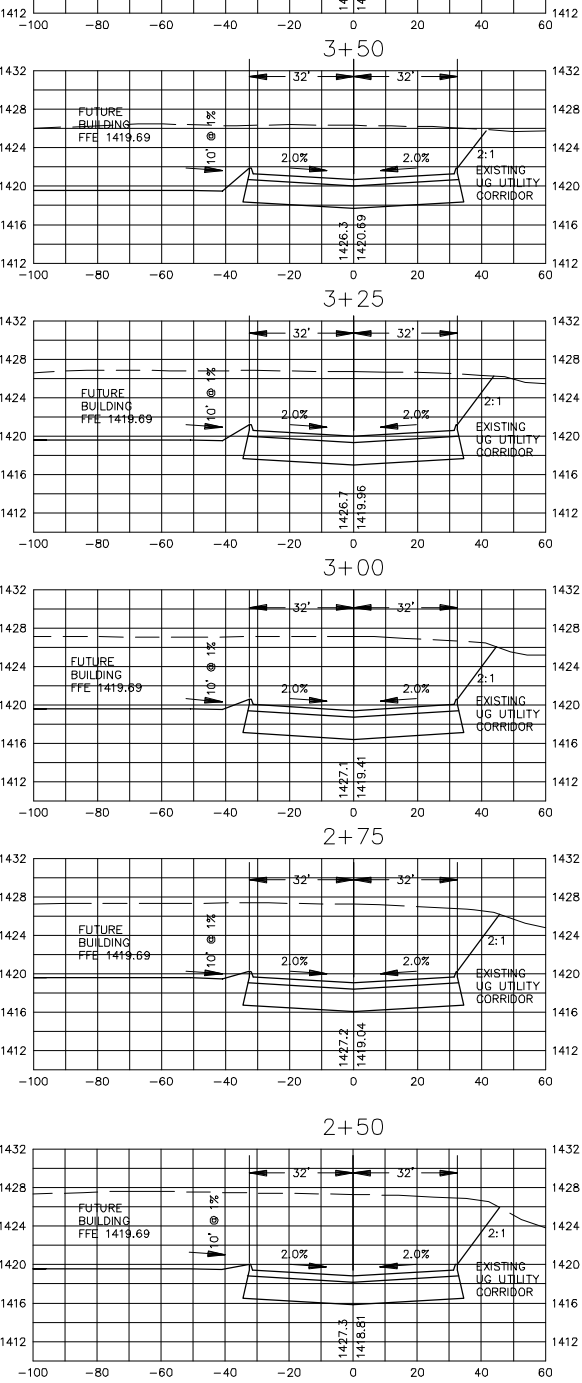
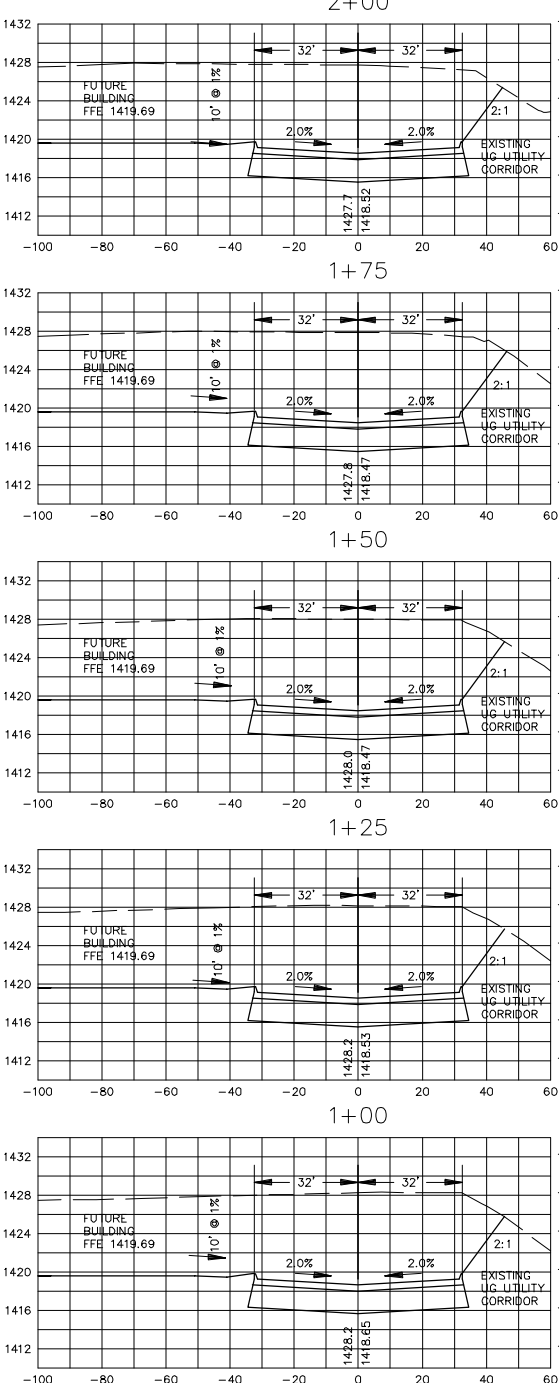
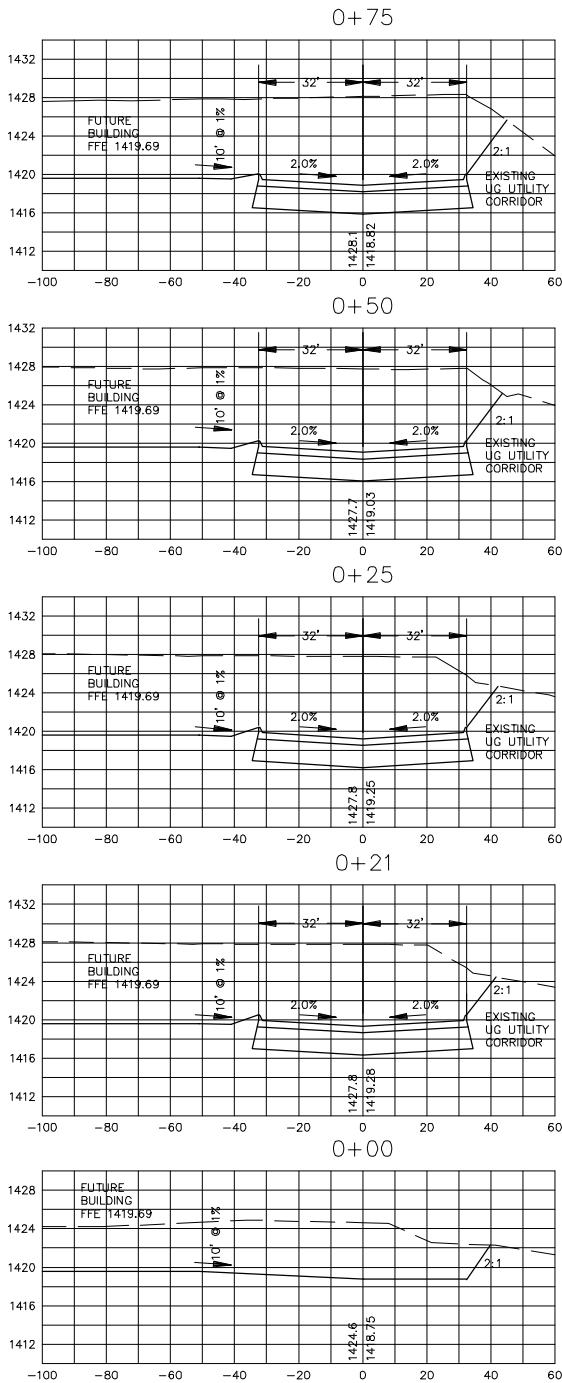
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SHEET TITLE
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NORTH SIDE PARKING ACCESS ROAD



HORIZ. SCALE: 1" = 30'



VERT. SCALE: 1" = 10'



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