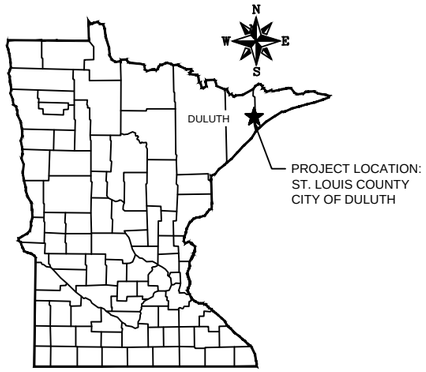
CITY OF DULUTH

LAKEWOOD WATER TREATMENT PLANT HEATING,VENTILATION, AND COOLING SYSTEM IMPROVEMENTS-ENGINEERING DIVISION

LOCATION: DULUTH, MN
CONSTRUCTION PLANS FOR: LAKEWOOD WATER TREATMENT PLANT
CITY PROJECT NUMBER: 1340



REGIONAL LOCATION MAP
MINNESOTA

SITE LOCATION MAP
NOT TO SCALE

GOVERNING SPECIFICATIONS

THE 2014 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" AND THE 2014 EDITION OF THE "MATERIALS LAB SUPPLEMENTAL SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN. AVAILABLE AT: http://www.dot.state.mn.us/pre-letting/spec/index.html

THE 2015 EDITION OF THE CITY OF DULUTH PUBLIC WORKS AND UTILITIES DEPARTMENT STANDARD CONSTRUCTION SPECIFICATIONS

SHEET INDEX

SEE COMPLETE SET LIST ON SHEET G-2

WARNING
LOCATION OF UNDERGROUND UTILITIES
TO BE VERIFIED BY CONTRACTOR
GOPHER STATE ONE CALL
CALL BEFORE DIGGING,
1-800-252-1166
REQUIRED BY LAW

NOTE:

UTILITY LOCATIONS SHOWN ON PLANS ARE APPROXIMATE AND CONTRACTOR SHALL HAVE APPROPRIATE UTILITY MARK EXACT LOCATIONS PRIOR TO CONSTRUCTION.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-.2, ENTILTED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

I HEREBY CERTIFY THAT THIS PLAN 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.

3/7/2016 — 44287
PROJECT ENGINEER: ENGINEER'S NAME — DATE — LIC NO.

CITY APPROVAL

Caroline Pedersen
APPROVED — CHIEF ENGINEER OF TRANSPORTATION — DATE

Eric R. Shaffer
APPROVED — CHIEF ENGINEER OF UTILITIES — DATE

Cindy Voigt
APPROVED — CITY ENGINEER — DATE

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. : .	CHECKED BY: SRC	.	.	.	.
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PLOT DATE: 3/7/16 , P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\G-1 TITLE SHEET.dwg					

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TITLE SHEET

LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

FILE NO. 00616097
SHEET G-1

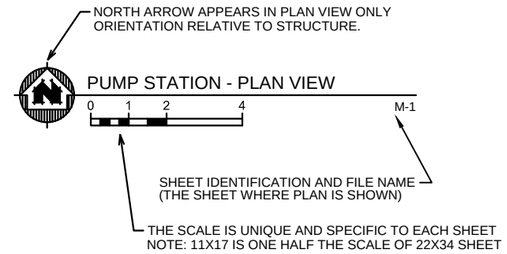
SHEET INDEX

DISCIPLINE IDENTIFICATION

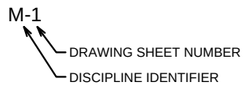
DESIGNATION	DISCIPLINE
G	GENERAL
C	SITE CIVIL
R	REMOVAL/DEMOLITION
S	STRUCTURAL
PM	MECHANICAL
PP	UTILITY PLAN & PROFILE
A	ARCHITECTURAL
M	PLUMBING/HVAC
E	ELECTRICAL

NOTE: FOR CLARITY, IN A FEW LOCATIONS PORTIONS OF WORK FOR A DISCIPLINE MAY BE SHOWN ON SHEET WITH A DIFFERENT DISCIPLINE DESIGNATION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO PROVIDE A COMPLETE AND OPERABLE SYSTEM.

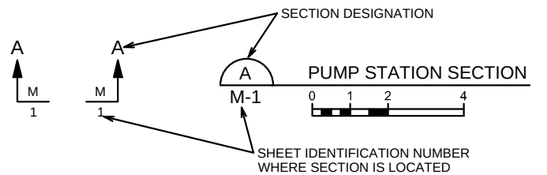
PLAN VIEW LABEL



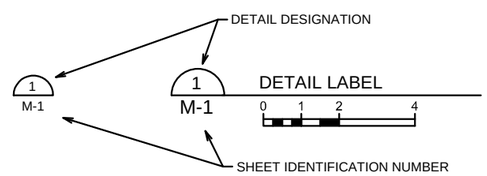
SHEET IDENTIFICATION NUMBERING EXAMPLE



SECTION DESIGNATION



DETAIL DESIGNATION



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SCOTT R. CHILSON — MARCH 7, 2016 (Date) — 44287 (License No.)

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

SHEET INDEX

FILE NO. 00616097

SHEET G-2

ABBREVIATIONS

A.B.	ANCHOR BOLT
ACOUST	ACOUSTIC(AL)
A/C	AIR CONDITIONER
ADJ	ADJACENT
A.F.F.	ABOVE FINISH FLOOR
ALT	ALTERNATE
ALUM	ALUMINUM
APPROX	APPROXIMATE(LY)
AVG	AVERAGE
B/	BOTTOM OF
BD	BOARD
BF	BLIND FLANGE
BFP	BACKFLOW PREVENTER
BIT	BITUMINOUS
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM
BRG	BEARING
BUR	BUILT UP ROOF
C.J.	CONTROL JOINT
CL	CENTERLINE
CLG	CEILING
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUOUS
CPVC	CHLORINATED POLYVINYL CHLORIDE
DBL	DOUBLE
DEG or °	DEGREE
DF	DRINKING FOUNTAIN
DI	DUCTILE IRON
DIA	DIAMETER
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DN	DOWN
DS	DOWN SPOUT
D.T.	DRAIN TILE
DWG	DRAWING
E.I.F.S.	EXTERIOR INSULATION FINISH SYSTEM
EA	EACH WAY
EB	ELBOW
ECC	ECCENTRIC
ELEC	ELECTRIC
EL	ELEVATION
EQ	EQUAL
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
F.E.	FIRE EXTINGUISHER
F.D.	FLOOR DRAIN
FCA	FLANGED COUPLING ADAPTOR
FIN	FINISH(ED)
FLG	FLANGE
FLR	FLOOR
FM	FLOW METER
FOC	FACE OF CONCRETE
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FT	FOOT OR FEET
FTG	FOOTING
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GPM	GALLON PER MINUTE
GWB	GYPSUM WALL BOARD
GYP	GYPSUM
HB	HOSE BIBB
HC	HANDICAP
HGT	HEIGHT
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HTG	HEATING
HP	HIGH POINT
HWH	HOT WATER HEATER
HWL	HIGH WATER LEVEL
HVAC	HEATING/VENTILATING/ AIR CONDITIONING
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
INSUL	INSULATION
INV	INVERT
JT	JOINT
LAV	LAVATORY
LP	LOW POINT
LR	LONG RADIUS
LWL	LOW WATER LEVEL
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MFR	MANUFACTURER
MH	MANHOLE
MJ	MECHANICAL JOINT
MIN	MINIMUM
MO	MASONRY OPENING
MR	MOISTURE RESISTANT
MTD	MOUNTED
MTL	METAL
N.I.C.	NOT IN CONTRACT
NO. or #	NUMBER
NPW	NON-POTABLE WATER
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
OD	OUTSIDE DIAMETER
OPP HD	OPPOSITE HAND
P.C.	PRECAST CONCRETE
P&ID	PROCESS AND INSTRUMENTATION DIAGRAM
PDF	POWER DRIVEN FASTENER
PCP	PRESTRESSED CONCRETE PIPE
PLBG	PLUMBING
PLWD	PLYWOOD
PNT.	PAINT(ED)
PRV	PRESSURE REDUCING VALVE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
P.T.	PRESSURE TREATED
R.C.P.	REFLECTED CEILING PLAN
R.D.	ROOF DRAIN
RCP	REINFORCED CONCRETE PIPE
RED	REDUCER
REINF	REINFORCING OR REINFORCED
REQ'D	REQUIRED
RO	ROUGH OPENING
SG	SLUICE GATE
SIM	SIMILAR
SM	SHEET METAL
SPECS	SPECIFICATIONS
SQ	SQUARE
SQ FT	SQUARE FOOT
SR	SHORT RADIUS
SS	SERVICE SINK
SST	STAINLESS STEEL
STD	STANDARD
STL	STEEL
SUSP	SUSPENDED
T&G	TONGUE & GROOVE
T/	TOP OF
T.O.F.	TOP OF FOOTING
TOC	TOP OF CONCRETE
TOG	TOP OF GRATING
TOW	TOP OF WALL
TYP	TYPICAL
UNEXC	UNEXCAVATED
UNO	UNLESS NOTED OTHERWISE
UV	UNIT VENTILATOR
VERT	VERTICAL
WD	WOOD
WH	WALL HYDRANT
W/	WITH
W/O	WITH OUT
WL	WATER LEVEL
WT	WEIGHT
WWM	WIRE WELDED MESH
YR	YEAR

LEGEND

W	EXISTING WATER MAIN
GV	EXISTING GATE VALVE & HYDRANT
	WATER SERVICE & CURB STOP
	PROPOSED WATERMAIN, VALVE, & HYDRANT
	PROPOSED WATER SERVICE & CURB STOP
SAN S	EXISTING SANITARY SEWER & MANHOLE
FM	EXISTING FORCEMAIN
SS	EXISTING STORM SEWER & INLET
>	PROPOSED STORM SEWER & INLET
>>	PROPOSED SANITARY MANHOLE & SEWER MAIN
<>	PROPOSED FORCE MAIN
E	BURIED ELECTRIC
G	BURIED GAS & VALVE
TV	BURIED CABLE TELEVISION
T	BURIED TELEPHONE
FO	BURIED FIBER OPTICS
OH	OVERHEAD UTILITY
	RAILROAD TRACKS
	EXISTING CURB & GUTTER
	PROPOSED CURB & GUTTER
	EXISTING SIDEWALK
	PROPOSED SIDEWALK
	EXISTING CULVERT PIPE
	PROPOSED CULVERT PIPE
	FENCE LINE
	DRAINAGE ARROW
	SILT FENCE
	RIGHT-OF-WAY
	BASELINE
	PROPERTY LINE
	TREE LINE
	BENCHMARK
	IRON PIPE
	IRON ROD
	CONTROL POINT
	UTILITY POLE & GUY
1 000.00	SOIL BORING
	LIGHT POLE
	PEDESTAL
	STREET SIGN
	MAILBOX
	FLAGPOLE
	TREE - DECIDUOUS
	TREE - CONIFEROUS
	TREE TO BE REMOVED
	EROSION BALES

PROCESS VALVE SYMBOLS

(M SHEETS)

BUTTERFLY VALVE (BFV)

CHECK VALVE (CV)

GATE VALVE (GV)

BALL VALVE (BA)

PLUG VALVE (PV)

MOTOR OPERATED PLUG VALVE

NOTE: UNDERGROUND PIPING IS SHOWN ON THE PLANS WITH FLANGED JOINTS FOR CONVENIENCE ONLY. SEE DIVISON 40- WASTEWATER PROCESS PIPING SYSTEMS OF THE SPECIFICATIONS FOR CORRECT JOINT TYPE.

PIPELINE INDENTIFIERS

AIR	AIR LOW PRESSURE
AL/FE	ALUM OR FERRIC CHEMICAL
ALK	ALKALINITY CHEMICAL
BYP	BYPASS
CHLOR	CHLORINATION CHEMICAL
CA	CAUSTIC SODA CHEMICAL
D	DRAIN
DCT	DECANT
DECHLOR	DECHLORINATION
DS	DIGESTION FLUID
EFFL	EFFLUENT
FEI	FLOW EQUALIZATION INFLUENT
FER	FLOW EQUALIZATION RETURN
FM	FORCEMAIN
G	GAS
HYPO	HYPOCHLORITE
INFL	INFLUENT
ML	MIXED LIQUOR
NG	NATURAL GAS
NPW	NON-POTABLE WATER
OF	OVERFLOW
OXD	OXIDATION DITCH
PLE	PLANT EFFLUENT WATER
POL	POLYMER CHEMICAL
RAS	RETURN ACTIVATED SLUDGE
RYC	RECYCLE
RET	RETURN SIDESTREAM
RW.SAN	RAW WASTEWATER
SAM	SAMPLE
SCE	SECONDARY EFFLUENT
SEL	SELECTOR TANK
SI	SECONDARY INFLUENT
SS	STORM SEWER
TWAS	THICKENED WAS
V	VENT
W	POTABLE WATER
WAS	WASTE ACTIVATED SLUDGE

ARCHITECTURAL SYMBOLS

CROSS SECTION CUT — 5 / A-6 — SECTION NUMBER / SHEET NUMBER

DETAIL OR SECTION CUT — 5 / A-6

PHOTO w/ DIRECTION — 5 / A-6

DOOR IDENTIFICATION — 5

NOTE IDENTIFICATION — 5

WINDOW IDENTIFICATION — C

ROOM IDENTIFICATION — ROOM NAME / 100

REVISION IDENTIFICATION — 1

GENERAL NOTES

1. FOR CLARITY, IN A FEW INSTANCES WORK FOR A DISCIPLINE MAY BE SHOWN ON A SHEET WITH A DIFFERENT DISCIPLINE SHEET DESIGNATION. THE GENERAL CONTRACTOR IS REQUIRED TO PROVIDE A COMPLETE AND OPERABLE SYSTEM.
2. REFER TO ELECTRICAL DRAWINGS AND SCHEDULES FOR WORK REQUIRED FOR ALL ELECTRICAL AND CONTROL DEVICES.

DEMOLITION GENERAL NOTES

1. THE GENERAL CONTRACTOR SHALL COORDINATE AND PROVIDE ALL DEMOLITION AND REMOVAL OF DEBRIS NECESSARY TO ACCOMMODATE NEW CONSTRUCTION.
2. DEMOLITION PLAN IS PROVIDED AS AN AID IN PLANNING AND DOES NOT RELIVE CONTRACTORS RESPONSIBILITY TO FILED VERIFY THE EXISTING JOB SITE.
3. DEMOLITION PLAN SHALL BE USED IN CONJUNCTION WITH THE REMAINDER OF THE SHEETS IN THIS SET.
4. REMOVED EXISTING CONCRETE SLABS AS REQUIRED FOR PROCESS MECHANICAL, HVAC, AND ELECTRICAL WORK.
5. ALL AREAS, FINISHED, AND ITEMS NOT REQUIRING DEMOLITION MUST BE PROTECTED DURING DEMOLITION AND CONSTRUCTION WORK.
6. REFERENCE HVAC AND ELECTRICAL SHEETS FOR ADDITIONAL ITEMS TO BE REMOVED AND OR RELOCATED.
7. PRIOR TO START OF DEMOLITION WORK, VERIFY WITH THE OWNER ALL ITEMS TO BE TURNED OVER TO THE OWNER. ALL OTHER ITEMS TO BE REMOVED SHALL BE RESPONSIBILITY OF THE GC.

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PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\G-3 LEGEND, SYMBOLS, & ABBREVIATIONS.dwg

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SCOTT R. CHILSON — MARCH 7, 2016 (Date) — 44287 (License No.)

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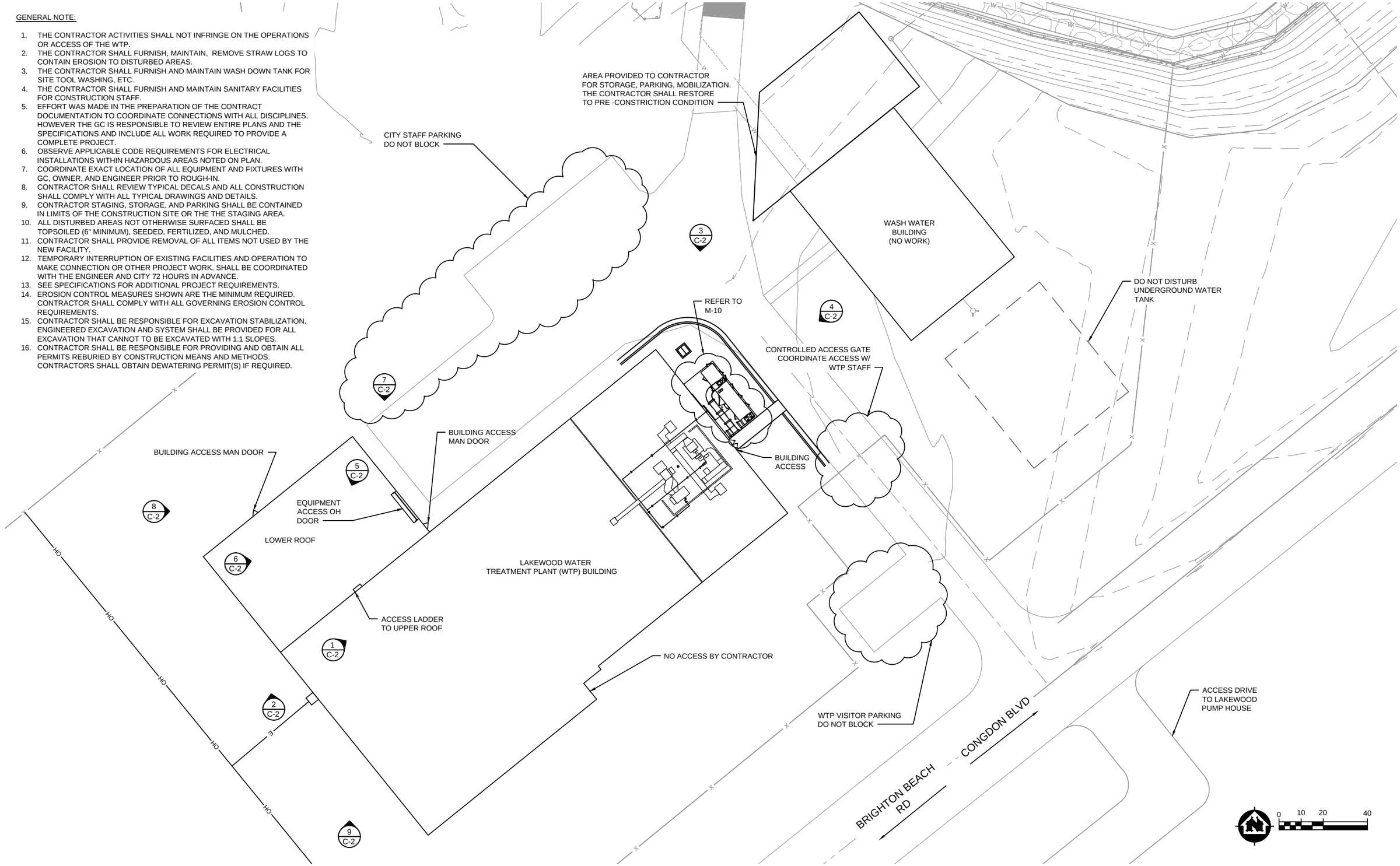
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

LEGEND, SYMBOLS, & ABBREVIATIONS

FILE NO. 00616097
SHEET G-3

GENERAL NOTE:

1. THE CONTRACTOR ACTIVITIES SHALL NOT INFRINGE ON THE OPERATIONS OR ACCESS OF THE WTP.
2. THE CONTRACTOR SHALL FURNISH, MAINTAIN, REMOVE STRAW LOGS TO CONTAIN EROSION TO DISTURBED AREAS.
3. THE CONTRACTOR SHALL FURNISH AND MAINTAIN WASH DOWN TANK FOR SITE TOOL WASHING, ETC.
4. THE CONTRACTOR SHALL FURNISH AND MAINTAIN SANITARY FACILITIES FOR CONSTRUCTION STAFF.
5. EFFORT WAS MADE IN THE PREPARATION OF THE CONTRACT DOCUMENTATION TO COORDINATE CONNECTIONS WITH ALL DISCIPLINES. HOWEVER THE GC IS RESPONSIBLE TO REVIEW ENTIRE PLANS AND THE SPECIFICATIONS AND INCLUDE ALL WORK REQUIRED TO PROVIDE A COMPLETE PROJECT.
6. OBSERVE APPLICABLE CODE REQUIREMENTS FOR ELECTRICAL INSTALLATIONS WITHIN HAZARDOUS AREAS NOTED ON PLAN.
7. COORDINATE EXACT LOCATION OF ALL EQUIPMENT AND FIXTURES WITH GC, OWNER, AND ENGINEER PRIOR TO ROUGH-IN.
8. CONTRACTOR SHALL REVIEW TYPICAL DECALS AND ALL CONSTRUCTION SHALL COMPLY WITH ALL TYPICAL DRAWINGS AND DETAILS.
9. CONTRACTOR STAGING, STORAGE, AND PARKING SHALL BE CONTAINED IN LIMITS OF THE CONSTRUCTION SITE OR THE THE STAGING AREA.
10. ALL DISTURBED AREAS NOT OTHERWISE SURFACED SHALL BE TOPSOILED (6" MINIMUM), SEEDED, FERTILIZED, AND MULCHED.
11. CONTRACTOR SHALL PROVIDE REMOVAL OF ALL ITEMS NOT USED BY THE NEW FACILITY.
12. TEMPORARY INTERRUPTION OF EXISTING FACILITIES AND OPERATION TO MAKE CONNECTION OR OTHER PROJECT WORK, SHALL BE COORDINATED WITH THE ENGINEER AND CITY 72 HOURS IN ADVANCE.
13. SEE SPECIFICATIONS FOR ADDITIONAL PROJECT REQUIREMENTS.
14. EROSION CONTROL MEASURES SHOWN ARE THE MINIMUM REQUIRED. CONTRACTOR SHALL COMPLY WITH ALL GOVERNING EROSION CONTROL REQUIREMENTS.
15. CONTRACTOR SHALL BE RESPONSIBLE FOR EXCAVATION STABILIZATION. ENGINEERED EXCAVATION AND SYSTEM SHALL BE PROVIDED FOR ALL EXCAVATION THAT CANNOT TO BE EXCAVATED WITH 1:1 SLOPES.
16. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND OBTAIN ALL PERMITS REBURIED BY CONSTRUCTION MEANS AND METHODS. CONTRACTORS SHALL OBTAIN DEWATERING PERMIT(S) IF REQUIRED.



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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

SITE PLAN

FILE NO. 00616097
SHEET C-1

1 WTP UPPER ROOF

2 WTP WEST WALL

3 WTP NE WALL

4 WTP EAST EXTERIOR

5 WTP LOWER ROOF

6 WTP LOWER ROOF

7 WTP WEST WALL AND LOADING DOCK

8 WTP NORTH WALL

9 WTP WEST WALL

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

SITE PHOTOS

FILE NO. 00616097

SHEET C-2

DEMOLITION GENERAL NOTES

A. THE CONTRACTOR SHALL COORDINATE AND PROVIDE ALL DEMOLITION AND REMOVAL OF DEBRIS NECESSARY TO ACCOMMODATE NEW CONSTRUCTION.
B. DEMOLITION PLAN IS PROVIDED AS AN AID IN PLANNING AND DOES NOT RELIEVE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE EXISTING JOB SITE.
C. ALL AREAS, FINISHES AND ITEMS NOT REQUIRING DEMOLITION MUST BE PROTECTED DURING DEMOLITION AND CONSTRUCTION WORK.
D. CONTRACTOR SHALL FIELD VERIFY EXISTING DIMENSIONS, ELEVATIONS, PIPE INVERTS, CONDITIONS, ETC.
E. PRIOR TO START OF DEMOLITION WORK, VERIFY w/ THE OWNER ALL ITEMS TO BE TURNED OVER TO THE OWNER. DISPOSAL OF ALL OTHER ITEMS TO BE REMOVED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
F. PROVIDE ALL TEMPORARY SHORING AS REQUIRED TO SUPPORT STRUCTURES AND FINISHES TO REMAIN.
G. IDENTIFY ALL EXISTING SUPPORT STRUCTURE AND LEAVE INTACT. NOTIFY ENGINEER WITH ANY CONFLICTS TO THE NEW CONSTRUCTION.
H. CORE DRILL OR SAW-CUT OPENINGS THROUGH EXISTING MASONRY OR CONCRETE TO REMAIN; OTHER METHODS ARE NOT ACCEPTABLE.
I. EXISTING BRICK REMOVED FOR NEW WORK SHALL BE SALVAGED, CLEANED, AND SAVED FOR REINSTALLATION.

GENERAL NOTES

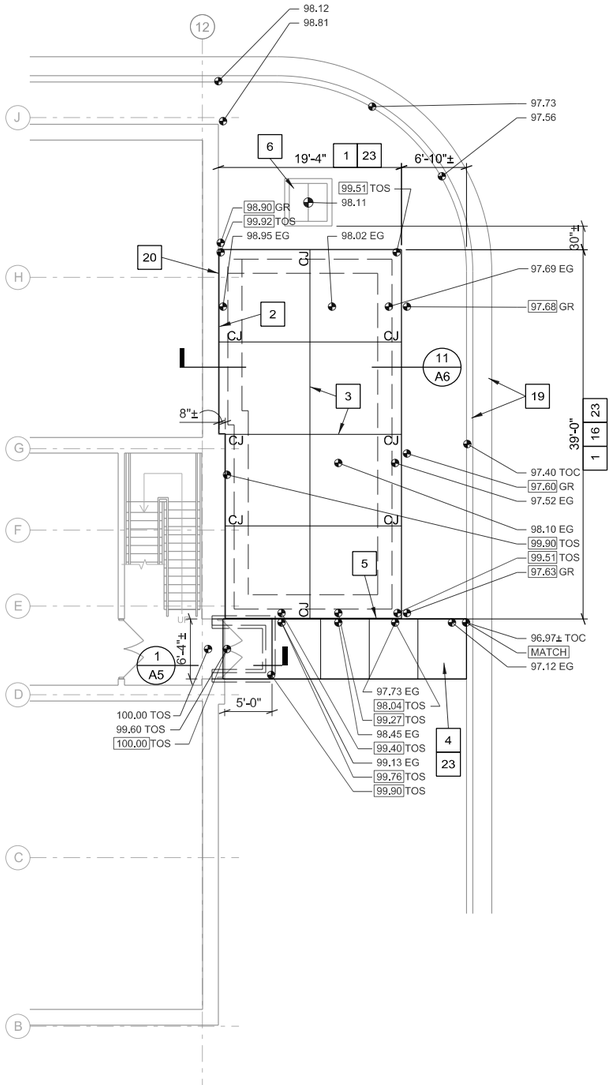
A. DO NOT SCALE DRAWINGS. IF DIMENSIONS ARE IN QUESTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING CLARIFICATION FROM THE ENGINEER BEFORE CONTINUING WITH CONSTRUCTION.
B. ALL DIMENSIONING IS TO FACE OF CONCRETE OR CMU.
C. ALL ITEMS NOT LABELED AS EXISTING ARE NEW.
D. OPENINGS FOR DUCTWORK IN WALLS AND FLOORS SHALL BE PROVIDED BY CONTRACTOR. LOCATION AND SIZE OF THESE OPENINGS SHALL BE THE RESPONSIBILITY OF THE HVAC CONTRACTOR.
E. EXTERIOR WALL AND RELATED EXTERIOR OPENINGS SHALL BE FLASHED AND CAULKED. ALL ROOFING PENETRATIONS SHALL BE FLASHED BY THE ROOFING CONTRACTOR.
F. ALL NEW INTERIOR EXPOSED ANCHORS AND CONDUIT SHALL BE PAINTED, UNO.
G. CONTRACTOR SHALL USE SALVAGED BRICK AT NEW EXTERIOR WALL PENETRATIONS.
H. PATCH HOLES LEFT IN EXISTING WALLS, CEILING, FLOOR, ETC. FROM ITEMS REMOVED w/ MATERIAL TO MATCH EXISTING CONSTRUCTION. TOUCH-UP PAINT.

LEGEND

- SPOT ELEVATION
- 97.56 EXISTING ELEVATION
- 97.60 PROPOSED ELEVATION
- TOC TOP OF CURB
- TOS TOP OF SLAB
- EG EXISTING GRADE
- GR PROPOSED GRADE

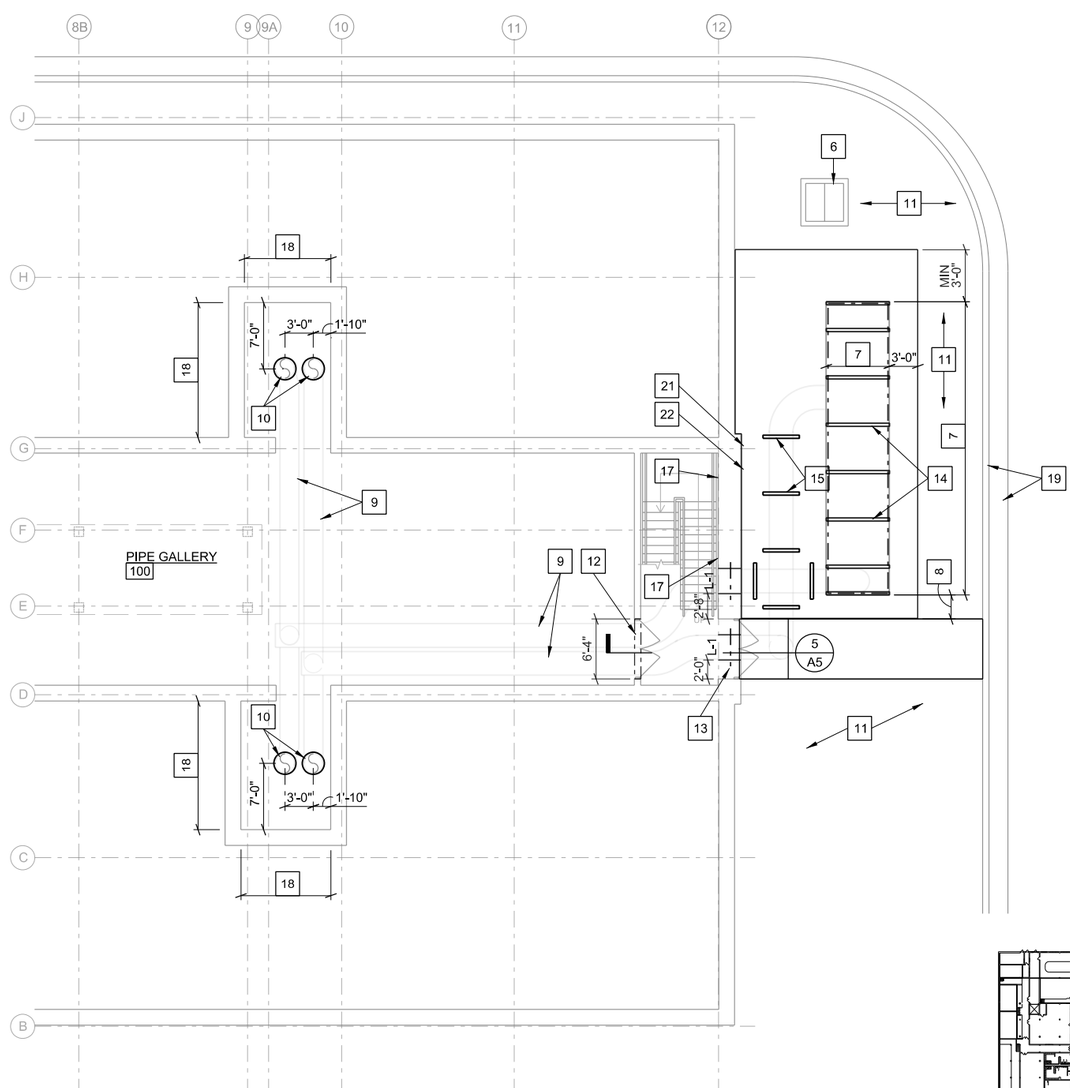
PLAN NOTES

1. CONCRETE SLAB w/ THICKENED EDGES AND BROOM FINISH. SEE DETAIL 11/A6 FOR CONSTRUCTION REQUIREMENTS.
2. 1/2" EXPANSION JOINT MATERIAL w/ REMOVABLE CAP AND SELF-LEVELING SEALANT AT SLAB/ BUILDING JOINT
3. SLAB CONTROL/CONSTRUCTION JOINT (CJ) LOCATION, TYP - SEE DETAIL 4/A6
4. CONCRETE SIDEWALK BROOM FINISH w/ TOOLED CONTROL JOINTS AS SHOWN - SEE DETAIL 2/A5
5. 1/2" EXPANSION JOINT MATERIAL w/ REMOVABLE CAP AND SELF-LEVELING SEALANT AT SLAB/ SIDEWALK JOINT, TYP
6. EXISTING ELECTRIC VAULT - FIELD VERIFY LOCATION. DO NOT DISTURB.
7. DEHUMIDIFIER - VERIFY SIZE w/ EQUIPMENT SUPPLIER
8. DISTANCE AS DETERMINED BY HVAC CONTRACTOR
9. DUCTWORK HUNG FROM CEILING - SEE HVAC
10. DUCTWORK UP THROUGH FLOOR ABOVE - SEE SECOND FLOOR PLAN FOR CONTINUATION
11. TOPSOIL AND SEED ALL DISTURBED AREA
12. REMOVE EXISTING MASONRY FULL WIDTH ABOVE DOORS, FROM BELOW DUCT TO UNDERSIDE OF EXISTING CONCRETE STRUCTURE ABOVE.
13. LINTEL FOR DUCT PENETRATION THROUGH EXTERIOR WALL, TYP - SEE DETAIL 8/A5
14. EQUIPMENT BASE SUPPORTS SPACED AT 5'-0" OC MAX - SEE DETAIL 8/A6
15. PIPE SUPPORT FOR DUCT, TYP, SPACE AT 5'-0" OC MAX. DO NOT INSTALL AT LOCATIONS WHICH WILL INTERFERE w/ EQUIPMENT ACCESS PANELS - COORDINATE w/ HVAC CONTRACTOR. SEE DETAIL 7/A5.
16. LENGTH REQUIRED SHALL BE VERIFIED w/ HVAC CONTRACTOR (BASED REQUIREMENTS LISTED ON FLOOR PLAN)
17. PAINT EAST WALL FULL HEIGHT, MATCH EXISTING COLOR
18. PAINT CEILING, THIS ROOM - MATCH EXISTING COLOR
19. EXISTING CONCRETE CURB AND GUTTER - TO REMAIN
20. EXISTING CONCRETE BRICK LEDGE HAS 1" CHAMFER ON OUTSIDE EDGE - FIELD VERIFY. TOP OF SLAB SHALL BE FLUSH w/ BOTTOM OF EXISTING CHAMFER - ADJUST GRADES AS NECESSARY.
21. EXISTING GAS LINE TO BE MOVED BY OWNER (NIC)
22. EXISTING CONDUIT/JUNCTION BOX TO REMAIN
23. COMPACT EXISTING SOILS IN PLACE w/ BACKHOE MOUNTED COMPACTOR BEFORE PLACEMENT OF FILL MATERIALS



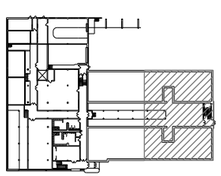
FOUNDATION PLAN

0 4 8 16 1/8" = 1'-0" (22x34)
1/16" = 1'-0" (11x17)



ENLARGED PARTIAL FIRST FLOOR PLAN

0 4 8 16 1/8" = 1'-0" (22x34)
1/16" = 1'-0" (11x17)



KEY PLAN

PROJECT NO: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: ABL	·	·	·	·
	CHECKED BY: AJS	·	·	·	·
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PLOT DATE: D:\00616097 a01 enlarged first fp.dgn 3/7/2016 4:36:30 PM cwastlund					

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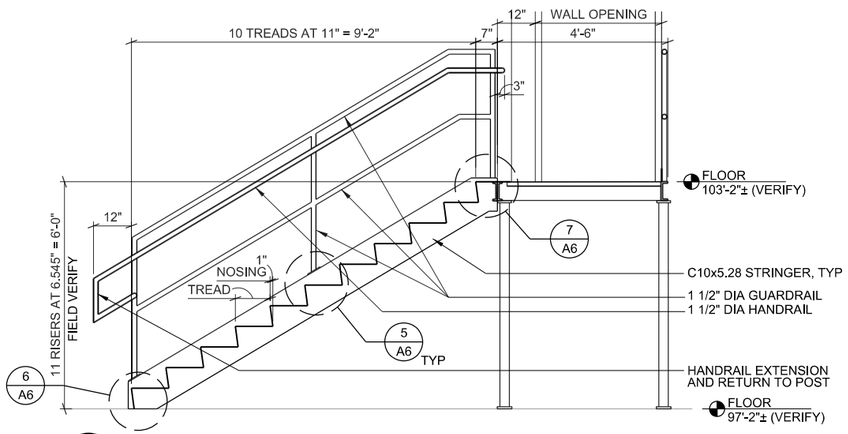
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

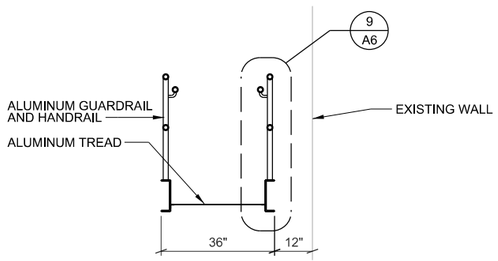
ENLARGED PARTIAL FIRST FLOOR PLAN AND FOUNDATION PLAN

FILE NO. 00616097
SHEET A1



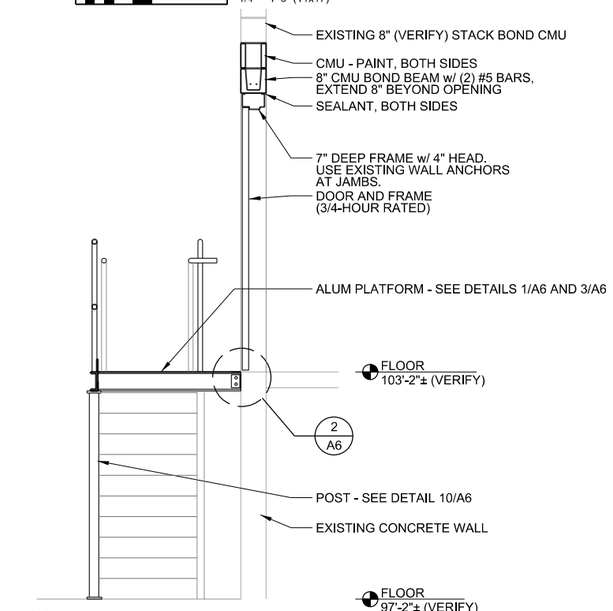
1 STAIR SECTION

A2 — 0 1 2 4 — 1/2" = 1'-0" (22x34), 1/4" = 1'-0" (11x17)



2 STAIR SECTION

A2 — 0 1 2 4 — 1/2" = 1'-0" (22x34), 1/4" = 1'-0" (11x17)

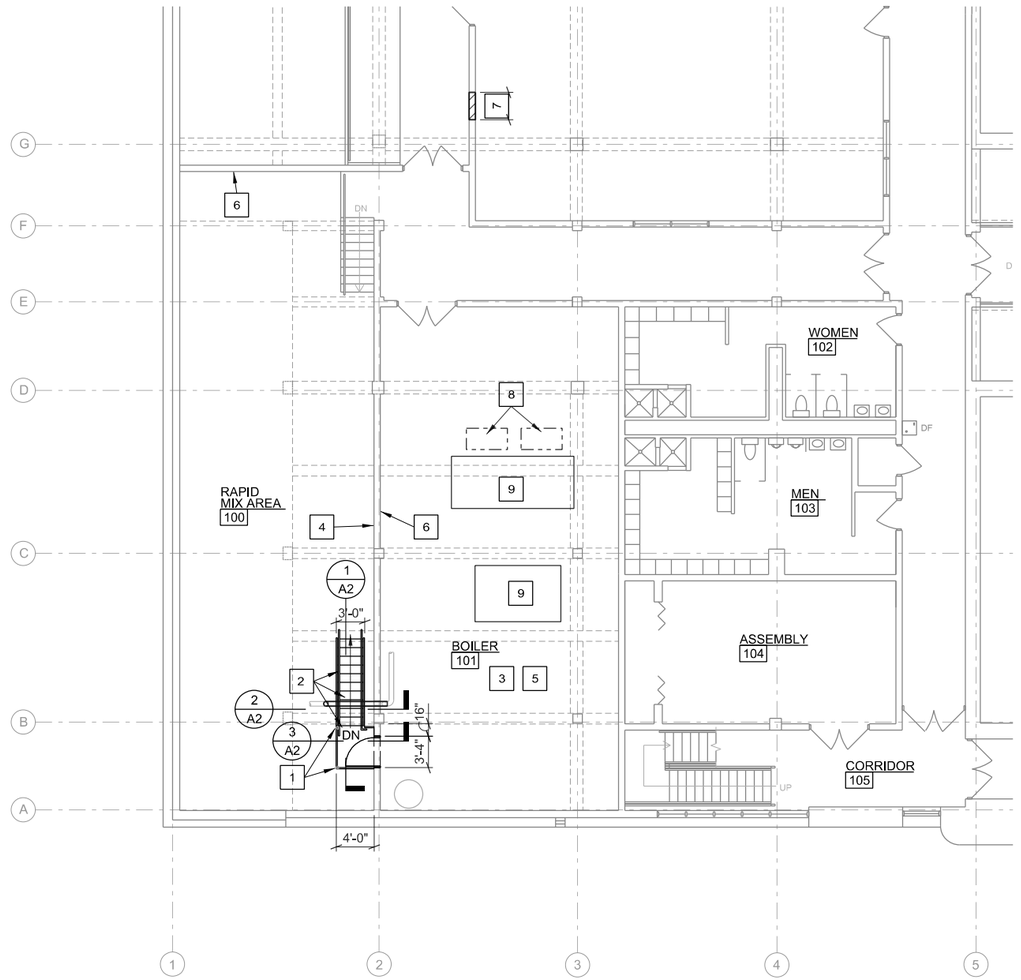


3 STAIR PLATFORM SECTION

A2 — 0 1 2 4 — 1/2" = 1'-0" (22x34), 1/4" = 1'-0" (11x17)

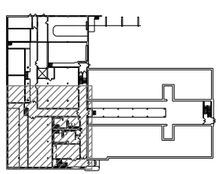
PLAN NOTES

1. ALUM TUBE COLUMN w/ BASE PLATE - SEE DETAIL 10/A6
2. ALUM STAIR, PLATFORM AND RAILING, TYP
3. PAINT EXISTING MASONRY WALLS, FULL HEIGHT, ENTIRE ROOM. MATCH EXISTING COLOR.
4. PAINT ENTIRE EXISTING MASONRY AND CONCRETE WALL, FULL HEIGHT. MATCH EXISTING COLOR.
5. EXISTING MECHANICAL ROOM 217 ON FLOOR ABOVE IN NORTHWEST CORNER. PREP AND PAINT EXISTING MASONRY WALLS, FULL HEIGHT, ENTIRE ROOM. MATCH EXISTING COLOR.
6. SAW-CUT EXISTING MASONRY WALL FOR DUCT PENETRATION. COORDINATE SIZE AND LOCATION w/ HVAC CONTRACTOR. INFILL AROUND DUCT w/ MASONRY. INSTALL BACKER ROD AND SEALANT AROUND DUCT PERIMETER - BOTH SIDES.
7. INFILL EXISTING OPENING (60"x24" - VERIFY) w/ MASONRY TO MATCH EXISTING. PAINT. SEE HVAC FOR LOCATION AND SIZE.
8. REMOVE EXISTING CONCRETE PAD AT REMOVED HVAC EQUIPMENT - SEE HVAC FOR LOCATION
9. 3 1/2" HIGH CONCRETE HOUSEKEEPING PAD FOR NEW HVAC EQUIPMENT - SEE HVAC FOR LOCATION AND SIZE



ENLARGED PARTIAL FIRST FLOOR PLAN

0 4 8 16 — 1/8" = 1'-0" (22x34), 1/16" = 1'-0" (11x17)



KEY PLAN

PROJECT NO: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY:	.	.	.	.
	CHECKED BY:	.	.	.	.
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PLOT DATE: D0616097 a02 enlarged first fp.dgn 3/6/2016 11:49:09 AM cwaslund

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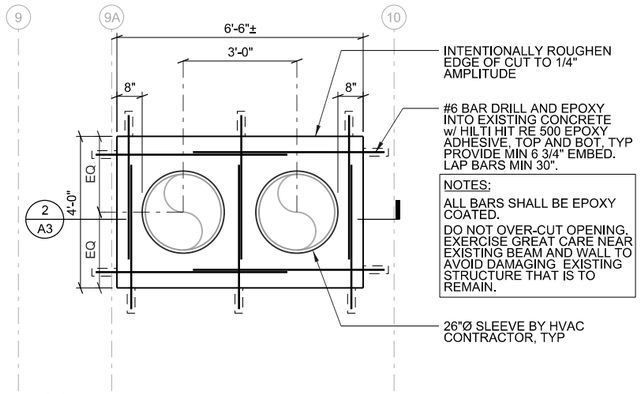
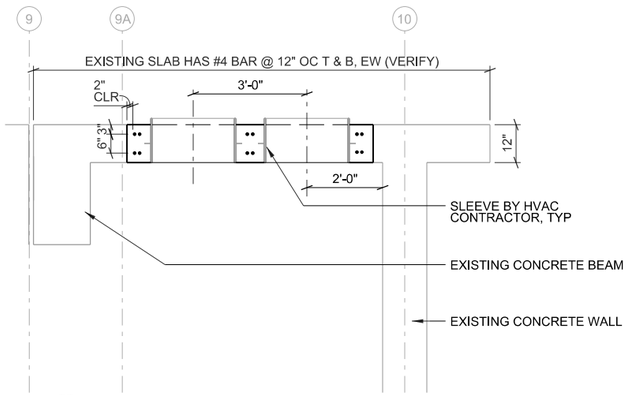
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

ENLARGED FIRST FLOOR PLAN

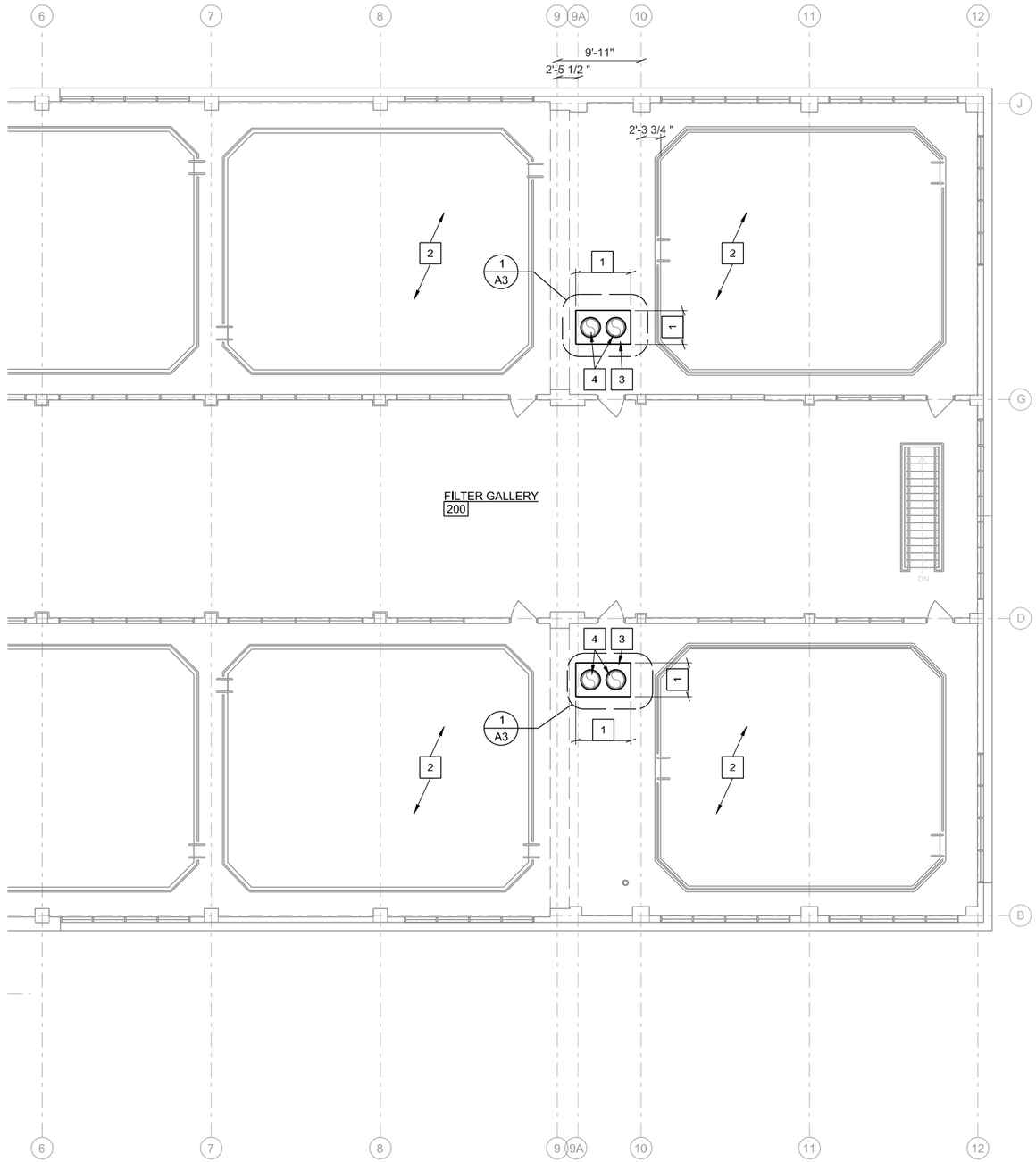
FILE NO. 00616097
SHEET A2



1 FLOOR PENETRATION DETAIL
A3 — 0 1 2 4 — 1/2" = 1'-0" (22x34), 1/4" = 1'-0" (11x17)



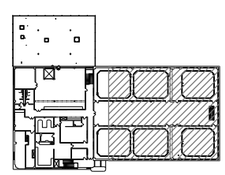
2 SECTION THROUGH FLOOR PENETRATION
A3 — 0 1 2 4 — 1/2" = 1'-0" (22x34), 1/4" = 1'-0" (11x17)



ENLARGED PARTIAL SECOND FLOOR PLAN
0 4 8 16 — 1/8" = 1'-0" (22x34), 1/16" = 1'-0" (11x17)

PLAN NOTES

1. SAW-CUT AND REMOVE EXISTING CONCRETE SLAB IN THIS AREA
2. EXISTING TANK w/ GUARDRAIL, TYP
3. CONCRETE SLAB INFILL
4. SLEEVE IN SLAB FOR DUCT. SEE FIRST FLOOR PLAN FOR LOCATION OF OPENINGS. SEE HVAC FOR DUCT SIZE. VERIFY w/ HVAC.



KEY PLAN

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PROJECT DATE: MARCH 2016	DRAWN BY:	.	.	.	.
	CHECKED BY:	.	.	.	.
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PLOT DATE: D616097 a03 enlarged second fp.dgn 3/6/2016 11:19:13 AM cwastlund

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
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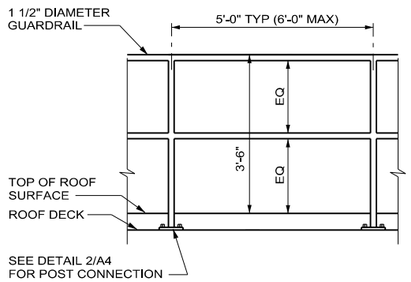
LAKEWOOD, MN

ENLARGED SECOND FLOOR PLAN

FILE NO. 00616097
SHEET A3

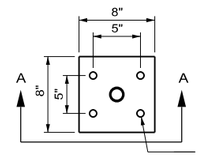
PLAN NOTES

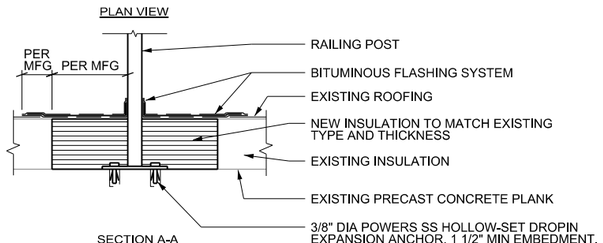
1. EXISTING ROOF FAN TO REMAIN
2. ROOF MOUNTED GUARDRAIL - SEE DETAIL 1/A4
3. EXISTING ROOF MEMBRANE AND INSULATION TO BE REMOVED TO PRECAST CONCRETE DECK AT GUARDRAIL MOUNTING LOCATIONS
4. ALIGN CENTER LINES OF NEW GUARDRAIL AND EXISTING FAN
5. EXISTING BUILT UP ROOF w/ PEA GRAVEL



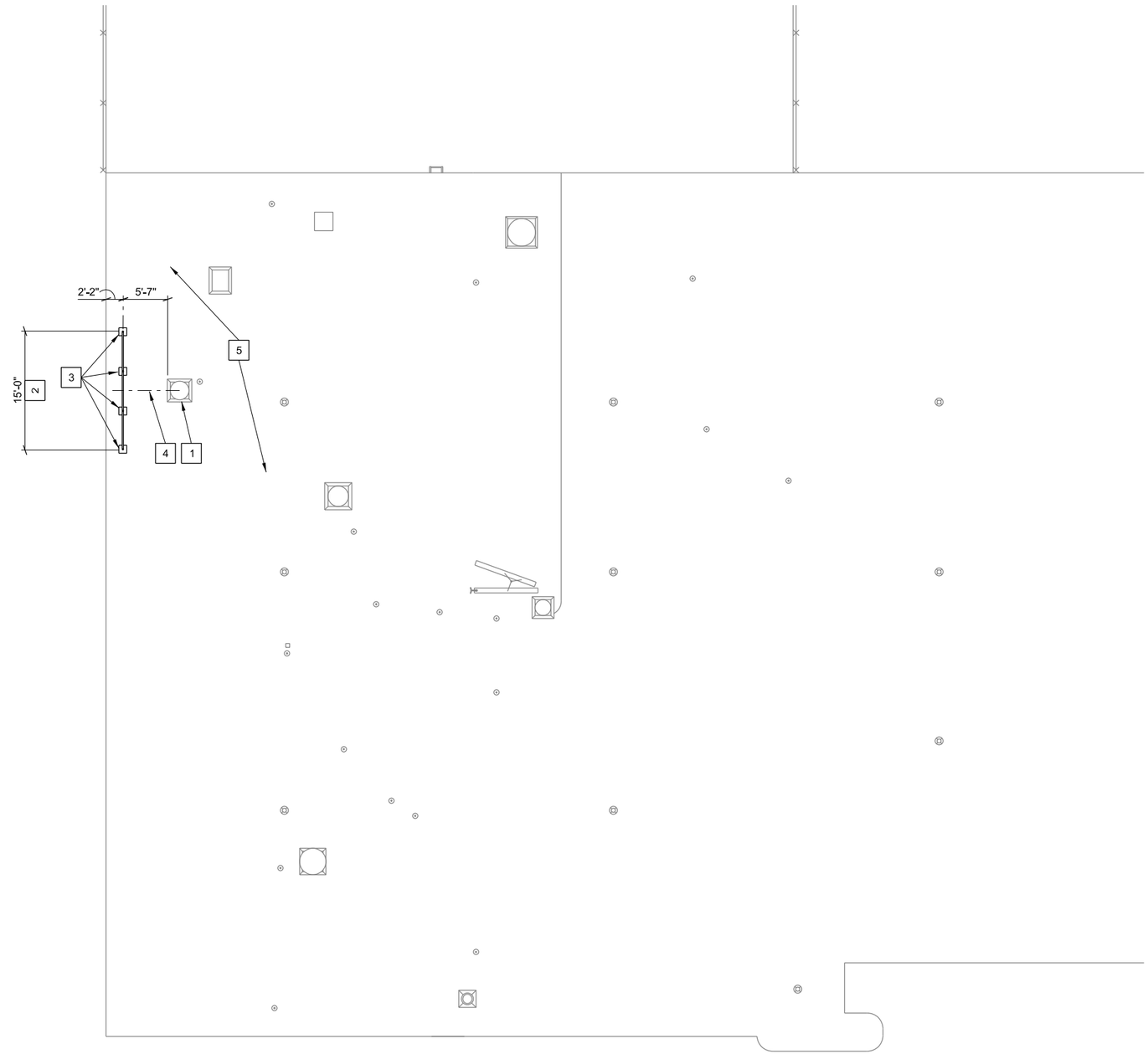
RAILING SHALL BE DESIGNED BY MANUFACTURER TO MEET THE FOLLOWING:
- TOP RAIL: 50 PLF APPLIED IN ANY DIRECTION
- TOP RAIL: A SINGLE CONCENTRATED LOAD OF 200 POUNDS AT ANY POINT
- INTERMEDIATE RAIL: 50 PLF APPLIED IN ANY DIRECTION
- CONNECTIONS SHALL BE DESIGNED BY MANUFACTURER.

1 ALUMINUM GUARDRAIL DETAIL, TYP
A4 NOT TO SCALE

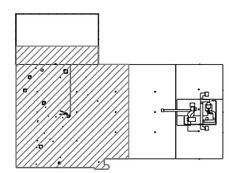




2 POST MOUNTING DETAIL
A4 NOT TO SCALE



ROOF PLAN
0 4 8 16
1/8" = 1'-0" (22x34)
1/16" = 1'-0" (11x17)



KEY PLAN

PROJECT NO: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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PLOT DATE: D616097 a04 roof plan.dgn 3/7/2016 11:50:51 AM cwastlund

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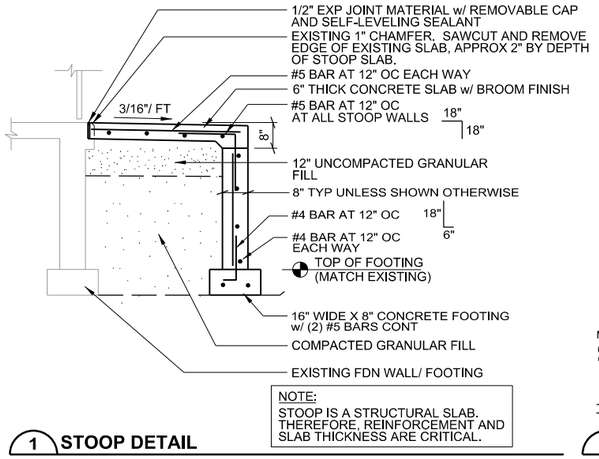
LAKEWOOD, MN

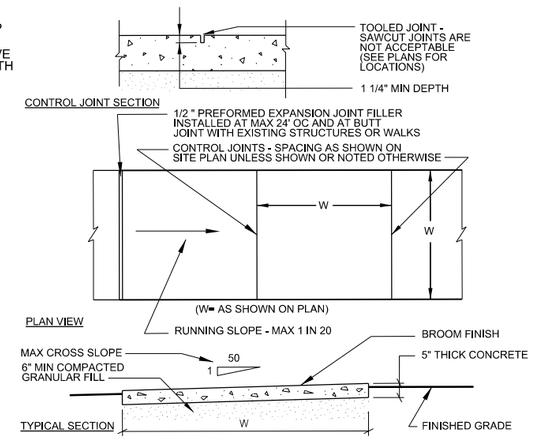
ROOF PLAN

FILE NO. 00616097
SHEET A4

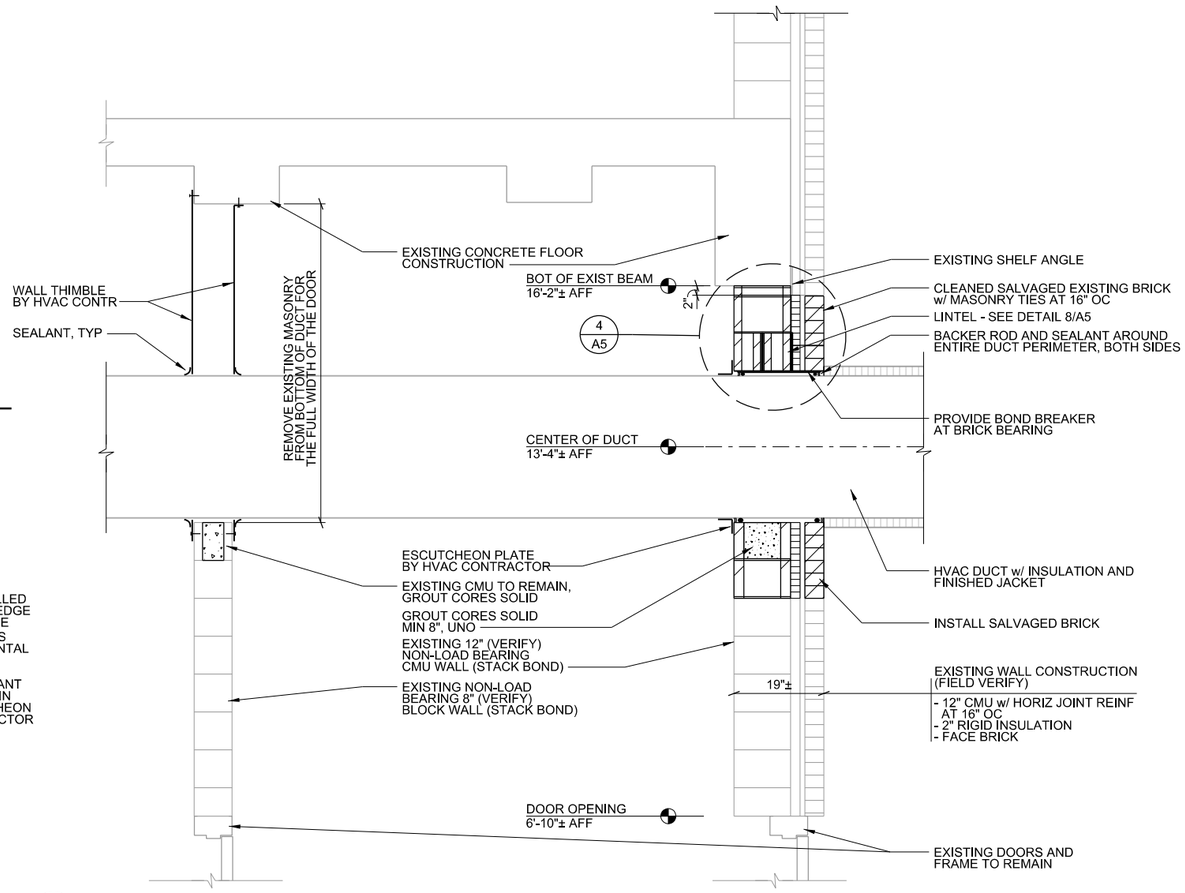


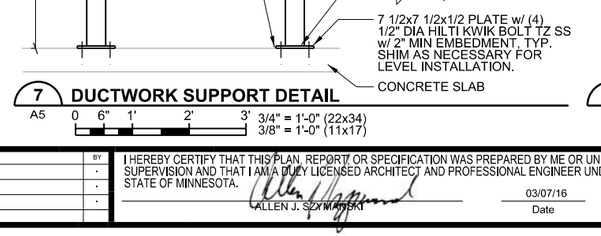
NOTE:
STOOP IS A STRUCTURAL SLAB. THEREFORE, REINFORCEMENT AND SLAB THICKNESS ARE CRITICAL.

1 STOOP DETAIL
A5



2 TYPICAL SIDEWALK CONSTRUCTION DETAIL
A5 NOT TO SCALE

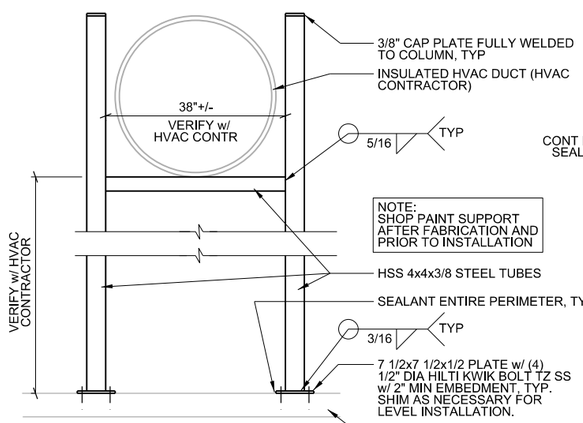


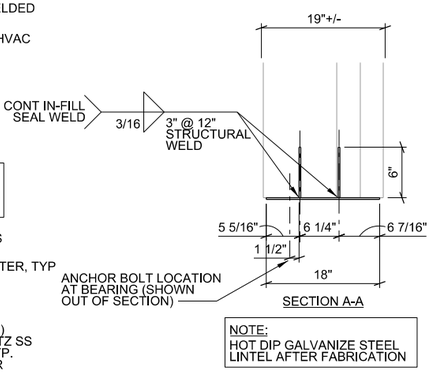


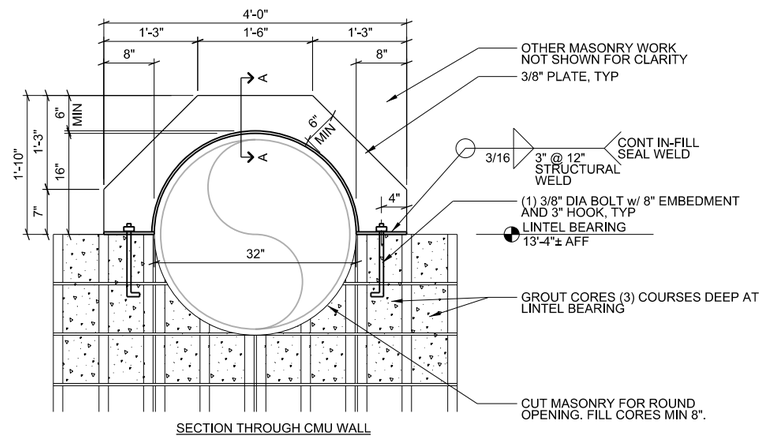
3 not used
A5

4 DUCT HEAD DETAIL
A5 0 3" 6" 12" 18" 1 1/2" = 1'-0" (22x34) 3/4" = 1'-0" (11x17)

5 PARTIAL SECTION
A5 0 6" 1' 2' 3' 3/4" = 1'-0" (22x34) 3/8" = 1'-0" (11x17)







SECTION THROUGH CMU WALL

6 not used
A5

7 DUCTWORK SUPPORT DETAIL
A5 0 6" 1' 2' 3' 3/4" = 1'-0" (22x34) 3/8" = 1'-0" (11x17)

8 LINTEL (L-1) DETAIL
A5 0 6" 1' 2' 1" = 1'-0" (22x34) 1/2" = 1'-0" (11x17)

PROJECT NO: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY:	·	·	·	·
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PLOT DATE: D616097 a05 section and details.dgn 3/7/2016 4:51:42 PM cwaalund

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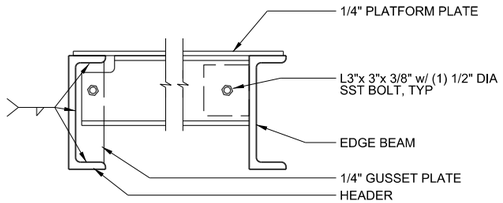
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

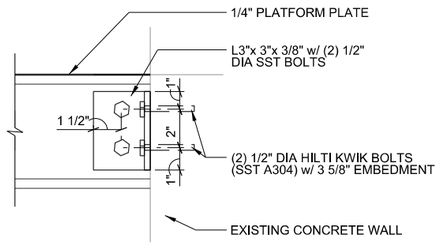
CITY OF DULUTH
LAKEWOOD, MN

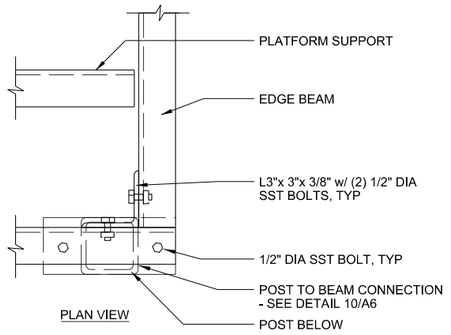
SECTION AND DETAILS

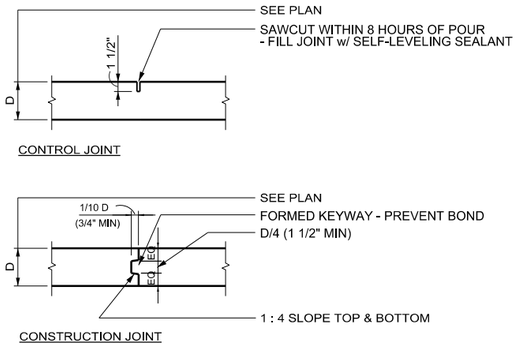
FILE NO. 00616097

SHEET A5



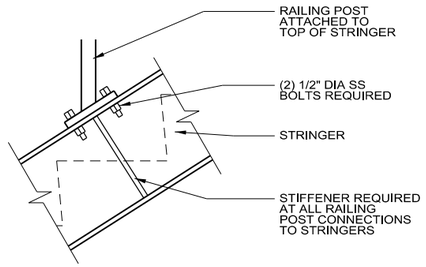






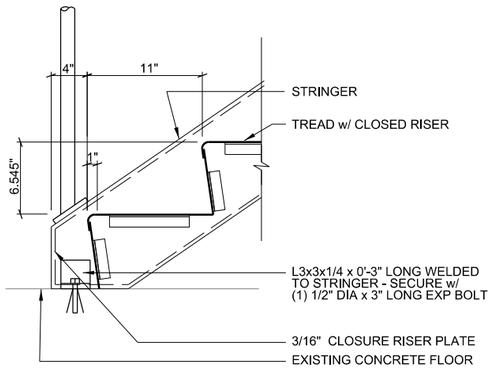
1 PLATFORM SUPPORT SECTION

A6 — 0 1½" 3" 6" 9" — 3" = 1'-0" (22x34); 1 1/2" = 1'-0" (11x17)



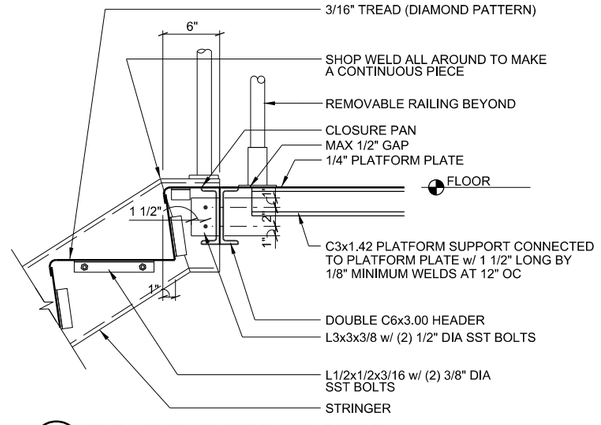
2 HEADER CONNECTION TO WALL

A6 — 0 1½" 3" 6" 9" — 3" = 1'-0" (22x34); 1 1/2" = 1'-0" (11x17)



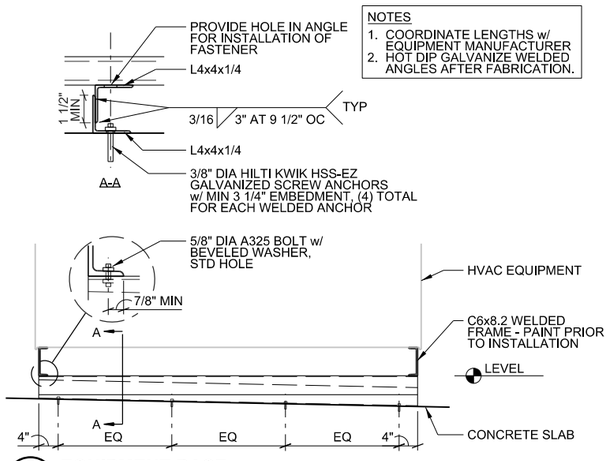
3 PLATFORM FRAME CONNECTION

A6 — 0 1½" 3" 6" 9" — 3" = 1'-0" (22x34); 1 1/2" = 1'-0" (11x17)



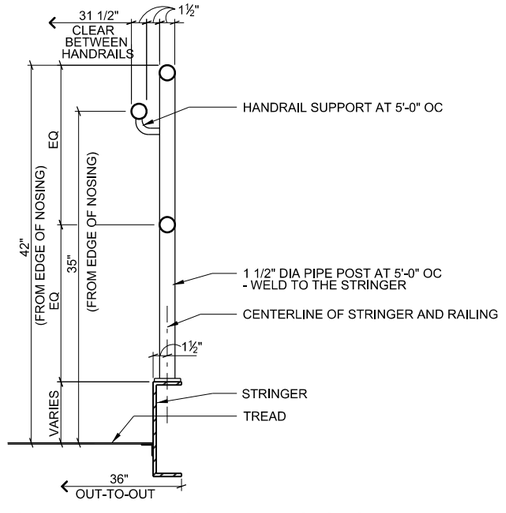
4 TYPICAL SLAB ON GRADE JOINT (CJ) DETAIL

A6 NOT TO SCALE



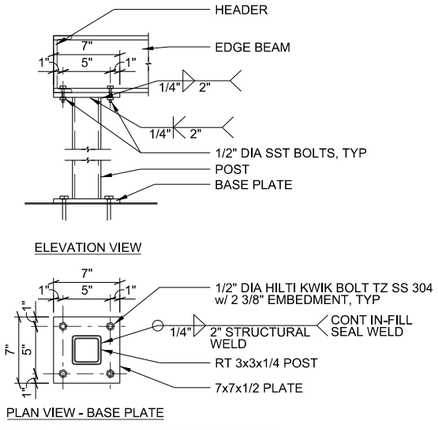
5 RAILING CONNECTION DETAIL

A6 NOT TO SCALE



6 BASE OF STAIR STRINGER DETAIL

A6 — 0 3" 6" 12" 18" — 1 1/2" = 1'-0" (22x34); 3/4" = 1'-0" (11x17)

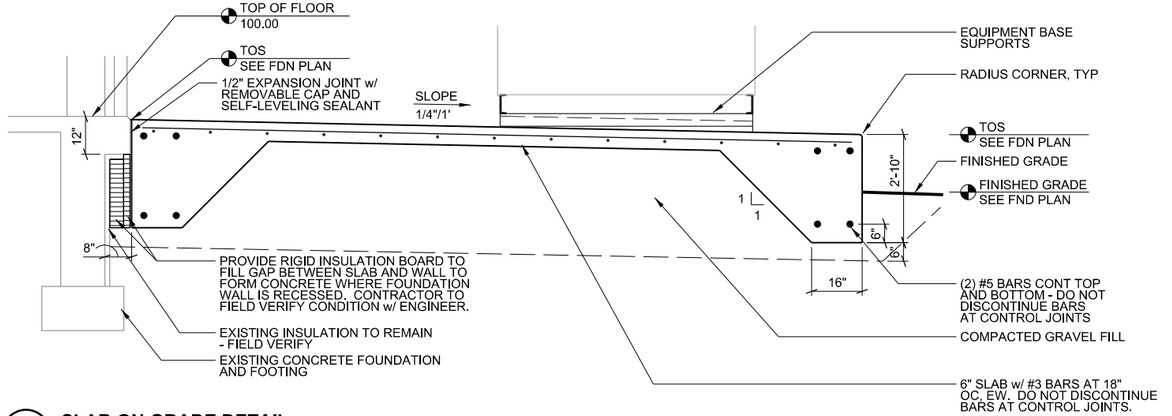


7 TOP OF STAIR STRINGER DETAIL

A6 — 0 3" 6" 12" 18" — 1 1/2" = 1'-0" (22x34); 3/4" = 1'-0" (11x17)

8 EQUIPMENT BASE

A6 — 0 6" 1' 2' 3' — 3/4" = 1'-0" (22x34); 3/8" = 1'-0" (11x17)



9 STAIR HANDRAIL/ GUARDRAIL SECTION

A6 — 0 3" 6" 12" 18" — 1 1/2" = 1'-0" (22x34); 3/4" = 1'-0" (11x17)

10 STAIR PLATFORM POST DETAIL

A6 — 0 3" 6" 12" 18" — 1 1/2" = 1'-0" (22x34); 3/4" = 1'-0" (11x17)

11 SLAB ON GRADE DETAIL

A6 — 0 1 2 4 — 1/2" = 1'-0" (22x34); 1/4" = 1'-0" (11x17)

PROJECT NO: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY:	.	.	.	.
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PLOT DATE: D616097 a06 details.dgn 3/7/2016 4:58:32 PM cwestlund

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DETAILS

FILE NO. 00616097
SHEET A6

MECHANICAL ABBREVIATIONS

ABV.	ABOVE
AC	AIR CONDITIONING
ACU–	AIR CONDITIONING UNIT
A.D.	AREA DRAIN
A.F.C.	ABOVE FINISHED CEILING
A.F.F.	ABOVE FINISHED FLOOR
A.L.	ACOUSTICAL LINING
AHU–	AIR HANDLING UNIT
AMU	AIR MEASURING UNIT
A.P.	ACCESS PANEL
APPROX.	APPROXIMATE
AR	ACID RESISTANT
ARCH.	ARCHITECT/ARCHITECTURAL
AS–	AIR SEPARATOR
BD	BLOWDOWN
B.F.F.	BELOW FINISHED FLOOR
BFV	BUTTERFLY VALVE
BFW	BOILER FEED WATER
BG	BELOW GRADE
BHP	BRAKE HORSEPOWER
BLW.	BELOW
B.O.D.	BOTTOM OF DUCT ELEVATION A.F.F.
B.O.P.	BOTTOM OF PIPE ELEVATION A.F.F.
BOT.	BOTTOM
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
CA	COMPRESSED AIR
CC–	COOLING COIL
CD	CEILING DIFFUSER
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
C.I.	CAST IRON
CG	CEILING GRILLE
CFH	CUBIC FEET PER HOUR
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
C.L.	CENTER LINE
CLG.	CEILING OR COOLING
CMPR.	COMPRESSOR
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
C.O.	CLEAN OUT
CONC.	CONCRETE
COND	CONDENSATE
CONN.	CONNECTION
CONST.	CONSTRUCTION
CONT.	CONTINUATION
CONTR.	CONTRACTOR
CONV–	CONVECTOR
CP	CONDENSATE PUMP
CU–	CONDENSING UNIT
CUH–	CABINET UNIT HEATER
CW	COLD WATER (DOMESTIC)
D.	DRAIN
D & T	DRIP & TRAP
DEMO.	DEMOLITION
DF	DRINKING FOUNTAIN
DFS	DRY FIRE SPRINKLER
DG	DOOR GRILLE
DIA.	DIAMETER
D.I.	DEIONIZED
DMPR.	DAMPER
DN.	DOWN
E.	EAST
EA.	EACH
EAT	ENTERING AIR TEMPERATURE
EF–	EXHAUST FAN
ELEC.	ELECTRIC
ELEV.	ELEVATION
ENCL.	ENCLOSURE
ER	EXHAUST REGISTER
ESP	EXTERNAL STATIC PRESSURE
ET–	EXPANSION TANK
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EXH.	EXHAUST
EXP.	EXPANSION
EXIST.	EXISTING
F & T	FLOAT & THERMOSTATIC
F–	PLUMBING FIXTURE
F.A.	FREE AREA
FCO	FLOOR CLEANOUT
F.D.	FLOOR DRAIN
FD/FS	FLOOR DRAIN WITH FUNNEL STRAINER
FD	FIRE DAMPER
FDV	FIRE DEPARTMENT VALVE
F.F.E.	FINISHED FLOOR ELEVATION
FL.	FLOOR
FMS	FLOW MEASURING STATION
FPM	FEET PER MINUTE
FR	FLOOR REGISTER
F.S.	FIRE SPRINKLER
FSK	FLOOR SINK
FT.	FOOT OR FEET
FTR–	FIN TUBE RADIATION
FUT.	FUTURE
G	GAS PIPING
GA.	GAUGE/GAGE
GEN'L.	GENERAL
GF–	GAS FURNACE
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GRD.	GRADE/GROUND
GR	GLYCOL RETURN
GS	GLYCOL SUPPLY
GV–	GRAVITY VENT
H.	HIGH
HB	HOSE BIBB
HC	HEATING COIL
HDG	HEAVY DUTY GRILLE
HG	REFRIGERANT HOT GAS
HORIZ.	HORIZONTAL
HPR	HIGH PRESSURE CONDENSATE RETURN
HPS	HIGH PRESSURE STEAM
HTR.	HEATER
H–STAT	HUMIDISTAT
HW	HOT WATER (DOMESTIC)
HWC	HOT WATER CIRCULATED
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HX–	HEAT EXCHANGER OR CONVERTOR
I.D.	INSIDE DIMENSION
I.B.S.	IN BEAM SPACE
I.J.S.	IN JOIST SPACE
INV. ELEV.	INVERT ELEVATION
I.T.S.	IN TRUSS/TEE SPACE
IW	INDIRECT WASTE
L	REFRIGERANT LIQUID
LAT	LEAVING AIR TEMPERATURE
LAV.	LAVATORY
L.D.	LINEAR DIFFUSER
L.F.	LINEAL FEET
LG.	LONG OR LENGTH
LP	LIQUID PROPANE
LPR	LOW PRESSURE CONDENSATE RETURN
LPS	LOW PRESSURE STEAM
LSD	LINEAR SLOT DIFFUSER
L.T.	LAUNDRY TUB
MAU–	MAKE–UP AIR UNIT
MAX.	MAXIMUM
MBH	1000 BTU PER HOUR
MFG.	MANUFACTURER
M.H.	MANHOLE
MIN.	MINIMUM
MOT.	MOTORIZED
MS	MOP SINK
N.	NORTH
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
NO.	NUMBER
N.T.S.	NOT TO SCALE
O.A.	OUTSIDE AIR
O.D.	OUTSIDE DIMENSION
OFRD	OVERFLOW ROOF DRAIN
OFRWL	OVERFLOW RAINWATER LEADER
OPNG.	OPENING
O.S. & Y.	OUTSIDE SCREW & YOKE
P–	PUMP
ΔP	PRESSURE DIFFERENCE
PCD	PERFORATED CEILING DIFFUSER
PC	PUMPED CONDENSATE
PCW	PROCESSED COLD WATER
PHW	PROCESSED HOT WATER
P.H.	PENTHOUSE
PRV	POWER ROOF VENTILATOR
PRV	PRESSURE REGULATING VALVE
PSI	POUNDS PER SQUARE INCH
PSIG	PSI GAUGE
PVC	POLYVINYL CHLORIDE
PW	PUMPED WASTE
RA	RETURN AIR
RAD	RETURN AIR DUCT
RAD.	RADIATOR
RCP	REFLECTED CEILING PLAN
RCP	REINFORCED CONCRETE PIPE
RCVR.	RECEIVER
RCD	ROUND CEILING DIFFUSER
R.D.	ROOF DRAIN
RE–	RETURN EXHAUST FAN
RECIRC.	RECIRCULATING
REQ'D.	REQUIRED
RF	RETURN FAN
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RHW	RECIRCULATING HOT WATER
RG	RETURN GRILLE
RPM	REVOLUTIONS PER MINUTE
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
RPZ	REDUCED PRESSURE ZONE BACKFLOW PREVENTER
RTU–	ROOFTOP UNIT
RWL	RAINWATER LEADER
S	REFRIGERANT SUCTION
S.	SOUTH
SA	SUPPLY AIR
SAD	SUPPLY AIR DUCT
SAN.	SANITARY
SD	SLOT DIFFUSER
SF–	SUPPLY FAN
SR	SUPPLY REGISTER
SP	STATIC PRESSURE
SPEC.	SPECIFICATION
SQ.	SQUARE
S.S.	STAINLESS STEEL
STD.	STANDARD
STM.	STEAM
STS	STORM SEWER
SYS.	SYSTEM
ΔT	TEMPERATURE DIFFERENCE
TEMP.	TEMPERATURE
TF–	TRANSFER FAN
THRU	THROUGH
T.O.	TAKE–OFF
T.O.D.	TOP OF DUCT ELEVATION A.F.F.
T.O.P.	TOP OF PIPE ELEVATION A.F.F.
T & P	TEMPERATURE AND PRESSURE
T–STAT	THERMOSTAT
TSP	TOTAL STATIC PRESSURE
TW	TEMPERED WATER
TYP.	TYPICAL
U.F.	UNDERFLOOR
UH–	UNIT HEATER
UR	URINAL
V.	VENT
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VCP	VITRIFIED CLAY TILE PIPE
VERT.	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
V.S.	VENT STACK
V.T.R.	VENT THRU ROOF
W	WATER SERVICE
W.	WEST
WC	WATER CLOSET
W.C.O.	WALL CLEANOUT
WG	WALL GRILLE
W.H.	WALL HYDRANT
WH–	WATER HEATER
WL–	WALL LOUVER
W.S.	WASTE STACK
WT.	WEIGHT
W/	WITH
W/O	WITHOUT
W–W ENC.	WALL TO WALL ENCLOSURE
WW	WELL WATER

GENERAL SYMBOLS

- (3) NUMBERED NOTE
- 103 ROOM NUMBER
- 1 REVISION (NO.1)
- ⌀ DIAMETER OR ROUND
- @ AT
- < ANGLE

FIRE SPRINKLER HEAD SYMBOLS

- UPRIGHT OR PENDENT HEAD
- SEMI–RECESSED PENDENT
- RECESSED OR CONCEALED HEAD
- FREEZEPROOF SIDEWALL HEAD
- SIDEWALL HEAD
- PRE–ACTION PENDENT

CONTROL SYMBOLS

- T THERMOSTAT
- TT TEMPERATURE OR THERMOSTAT SENSOR
- H HUMIDISTAT OR HUMIDITY SENSOR
- S TEMPERATURE SENSOR
- CO CARBON MONOXIDE SENSOR
- $ TIMER SWITCH
- SP STATIC PRESSURE SENSOR

PIPING SYMBOLS

—W—	DOMESTIC WATER SERVICE
—F—	FIRE PROTECTION WATER SERVICE
—FS—	FIRE SPRINKLER
—SAN—	SANITARY SEWER
—STS—	STORM SEWER
—WW—	WELL WATER
— — — —	UNDERFLOOR SOIL & WASTE
— — —AR— — —	UNDERFLOOR ACID RESISTANT WASTE
═══	ABOVE FLOOR WASTE
═══AR═══	ABOVE FLOOR ACID RESISTANT WASTE
—CD—▶	CONDENSATE DRAIN
—D—▶	DRAIN
—W—▶	INDIRECT WASTE (OPEN WASTE)
—PD—▶	PUMPED DRAIN
—PW—▶	PUMPED WASTE
- - - -V- - - -	ABOVE FLOOR VENT
- - - -AR- - - -	ABOVE FLOOR ACID RESISTANT VENT
- - - -IV- - - -	ISLAND VENT
= = = =V= = = =	UNDERFLOOR VENT
= = = =AR= = = =	UNDERFLOOR ACID RESISTANT VENT
— — —▷— — —	UNDERFLOOR RAINWATER LINE
═══▷═══	ABOVE FLOOR RAINWATER LINE
— — —▷— — —	UNDERFLOOR OVERFLOW RAINWATER LINE
═══▷═══	ABOVE FLOOR OVERFLOW RAINWATER LINE
—— - ——	COLD WATER
—— - - ——	HOT WATER
—— - - - ——	RECIRCULATING HOT WATER
—NP—	NON POTABLE WATER
—EW—	EFFLUENT WATER
—TW—	TEMPERED WATER
—SW—	SOFTENED COLD WATER
—HP—	HIGH PRESSURE WATER
—HARD—	HARD COLD WATER
—DI—	DEIONIZED WATER
—140 - - ——	140° HOT WATER
—180 - - ——	180° HOT WATER
—C—	GAS
—IG—	INTERRUPTABLE GAS
—FG—	FIRM GAS
—CA—	COMPRESSED AIR
—L—▶	REFRIGERANT LIQUID
◀—S—	REFRIGERANT SUCTION
◀—HG—	REFRIGERANT HOT GAS
—HWS—▶	HEATING WATER SUPPLY
◀—HWR—	HEATING WATER RETURN
◀—HRR—	HEATING WATER REVERSE RETURN
—HGS—▶	HEATING GLYCOL SUPPLY
◀—HGR—	HEATING GLYCOL RETURN
—CHWS—▶	CHILLED WATER SUPPLY
◀—CHWR—	CHILLED WATER RETURN
◀—PC—	PUMPED CONDENSATE
—STM—▶	STEAM
◀- -LPR- - —	LOW PRESSURE CONDENSATE RETURN
—HPS—▶	HIGH PRESSURE STEAM
◀- -HPR- - —	HIGH PRESSURE CONDENSATE RETURN
—CS—▶	CORE WATER RETURN
◀—CR—	CORE WATER SUPPLY
—CWS—▶	CONDENSER WATER SUPPLY
◀—CWR—	CONDENSER WATER RETURN
—CGS—▶	COOLING GLYCOL SUPPLY
◀—CGR—	COOLING GLYCOL RETURN
—FOS—▶	FUEL OIL SUPPLY
◀—FOR—	FUEL OIL RETURN
—A—	MEDICAL COMPRESSED AIR
—N—	NITROGEN
—O—	OXYGEN
—N_2O—	NITROUS OXIDE
—CO_2—	CARBON DIOXIDE
—TGE—	TRACE GAS EVACUATION
—VAC—	VACUUM

VALVES, FITTINGS & APPURTENANCES

- UNION
- SHUT–OFF VALVE
- GATE VALVE
- OUTSIDE STEM & YOKE VALVE
- CHECK VALVE
- BALANCING VALVE
- STOP & WASTE VALVE
- SOLENOID VALVE
- 2–WAY CONTROL VALVE
- 3–WAY CONTROL VALVE
- THERMOSTATIC MIXING VALVE
- GLOBE VALVE
- PRESSURE REGULATING VALVE
- WATER REGULATING VALVE
- GAS PRESSURE REGULATOR
- BALL VALVE
- BUTTERFLY VALVE
- TEMPERATURE & PRESSURE RELIEF VALVE
- BACKFLOW PREVENTER
- REDUCED PRESSURE BACKFLOW PREVENTER
- PIPE ANCHOR
- PIPE GUIDE
- STEAM TRAP
- FLOW MEASURING STATION
- STRAINER
- FLEXIBLE PIPE CONNECTOR
- SHOCK ABSORBER
- PRESSURE GAUGE
- THERMOMETER
- AIR VENT
- FLOW ALARM
- FLOOR SINK
- AREA DRAIN
- ROOF DRAIN
- FLOOR DRAIN
- C.O. CEILING/WALL CLEANOUT
- C.O. FLOOR CLEANOUT
- SHOWER HEAD
- CAPPED PIPE
- DIRECTION OF FLOW
- TOP TAKE–OFF
- RISER
- BOTTOM TAKE–OFF
- PIPE DROP
- PIPE RISE

DUCTWORK SYMBOLS

- FIRE DAMPER
- COMBINATION SMOKE/FIRE DAMPER
- SUPPLY DUCT UP
- RETURN OR EXHAUST DUCT UP
- SUPPLY DUCT DOWN
- RETURN OR EXHAUST DUCT DOWN
- MOTORIZED DAMPER
- BACKDRAFT DAMPER
- OPPOSED BLADE
- PARALLEL BLADE
- SUPPLY AIR DIFFUSER
- RETURN OR EXHAUST AIR GRILLE
- 10"⌀ ROUND DUCT
- 10/12 RECTANGULAR DUCT (FIRST FIG. IS SIDE SHOWN)
- MANUAL BALANCING DAMPER
- FLEXIBLE DUCT CONNECTION
- AP ACCESS PANEL (SIZE AS REQUIRED)
- SQUARE TURN DUCT ELBOW WITH TURNING VANES
- RADIUSED DUCT ELBOW WITH RADIUS = 1.5 X WIDTH OF SIDE SHOWN
- CONICAL BRANCH TAKE–OFF CONNECTION
- 45° ENTRY BRANCH TAKE–OFF CONNECTION WITH FILLER PIECES AT CORNERS
- RIGID SHEET METAL BRANCH DUCT WITH FLEXIBLE AIR DUCT EXTENSION TO DIFFUSER
- TRANSITION (20° MAXIMUM ANGLE)
- ACOUSTICALLY LINED DUCT

DIFFUSER DESIGNATION CODE

24 06 — 24 INDICATES NECK SIZE DIAMETER IN INCHES; 06 INDICATES SQUARE DIFFUSER SIZE IN INCHES

NOTE: NOT ALL OF THESE ITEMS MAY BE USED ON THESE DRAWINGS

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F.B.:	A79-164	CHECKED BY: TAW	.	.	.	.
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THOMAS A. WENTZ — MARCH 7, 2016 (Date) — 18609 (License No.)

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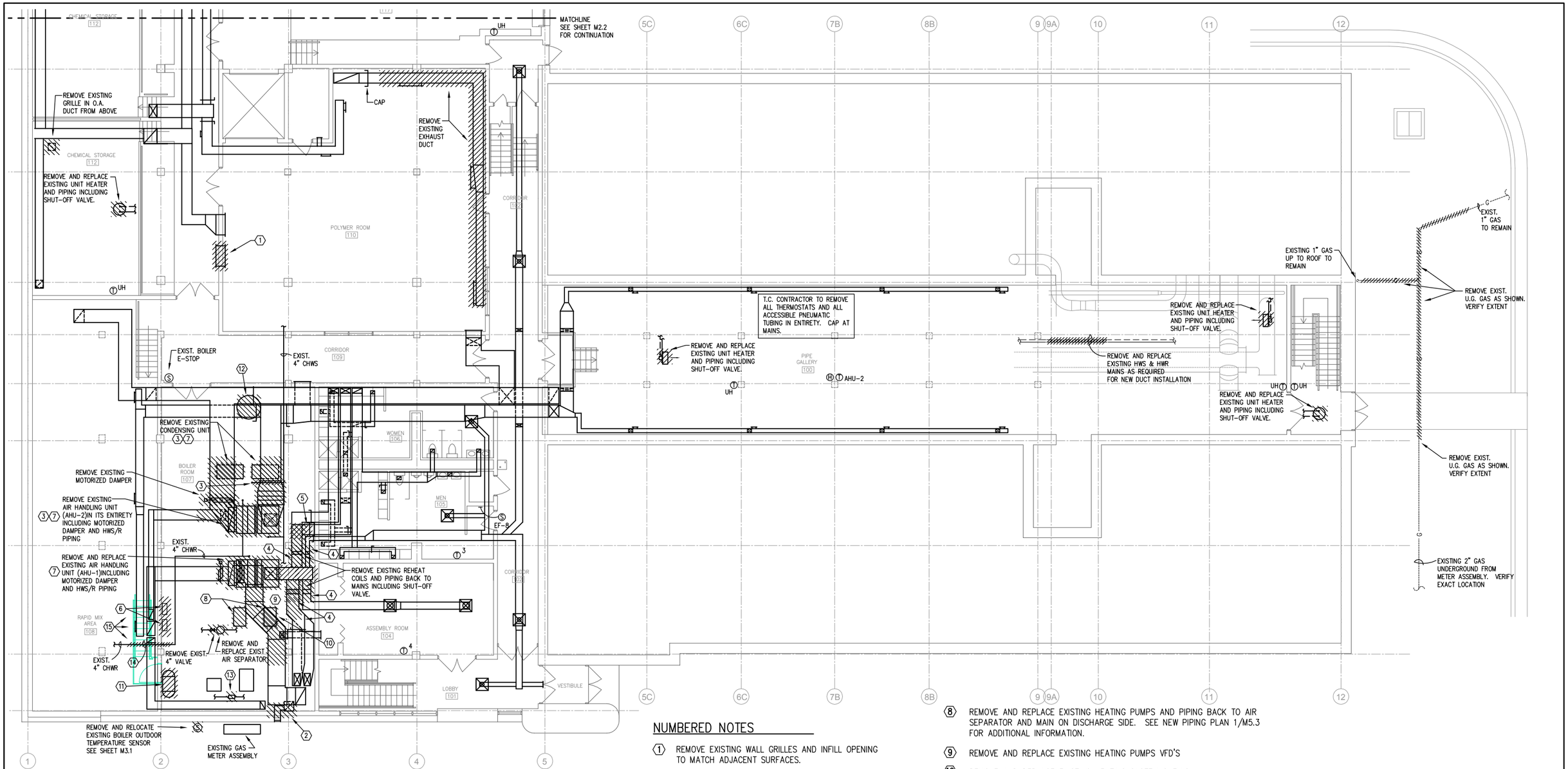
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

MECHANICAL SYMBOLS & ABBREVIATIONS

FILE NO. 00616097

SHEET M1.0



GENERAL NOTES

1 – CONTRACTOR SHALL VISIT SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS PRIOR TO BIDDING.

2 – REMOVE ITEMS INDICATED AS HACHURED.

3 – CONTRACTOR IS RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED FOR REMOVAL AND INSTALLATION OF MECHANICAL ITEMS. ALL NEW PATCHING SHALL MATCH EXISTING SURFACES.

4 – WHERE EQUIPMENT, PIPING AND DUCTWORK IS REMOVED AND NO NEW WORK IS INVOLVED, CAP, PATCH AND FILL ALL HOLES TO MATCH ADJACENT SURFACES. COORDINATE WITH NEW CONSTRUCTION PLANS.

5 – WHERE EQUIPMENT IS INDICATED TO BE REMOVED, ALSO REMOVE ALL ASSOCIATED PIPING AND CONTROLS.

6 – WHERE PIPING AND DUCTWORK IS INDICATED TO BE REMOVED OR REPLACED, ALSO REMOVE AND REPLACE ALL ASSOCIATED HANGERS AND SUPPORTS.

7 – COORDINATE DEMO WORK WITH OTHER TRADES.

8 – CONTRACTOR TO REMOVE ALL EXISTING CONCRETE HOUSEKEEPING PADS NOT USED FOR NEW EQUIPMENT.

NUMBERED NOTES

(1) REMOVE EXISTING WALL GRILLES AND INFILL OPENING TO MATCH ADJACENT SURFACES.

(2) REMOVE EXISTING MECHANICAL ROOM EXHAUST FAN AND LOWER PORTION OF DUCTWORK. LOUVER AND UPPER PORTION OF DUCTWORK TO REMAIN.

(3) REMOVE ALL COOLING WATER PIPING ASSOCIATED WITH CONDENSER SYSTEM AND AHU-2 BACK TO MAIN AND CAP. VERIFY EXACT PIPING QUANTITY AND LOCATION OF MAINS.

(4) REMOVE EXISTING DUCTWORK AS REQUIRED TO ACCOMMODATE INSTALLATION OF NEW VAV BOX. VERIFY EXTENT.

(5) REMOVE EXISTING ZONE #2 DUCTWORK FROM 30x24 PLENUM TO WALL AND CAP. FIRE DAMPER TO BE TRIPPED AND REMAIN.

(6) REMOVE EXISTING TEMPERATURE CONTROL CABINET IN ENTIRETY.

(7) REMOVE OR MODIFY EXISTING CONCRETE EQUIPMENT PAD AS REQUIRED FOR NEW EQUIPMENT.

(8) REMOVE AND REPLACE EXISTING HEATING PUMPS AND PIPING BACK TO AIR SEPARATOR AND MAIN ON DISCHARGE SIDE. SEE NEW PIPING PLAN 1/M5.3 FOR ADDITIONAL INFORMATION.

(9) REMOVE AND REPLACE EXISTING HEATING PUMPS VFD'S

(10) REMOVE AND REPLACE EXISTING HEATING SYSTEM CHEMICAL FEEDER SYSTEM.

(11) REMOVE EXISTING COMPRESSION TANK AND ASSOCIATED PIPING FROM AIR SEPARATOR AND SUPPORT STAND.

(12) REMOVE EXISTING ABANDONED WATER HEATER AND BRANCH PIPING BACK TO MAINS AND CAP.

(13) DISCONNECT EXISTING HEATING SYSTEM MAKE-UP WATER CONNECTION.

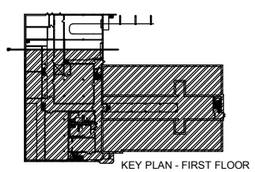
(14) DISCONNECT AND RELOCATE SECTION OF EXISTING 4" CHWR DRAIN PIPING AS REQUIRED FOR NEW DOOR AND STAIR INSTALLATION. PIPING TO BE RECONNECTED. PATCH WALL TO MATCH EXISTING.

(15) DISCONNECT AND RELOCATE EXISTING SAMPLE PUMPS AND ASSOCIATED PIPING AND SUPPORTS AS REQUIRED FOR NEW DOOR AND STAIR INSTALLATION VERIFY EXTENT OF WORK. SEE SHEET M5.5 FOR MORE INFORMATION.

FIRST FLOOR SOUTH DEMOLITION PLAN

N

0 4 8 16



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PLOT DATE: 3/4/16, X:\projects\2014 Projects\14-032B Duluth Lakewood WTP\DWG\M2.1.dwg

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THOMAS A. WENTZ — MARCH 7, 2016 (Date) — 18609 (License No.)

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PHONE: 952/831-1180
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EMAIL: info@wentzassoc.com
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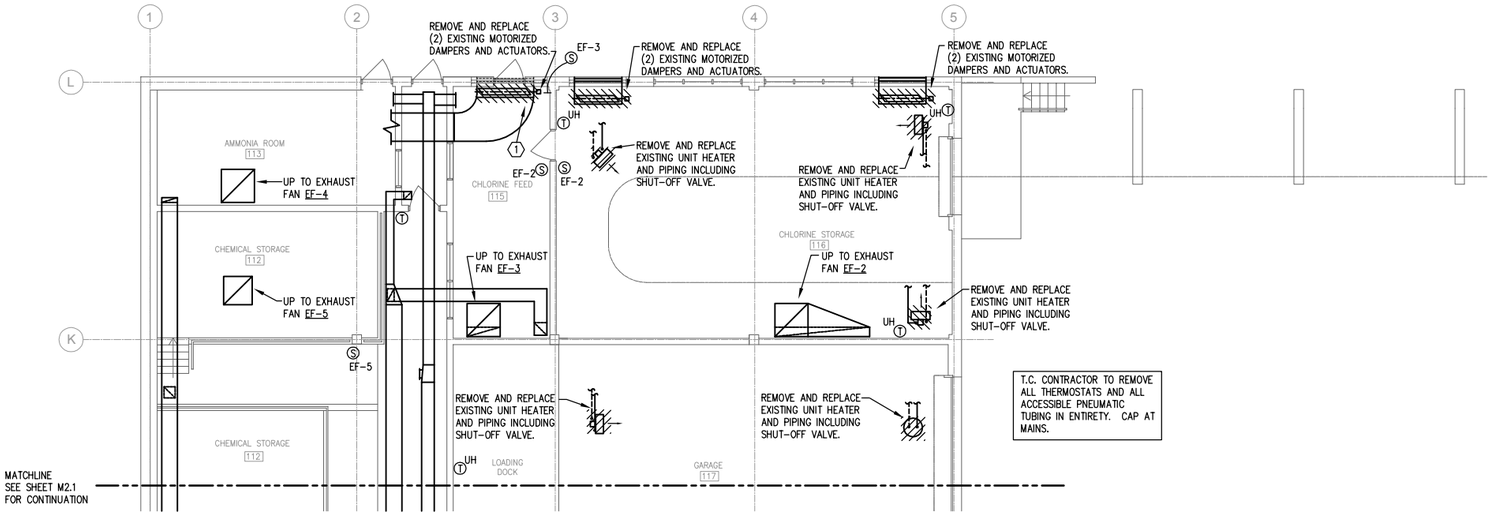
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

FIRST FLOOR SOUTH
MECHANICAL DEMOLITION

FILE NO. 00616097

SHEET M2.1



GENERAL NOTES

1 – CONTRACTOR SHALL VISIT SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS PRIOR TO BIDDING.

2 – REMOVE ITEMS INDICATED AS HACHURED.

3 – CONTRACTOR IS RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED FOR REMOVAL AND INSTALLATION OF MECHANICAL ITEMS. ALL NEW PATCHING SHALL MATCH EXISTING SURFACES.

4 – WHERE EQUIPMENT, PIPING AND DUCTWORK IS REMOVED AND NO NEW WORK IS INVOLVED, CAP, PATCH AND FILL ALL HOLES TO MATCH ADJACENT SURFACES. COORDINATE WITH NEW CONSTRUCTION PLANS.

5 – WHERE EQUIPMENT IS INDICATED TO BE REMOVED, ALSO REMOVE ALL ASSOCIATED PIPING AND CONTROLS.

6 – WHERE PIPING AND DUCTWORK IS INDICATED TO BE REMOVED OR REPLACED, ALSO REMOVE AND REPLACE ALL ASSOCIATED HANGERS AND SUPPORTS.

7 – COORDINATE DEMO WORK WITH OTHER TRADES.

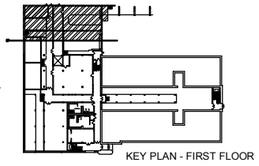
NUMBERED NOTES

(1) EXISTING MOTORIZED DAMPER SERVING AMMONIA ROOM IS WITHIN DUCTWORK. REMOVE AND REPLACE DUCTWORK AND DAMPER ACCESS DOOR AS REQUIRED.

N

FIRST FLOOR NORTH DEMOLITION PLAN

0 4 8 16



KEY PLAN - FIRST FLOOR

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: SRS	.	.	.	.
F.B. : A79-164	CHECKED BY: TAW	.	.	.	.
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PLOT DATE: 3/4/16, X:\projects\2014 Projects\14-032B Duluth Lakewood WTP\0DWG\M2.2.dwg

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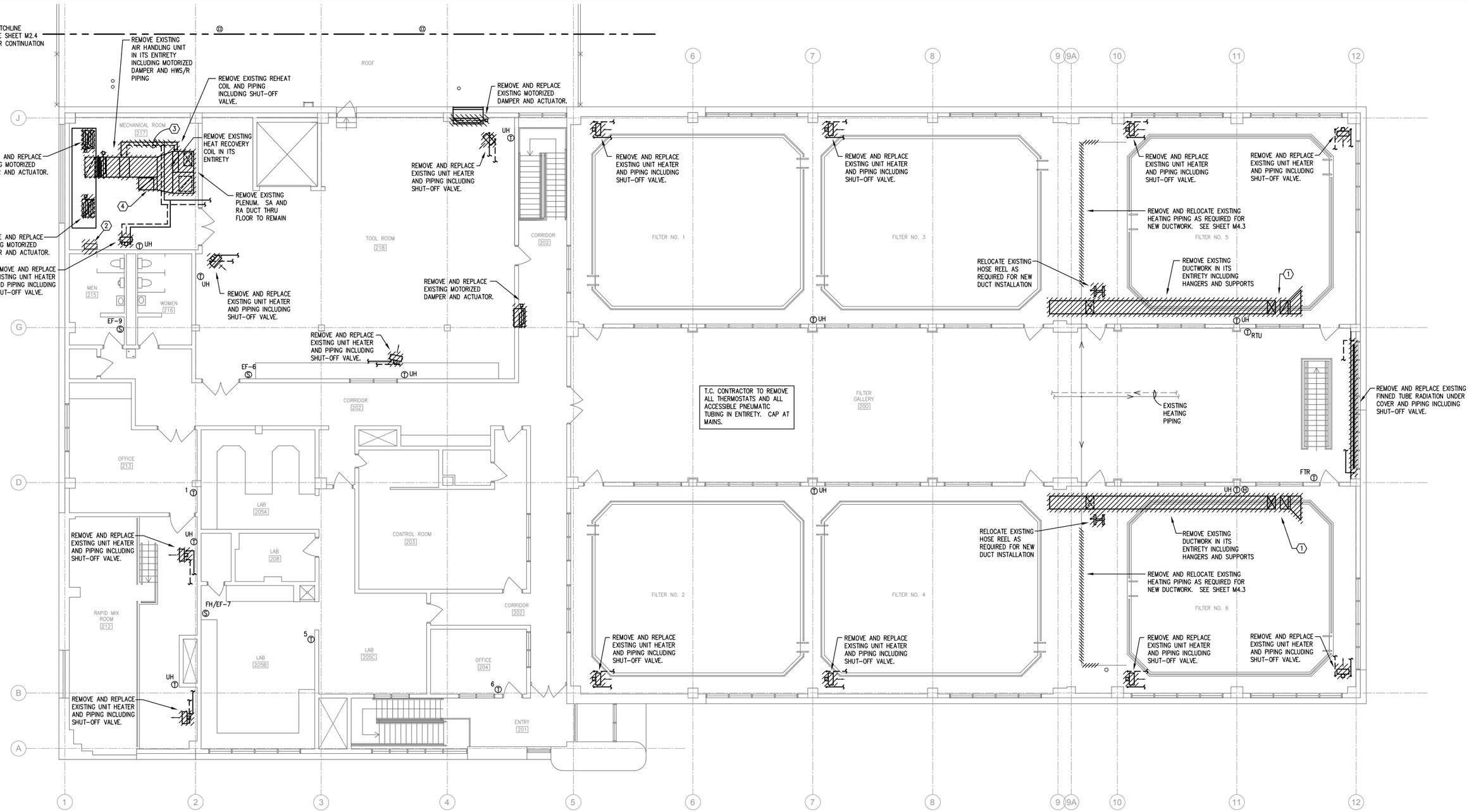
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

FIRST FLOOR NORTH MECHANICAL DEMOLITION

FILE NO. 00616097

SHEET M2.2



GENERAL NOTES

1 – CONTRACTOR SHALL VISIT SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS PRIOR TO BIDDING.

2 – REMOVE ITEMS INDICATED AS HACHURED.

3 – CONTRACTOR IS RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED FOR REMOVAL AND INSTALLATION OF MECHANICAL ITEMS. ALL NEW PATCHING SHALL MATCH EXISTING SURFACES.

4 – COORDINATE DEMO WORK WITH OTHER TRADES.

5 – WHERE EQUIPMENT, PIPING AND DUCTWORK IS REMOVED AND NO NEW WORK IS INVOLVED, CAP, PATCH AND FILL ALL HOLES TO MATCH ADJACENT SURFACES. COORDINATE WITH NEW CONSTRUCTION PLANS.

6 – WHERE EQUIPMENT IS INDICATED TO BE REMOVED, ALSO REMOVE ALL ASSOCIATED PIPING AND CONTROLS.

7 – WHERE PIPING AND DUCTWORK IS INDICATED TO BE REMOVED OR REPLACED, ALSO REMOVE AND REPLACE ALL ASSOCIATED HANGERS AND SUPPORTS.

NUMBERED NOTES

(1) PROVIDE PAINTED STEEL PANEL AT ROOF OPENING FROM REMOVED DUCTWORK.

(2) REMOVE EXISTING TEMPERATURE CONTROL CABINET IN ENTIRETY.

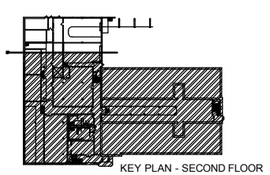
(3) REMOVE EXISTING HWS & HWR PIPING AS REQUIRED FOR NEW AHU SYSTEM.

(4) REMOVE EXISTING IN-LINE FAN AND DUCTWORK UP THRU ROOF.

N

0 4 8 16

SECOND FLOOR SOUTH DEMOLITION PLAN



PROJECT NO.:	00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE:	MARCH 2016	DRAWN BY: SRS	.	.	.	.
F.B.:	A79-164	CHECKED BY: TAW	.	.	.	.
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PLOT DATE: 3/4/16, X:\projects\2014 Projects\14-032B Duluth Lakewood WTP\0DWG\M2.3.dwg

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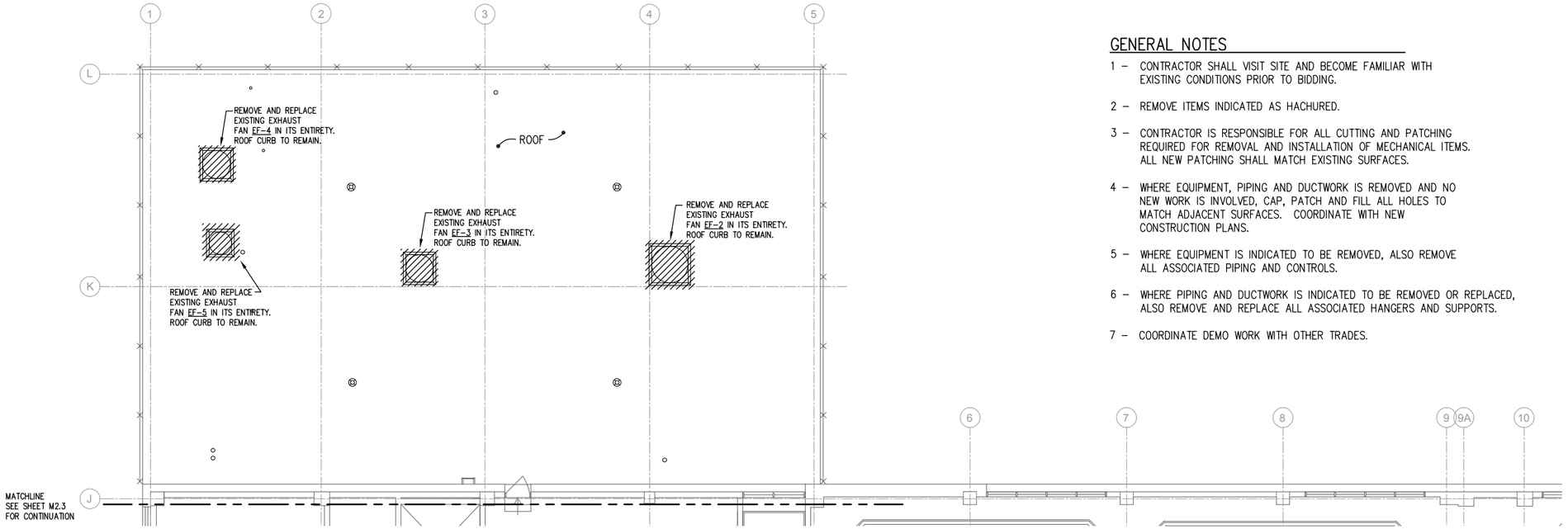
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

SECOND FLOOR SOUTH MECHANICAL DEMOLITION

FILE NO. 00616097

SHEET M2.3



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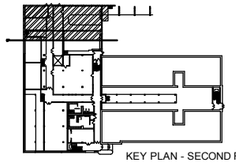
7 – COORDINATE DEMO WORK WITH OTHER TRADES.

N

SECOND FLOOR NORTH DEMOLITION PLAN

0 4 8 16



KEY PLAN - SECOND FLOOR

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: SRS	.	.	.	.
F.B. : A79-164	CHECKED BY: TAW	.	.	.	.
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PLOT DATE: 3/4/16, X:\projects\2014 Projects\14-032B Duluth Lakewood WTP\0DWG\M2.4.dwg

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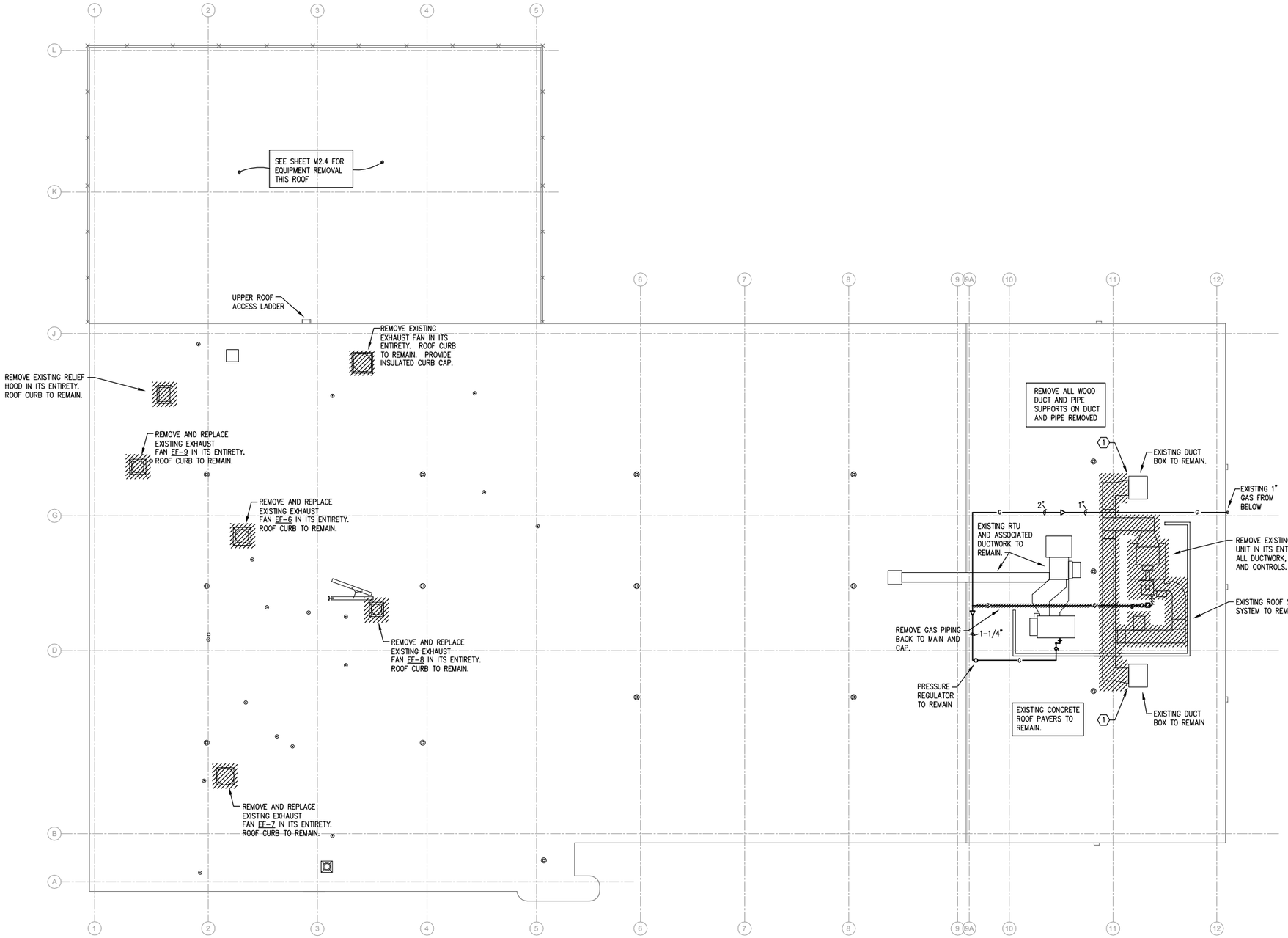
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

SECOND FLOOR NORTH
MECHANICAL DEMOLITION

FILE NO. 00616097

SHEET M2.4



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6 – WHERE PIPING AND DUCTWORK IS INDICATED TO BE REMOVED OR REPLACED, ALSO REMOVE AND REPLACE ALL ASSOCIATED HANGERS AND SUPPORTS.

7 – COORDINATE DEMO WORK WITH OTHER TRADES.

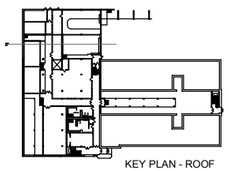
NUMBERED NOTES

(1) EXISTING DUCT BOX TO REMAIN. REMOVE DUCTWORK CONNECTING TO SIDE OF BOX, STUFF WITH FIBERGLASS INSULATION AND CAP OPENING IN SIDE OF DUCT BOX. SEAL COMPLETELY WEATHERTIGHT.

N

ROOF MECHANICAL DEMOLITION PLAN

0 2 4 6 8 12 16 24 32



KEY PLAN - ROOF

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PROJECT DATE: MARCH 2016	DRAWN BY: SRS	.	.	.	.
F.B.: A79-164	CHECKED BY: TAW	.	.	.	.
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PLOT DATE: 3/4/16, X:\projects\2014 Projects\14-032B Duluth Lakewood WTP\0DWG\M2.5.dwg

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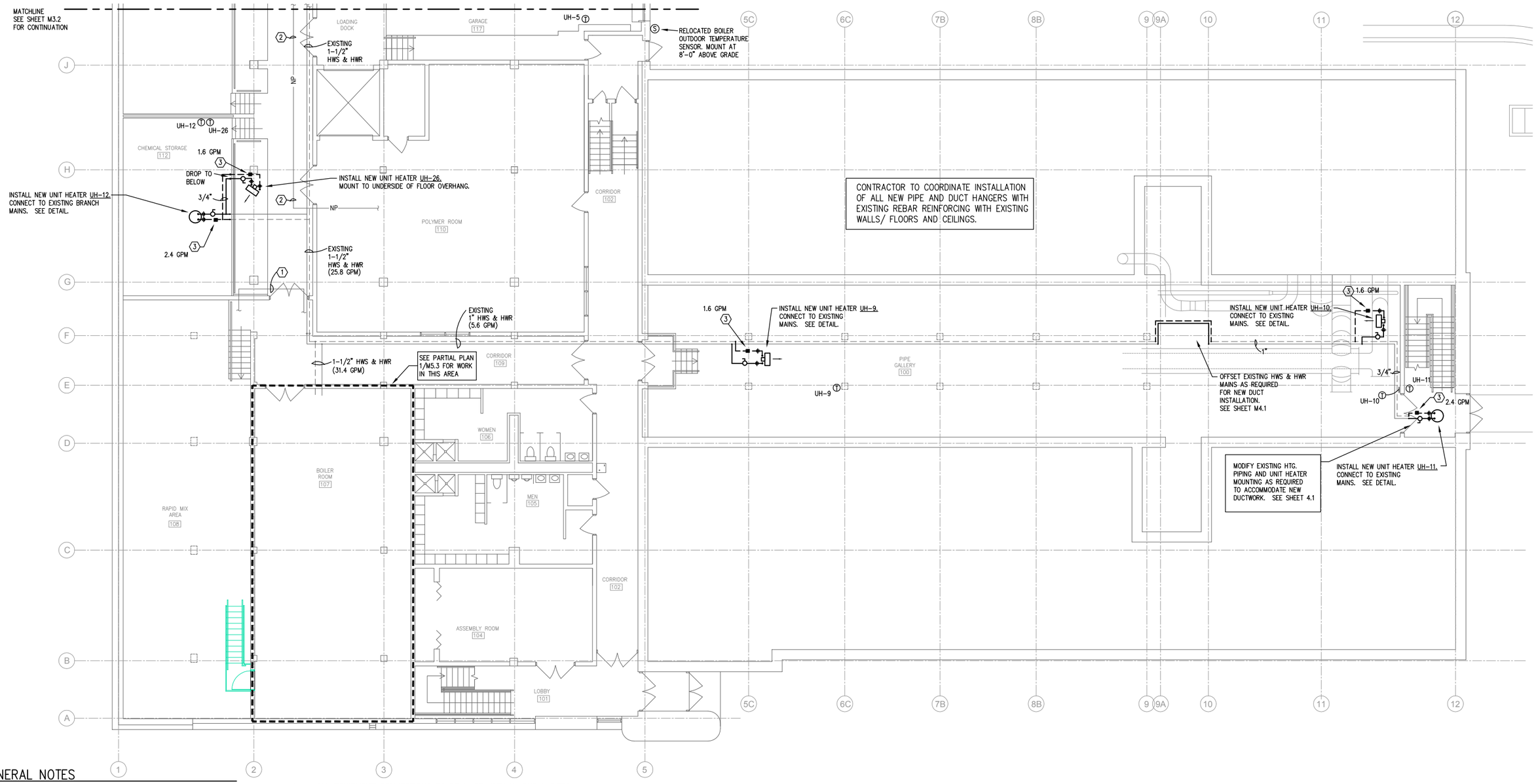
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

ROOF
MECHANICAL DEMOLITION

FILE NO. 00616097

SHEET M2.5



GENERAL NOTES

1 – MAINTAIN MINIMUM OF 42" CLEARANCE IN FRONT OF AND DIRECTLY OVER ALL ELECTRICAL PANELS, FLOOR TO CEILING.

2 – SEAL ALL DUCT AND PIPE OPENINGS THRU EXTERIOR WALL WEATHERTIGHT.

3 – PIPING SHOWN AWAY FROM WALLS FOR CLARITY ONLY. SECURELY RACK PIPING ON WALLS WHERE POSSIBLE.

4 – PROVIDE SHUT–OFF VALVES ON ALL BRANCH PIPING.

5 – MOUNT ALL HORIZONTAL HW UNIT HEATERS WITH BOTTOM AT 8 FT. A.F.F. AND ALL VERTICAL HW UNIT HEATERS WITH BOTTOM AT 10 FT. A.F.F.

6 – PIPING INSTALLATION TO BE COORDINATED WITH OTHER SERVICES RACKED ON WALLS.

7 – SEAL ALL PIPING PENETRATIONS OF CHEMICAL ROOM WALLS.

8 – ALL EQUIPMENT CONNECTIONS TO BE MADE WITH UNIONS UNLESS NOTED OTHERWISE.

9 – PROVIDE ADDITIONAL UNISTRUT PIPING SUPPORT STANDS AS REQUIRED FOR SMALLER PIPING. COORDINATE WITH FIELD ENGINEER. MAINTAIN ACCESS AND SERVICE CLEARANCES.

10 – ALL BRANCH HEATING WATER SUPPLY AND RETURN PIPING TO UNIT HEATERS AND CABINET UNIT HEATERS TO BE 3/4" UNLESS NOTED OTHERWISE.

11 – PROVIDE MANUAL AIR VENTS IN HEATING WATER SYSTEM AT ALL HIGH POINTS OF RISERS.

12 – PROVIDE NEW SHUT–OFF VALVES, BALANCING VALVES AND DRAIN VALVES IN ALL BRANCH PIPING TO UNIT HEATERS AND CABINET UNIT HEATERS.

13 – PROVIDE LABOR/MATERIAL FOR INSULATING EQUIVALENT OF 150 L.F. OF ADDITIONAL EXISTING 2" PIPING. PIPING TO BE INSULATED TO BE FIELD LOCATED BY FIELD ENGINEER.

NUMBERED NOTES

1 INSULATE EXISTING 10" OVERHEAD PROCESS WATER PIPE ON CHEMICAL STORAGE ROOM SIDE OF WALL.

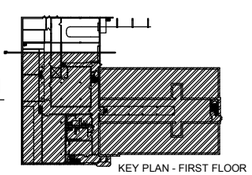
2 INSULATE EXISTING 2" NON–POTABLE (NP) WATER PIPING IN CHEMICAL STORAGE CORRIDOR.

3 INSTALL AUTOMATIC FLOW CONTROL VALVE. FLOW AS INDICATED OR AS SCHEDULED FOR EQUIPMENT SERVED.

N

0 4 8 16

FIRST FLOOR SOUTH HEATING/COOLING PLAN



KEY PLAN - FIRST FLOOR

PROJECT NO.:	00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE:	MARCH 2016	DRAWN BY: SRS	.	.	.	.
F.B.:	A79-164	CHECKED BY: TAW	.	.	.	.
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PLOT DATE: 3/4/16, X:\projects\2014 Projects\14-032B Duluth Lakewood WTP\0DWG\M3.1.dwg

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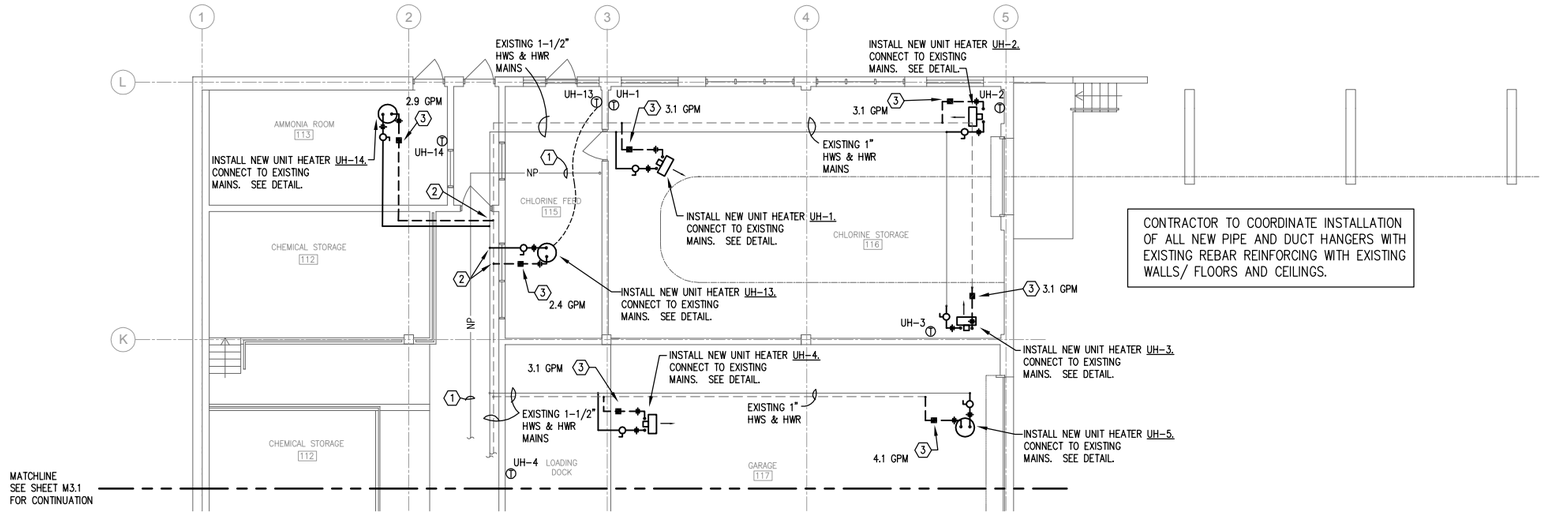
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

FIRST FLOOR SOUTH HEATING/COOLING PIPING

FILE NO. 00616097

SHEET M3.1



CONTRACTOR TO COORDINATE INSTALLATION OF ALL NEW PIPE AND DUCT HANGERS WITH EXISTING REBAR REINFORCING WITH EXISTING WALLS/ FLOORS AND CEILINGS.

GENERAL NOTES

1 – MAINTAIN MINIMUM OF 42" CLEARANCE IN FRONT OF AND DIRECTLY OVER ALL ELECTRICAL PANELS, FLOOR TO CEILING.

2 – SEAL ALL DUCT AND PIPE OPENINGS THRU EXTERIOR WALL WEATHERTIGHT.

3 – PIPING SHOWN AWAY FROM WALLS FOR CLARITY ONLY. SECURELY RACK PIPING ON WALLS WHERE POSSIBLE.

4 – PROVIDE SHUT–OFF VALVES ON ALL BRANCH PIPING.

5 – MOUNT ALL HORIZONTAL HW UNIT HEATERS WITH BOTTOM AT 8 FT. A.F.F. AND ALL VERTICAL HW UNIT HEATERS WITH BOTTOM AT 10 FT. A.F.F.

6 – PIPING INSTALLATION TO BE COORDINATED WITH OTHER SERVICES RACKED ON WALLS.

7 – SEAL ALL PIPING PENETRATIONS OF CHEMICAL ROOM WALLS.

8 – ALL EQUIPMENT CONNECTIONS TO BE MADE WITH UNIONS UNLESS NOTED OTHERWISE.

9 – PROVIDE ADDITIONAL UNISTRUT PIPING SUPPORT STANDS AS REQUIRED FOR SMALLER PIPING. COORDINATE WITH FIELD ENGINEER. MAINTAIN ACCESS AND SERVICE CLEARANCES.

10 – ALL BRANCH HEATING WATER SUPPLY AND RETURN PIPING TO UNIT HEATERS AND CABINET UNIT HEATERS TO BE 3/4" UNLESS NOTED OTHERWISE.

11 – PROVIDE MANUAL AIR VENTS IN HEATING WATER SYSTEM AT ALL HIGH POINTS OF RISERS.

12 – PROVIDE NEW SHUT–OFF VALVES, BALANCING VALVES AND DRAIN VALVES IN ALL BRANCH PIPING TO UNIT HEATERS AND CABINET UNIT HEATERS. MAKE CONNECTION TO EXISTING BRANCH PIPING. VERIFY EXACT CONNECTION SIZE AND LOCATION.

13 – PROVIDE LABOR/MATERIAL FOR INSULATING EQUIVALENT OF 150 L.F. OF ADDITIONAL EXISTING 2" PIPING. PIPING TO BE INSULATED TO BE FIELD LOCATED BY FIELD ENGINEER.

NUMBERED NOTES

(1) INSULATE EXISTING 2" NON–POTABLE (NP) WATER PIPING.

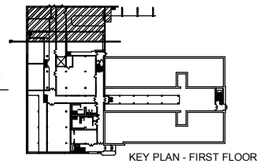
(2) MAKE CONNECTION OF NEW 3/4" HWS & HWR TO EXISTING HWS & HWR MAINS. VERIFY EXACT CONNECTION SIZE AND LOCATION.

(3) INSTALL AUTOMATIC FLOW CONTROL VALVE. FLOW AS INDICATED OR AS SCHEDULED FOR EQUIPMENT SERVED.

N

FIRST FLOOR NORTH HEATING/COOLING PLAN

0 4 8 16



KEY PLAN - FIRST FLOOR

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F.B. : A79-164	CHECKED BY: TAW	.	.	.	.
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PLOT DATE: 3/4/16, X:\projects\2014 Projects\14-032B Duluth Lakewood WTP\0DWG\M3.2.dwg

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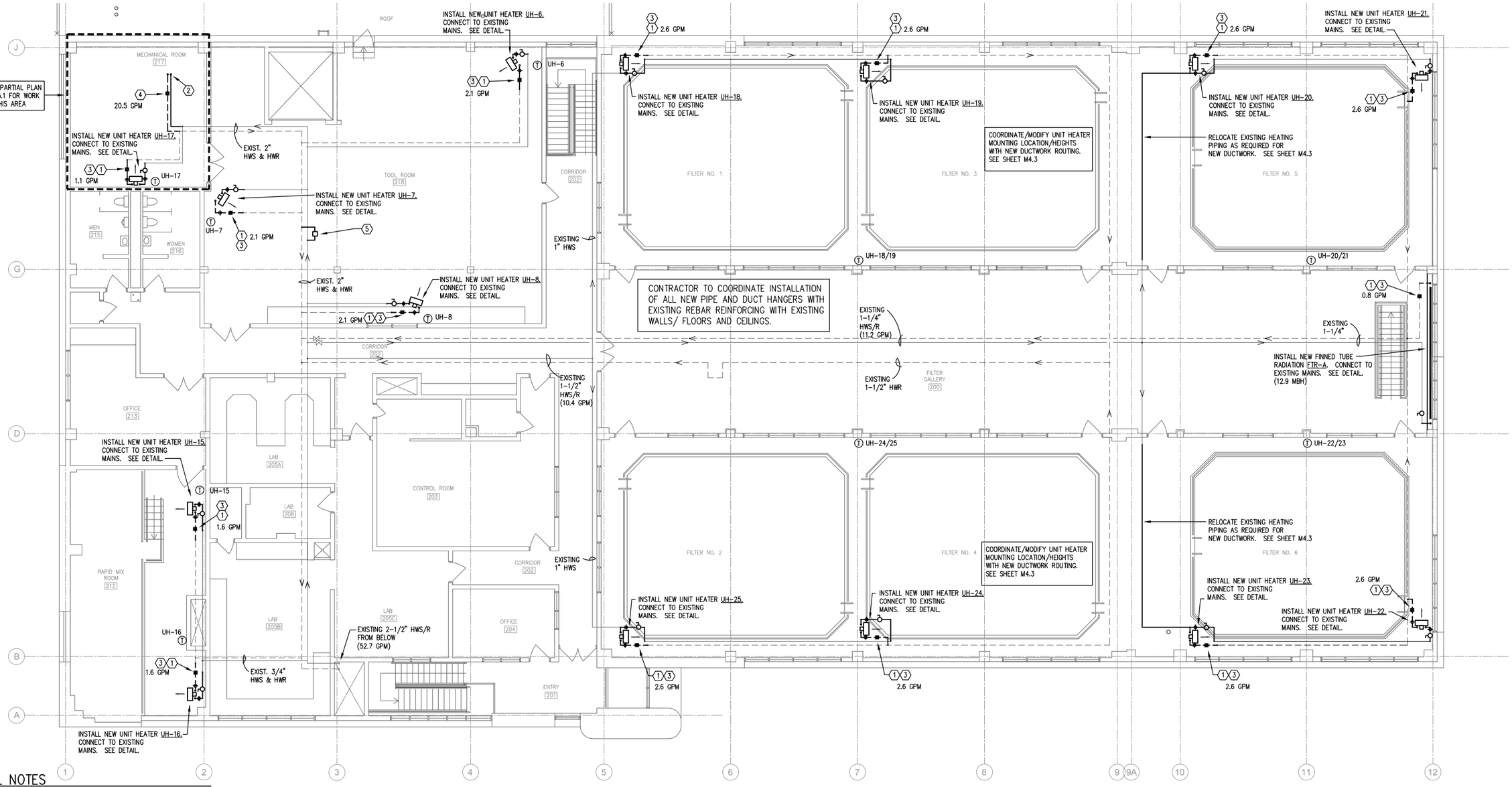
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

FIRST FLOOR NORTH HEATING/COOLING PIPING

FILE NO. 00616097

SHEET M3.2



GENERAL NOTES

1 – MAINTAIN MINIMUM OF 42" CLEARANCE IN FRONT OF AND DIRECTLY OVER ALL ELECTRICAL PANELS, FLOOR TO CEILING.

2 – SEAL ALL DUCT AND PIPE OPENINGS THRU EXTERIOR WALL WEATHERTIGHT.

3 – PIPING SHOWN AWAY FROM WALLS FOR CLARITY ONLY. SECURELY RACK PIPING ON WALLS WHERE POSSIBLE.

4 – PROVIDE SHUT–OFF VALVES ON ALL BRANCH PIPING.

5 – MOUNT ALL HORIZONTAL HW UNIT HEATERS WITH BOTTOM AT 8 FT. A.F.F. AND ALL VERTICAL HW UNIT HEATERS WITH BOTTOM AT 10 FT. A.F.F.

6 – PIPING INSTALLATION TO BE COORDINATED WITH OTHER SERVICES RACKED ON WALLS.

7 – SEAL ALL PIPING PENETRATIONS OF CHEMICAL ROOM WALLS.

8 – ALL EQUIPMENT CONNECTIONS TO BE MADE WITH UNIONS UNLESS NOTED OTHERWISE.

9 – PROVIDE ADDITIONAL UNISTRUT PIPING SUPPORT STANDS AS REQUIRED FOR SMALLER PIPING. COORDINATE WITH FIELD ENGINEER. MAINTAIN ACCESS AND SERVICE CLEARANCES.

10 – ALL BRANCH HEATING WATER SUPPLY AND RETURN PIPING TO UNIT HEATERS AND CABINET UNIT HEATERS TO BE 3/4" UNLESS NOTED OTHERWISE.

11 – PROVIDE MANUAL AIR VENTS IN HEATING WATER SYSTEM AT ALL HIGH POINTS OF RISERS.

12 – PROVIDE NEW SHUT–OFF VALVES, BALANCING VALVES AND DRAIN VALVES IN ALL BRANCH PIPING TO UNIT HEATERS AND CABINET UNIT HEATERS.

13 – PROVIDE LABOR/MATERIAL FOR INSULATING EQUIVALENT OF 150 L.F. OF ADDITIONAL EXISTING 2" PIPING. PIPING TO BE INSULATED TO BE FIELD LOCATED BY FIELD ENGINEER.

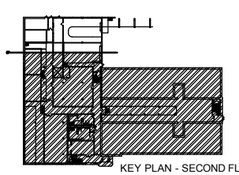
NUMBERED NOTES

1. MAKE CONNECTION OF NEW 3/4" HWS & HWR TO EXISTING HWS & HWR MAINS. VERIFY EXACT CONNECTION SIZE AND LOCATION.
2. 1–1/2" HWS & HWR TO AHU–3 HEATING COIL. SEE DETAIL.
3. INSTALL AUTOMATIC FLOW CONTROL VALVE. FLOW AS INDICATED OR AS SCHEDULED FOR EQUIPMENT SERVED.
4. FLOW MEASURING STATION. BALANCE TO FLOW INDICATED.
5. INSTALL NEW HEATING SYSTEM DIFFERENTIAL PRESSURE SENSOR ACROSS HWS & HWR MAINS.

N

SECOND FLOOR SOUTH HEATING/COOLING PLAN

0 4 8 16



KEY PLAN - SECOND FLOOR

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: SRS	.	.	.	.
F.B. : A79-164	CHECKED BY: TAW	.	.	.	.
.	.	.	.	.	.
PLOT DATE: 3/4/16, X:\projects\2014 Projects\14-032B Duluth Lakewood WTP\DWG\M3.3.dwg					

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

SECOND FLOOR SOUTH HEATING/COOLING PIPING

FILE NO. 00616097

SHEET M3.3

MATCHLINE
SEE SHEET M4.2
FOR CONTINUATION

CHEMICAL STORAGE 112
GARAGE 117
POLYMER ROOM 110
CORRIDOR 102
CORRIDOR 109
PIPE GALLERY 100
BOILER ROOM 107
WOMEN 106
MEN 105
ASSEMBLY ROOM 104
LOBBY 101
RAPID MIX AREA 108

REBALANCE EXISTING SUPPLY DIFFUSER TO 130 CFM.
EXISTING EXHAUST DUCT CAPPED
REBALANCE EXISTING SUPPLY DIFFUSER TO 400 CFM.
REBALANCE EXISTING SUPPLY DIFFUSER TO 300 CFM.
REBALANCE EXISTING SUPPLY DIFFUSER TO 400 CFM.
REBALANCE EXISTING EXHAUST REGISTER TO 1400 CFM.
REBALANCE EXISTING SUPPLY DIFFUSER TO 240 CFM.
REBALANCE EXISTING EXHAUST REGISTER TO 390 CFM.
REBALANCE EXISTING SUPPLY REGISTER TO 500 CFM.
REBALANCE EXISTING SUPPLY REGISTER TO 300 CFM.
REBALANCE EXISTING EXHAUST REGISTER TO 40 CFM.
REBALANCE EXISTING SUPPLY DIFFUSER TO 180 CFM.
REBALANCE EXISTING EXHAUST REGISTER TO 75 CFM.
REBALANCE EXISTING EXHAUST REGISTER TO 200 CFM.
REBALANCE EXISTING EXHAUST REGISTER TO 120 CFM.
REBALANCE TO 120 CFM. EF-8 (S)
REBALANCE EXISTING SUPPLY DIFFUSER TO 180 CFM.
REBALANCE EXISTING EXHAUST REGISTER TO 40 CFM.
REBALANCE EXISTING SUPPLY REGISTER TO 615 CFM. (TYP OF 3)
REBALANCE EXISTING RETURN REGISTER TO 250 CFM.
REBALANCE EXISTING SUPPLY DIFFUSER TO 135 CFM.
REBALANCE EXISTING SUPPLY DIFFUSER TO 240 CFM.
REBALANCE EXISTING SUPPLY REGISTER TO 150 CFM.
REBALANCE EXISTING SUPPLY DIFFUSER TO 240 CFM.
REBALANCE EXISTING SUPPLY REGISTER TO 115 CFM. (TYP OF 8)
REBALANCE EXISTING SUPPLY REGISTER TO 115 CFM. (TYP OF 8)

NEW 12"ø @ APPROX. 9 FT. A.F.F
NEW 12"ø @ APPROX. 12 FT. A.F.F
12"ø
D-2 (T) (H) D-2
3 (T)
4 (T)

SEE PARTIAL PLAN 1/M5.2 FOR WORK IN THIS AREA

5C 6C 7B 8B 9 9A 10 11 12
1 2 3 4 5

24"ø UP THRU CEILING TO FILTER ROOM ABOVE (5)
DUCT THRU FLOOR SLEEVE. (TYPICAL) SEE DETAIL 6/M6.2
RISE TO ℄ @ 16'-0" A.F.F.
ROUTE DUCT BETWEEN 48"ø INFLUENT PIPE AND 30"ø WASH WATER SUPPLY BOTTOM @ APPROX. 11'-0" A.F.F.
30"ø S.A.
30"ø R.A.
RISE
45° LATERAL TEE WITH 24"ø BRANCH DROP TO BOTTOM @ APPROX. 11'-0" A.F.F.
DUCT THRU FLOOR SLEEVE. (TYPICAL) SEE DETAIL 6/M6.2
24"ø UP THRU CEILING TO FILTER ROOM ABOVE (5)
30"ø DUCT THRU WALL ℄ @ 16'-0" A.F.F. (5)
WALL THIMBLE. SEE DETAIL 5/M6.2 (5)

ROUTE NEW 1-1/2" GAS UNDERGROUND TO BLDG. THEN RISE UP BEYOND NEW CONCRETE PAD AND ROUTE ALONG FACE OF BLDG. EXPOSED AND CONNECT TO EXISTING 1" UP TO ROOF.
CONNECT NEW 1-1/2" GAS TO EXISTING 1" GAS
EXIST. ELECTRICAL VAULT
CONNECT NEW 2" GAS TO EXISTING 1" GAS UNDERGROUND. VERIFY EXACT CONNECTION LOCATION
1-1/2"
EXIST. 1" GAS
DEHUMIDIFIER D-1 ON CONCRETE PAD
30"ø R.A.
DUCT SUPPORTS SECURELY ANCHORED TO CONCRETE PAD. SEE STRUCT. PLANS AND DETAILS.
CONCRETE HOUSEKEEPING PAD
EXTERIOR JACKETED AND INSULATED DUCT
2"
30"ø DUCT THRU WALL ℄ @ 13'-4" A.F.F.
CONNECT NEW 2" GAS TO EXISTING 2" GAS UNDERGROUND AND ROUTE AROUND NEW CONCRETE PAD. VERIFY EXTENT.
EXISTING 2" GAS UNDERGROUND FROM METER. VERIFY EXACT SIZE & LOCATION

CONTRACTOR TO COORDINATE INSTALLATION OF ALL NEW PIPE AND DUCT HANGERS WITH EXISTING REBAR REINFORCING WITH EXISTING WALLS/ FLOORS AND CEILINGS.

CONTRACTOR TO COORDINATE INSTALLATION OF ALL NEW EXTERIOR DUCT SUPPORTS WITH NEW DEHUMIDIFIER D-1 ACCESS DOOR LOCATIONS

NUMBERED NOTES

(1) CONNECT NEW 12"ø REACT. AIR INLET FOR DEHUMIDIFIER D-2 TO EXISTING 36x24 FROM ABOVE. FABRICATE PLENUM BOX AS REQUIRED.

(2) PROVIDE ESCUTCHEON PLATE AROUND DUCT ON BOTH SIDES AT WALL PENETRATION. ANCHOR TO WALL. SEAL AIRTIGHT AT WALL AND DUCT BOTH SIDES. ESCUTCHEON TO BE TYPE 316 STAINLESS STEEL.

(3) MAKE 1-1/2" GAS CONNECTION TO EQUIPMENT WITH SHUT-OFF VALVE, DRIP LEG AND PRESSURE REGULATOR.

(4) EXTERIOR DUCTWORK TO BE INSULATED AND JACKETED WEATHERTIGHT.

(5) PROVIDE ESCUTCHEON PLATE AROUND DUCT ON BOTH SIDES OF WALL/FLOOR PENETRATIONS. ANCHOR TO WALL/FLOOR. CAULK WEATHERTIGHT AT WALL/FLOOR AND DUCT BOTH SIDES. ESCUTCHEON TO BE ALUMINUM.

(6) FLEXIBLE DUCT CONNECTION AT UNIT. INSULATION AND JACKET TO COVER FLEX CONNECTION.

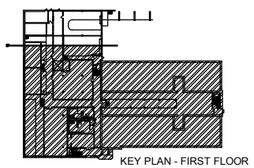
GENERAL NOTES

1 - ALL ROUND EXPOSED DUCTWORK WITHIN FILTER ROOMS TO BE TYPE 3003-H14 ALUMINUM SPIRAL DUCT WITH TYPE 316 STAINLESS STEEL SUPPORTS AND HANGERS. ISOLATE DISSIMILIAR METAL COMPONENTS WITH NEOPRENE SHEETING OR EQUIPMENT.

N
A

FIRST FLOOR SOUTH DUCTWORK PLAN

0 4 8 16


KEY PLAN - FIRST FLOOR

PROJECT NO.:	00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE:	MARCH 2016	DRAWN BY: SRS	.	.	.	.
F.B.:	A79-164	CHECKED BY: TAW	.	.	.	.
			.	.	.	.
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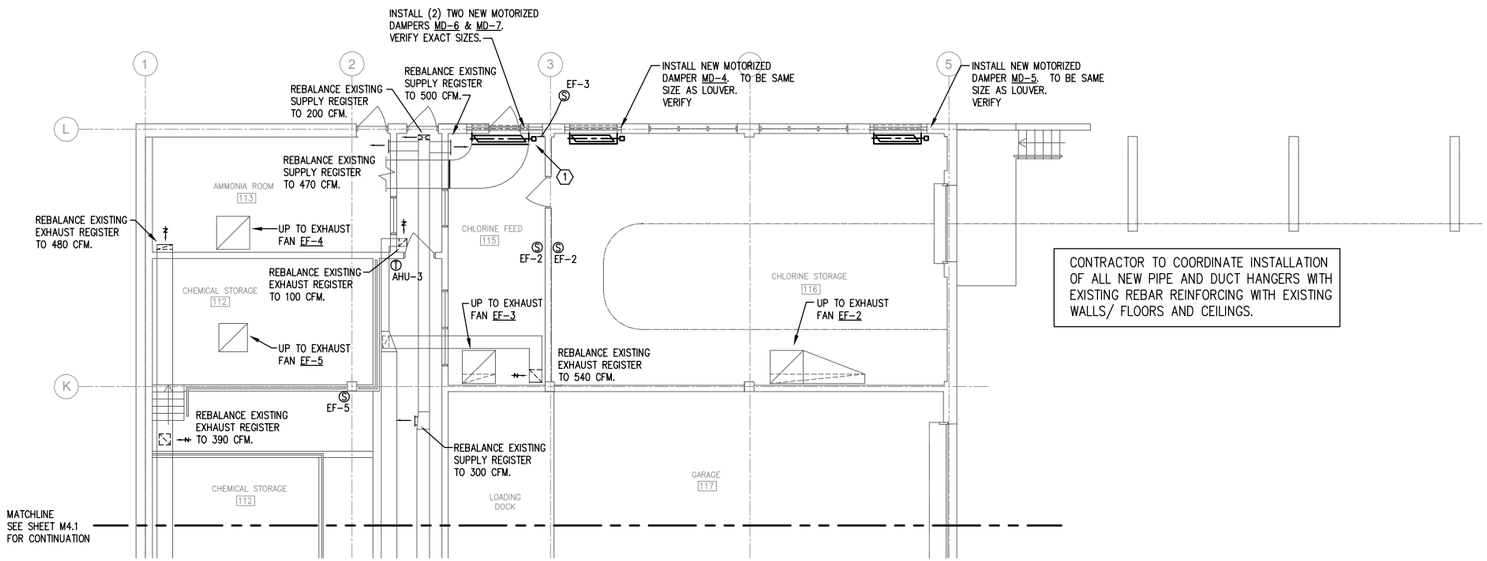
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

FIRST FLOOR SOUTH DUCTWORK PLAN

FILE NO. 00616097
SHEET M4.1



CONTRACTOR TO COORDINATE INSTALLATION OF ALL NEW PIPE AND DUCT HANGERS WITH EXISTING REBAR REINFORCING WITH EXISTING WALLS/ FLOORS AND CEILINGS.

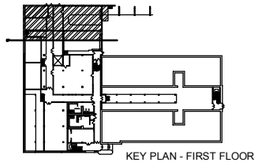
NUMBERED NOTES

1. MOTORIZED DAMPER MD-7 LOCATED WITHIN DUCTWORK. REPLACE DUCTWORK AND DAMPER ACCESS DOOR.

N

FIRST FLOOR NORTH DUCTWORK PLAN

0 4 8 16



KEY PLAN - FIRST FLOOR

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

FIRST FLOOR NORTH DUCTWORK PLAN

FILE NO. 00616097

SHEET M4.2

MATCHLINE
SEE SHEET M4.4
FOR CONTINUATION

SEE PARTIAL PLAN 1/M5.1 FOR WORK IN THIS AREA

INSTALL NEW MOTORIZED DAMPER MD-3. TO BE SAME SIZE AS LOUVER. VERIFY

INSTALL NEW 36x24 MOTORIZED DAMPER MD-1 IN EXISTING DUCT DROP DOWN TO FLOOR BELOW. VERIFY EXACT SIZE

INSTALL NEW 36x24 MOTORIZED DAMPER MD-2 IN EXISTING DUCT DROP DOWN TO FLOOR BELOW. VERIFY EXACT SIZE

REBALANCE EXISTING EXHAUST REGISTER TO 150 CFM.

REBALANCE EXISTING SUPPLY DIFFUSER TO 190 CFM.

REBALANCE EXISTING EXHAUST REGISTER TO 125 CFM.

REBALANCE EXISTING EXHAUST REGISTER TO 125 CFM.

REBALANCE EXISTING SUPPLY DIFFUSER TO 85 CFM.

REBALANCE EXISTING SUPPLY DIFFUSER TO 85 CFM.

INSTALL NEW MOTORIZED DAMPER MD-8 IN EXISTING CEILING RELIEF DUCT. VERIFY SIZE.

EXISTING UP TO NEW EF-6 ON ROOF

REBALANCE EXISTING EXHAUST REGISTER TO 50 CFM.

EF-9

REBALANCE EXISTING SUPPLY DIFFUSER TO 190 CFM.

EF-6

REBALANCE EXISTING SUPPLY DIFFUSER TO 190 CFM.

REBALANCE EXISTING SUPPLY REGISTER TO 400 CFM.

EXISTING ZONE 2 ABANDONED

REBALANCE EXISTING SUPPLY DIFFUSER TO 350 CFM.

REBALANCE EXISTING SUPPLY DIFFUSER TO 300 CFM.

REBALANCE EXISTING SUPPLY DIFFUSER TO 115 CFM.

FH/EF-7

REBALANCE EXISTING SUPPLY DIFFUSER TO 350 CFM.

REBALANCE EXISTING SUPPLY DIFFUSER TO 350 CFM.

REBALANCE EXISTING SUPPLY DIFFUSER TO 100 CFM.

REBALANCE EXISTING SUPPLY DIFFUSER TO 350 CFM.

REBALANCE EXISTING SUPPLY DIFFUSER TO 265 CFM.

REBALANCE EXISTING SUPPLY DIFFUSER TO 265 CFM.

CONTRACTOR TO COORDINATE INSTALLATION OF ALL NEW PIPE AND DUCT HANGERS WITH EXISTING REBAR REINFORCING WITH EXISTING WALLS/ FLOORS AND CEILINGS.

REBALANCE EXISTING SUPPLY DIFFUSER TO 680 CFM. (TYPICAL OF 3)

EXISTING SUPPLY AIR FROM RTU ABOVE.

24"ø THRU FLOOR FROM BELOW THRU FLOOR SLEEVE. SEE DETAIL 6/M6.2

EXISTING SUPPLY AIR FROM RTU ABOVE.

REBALANCE EXISTING SUPPLY DIFFUSER TO 680 CFM. (TYPICAL OF 2)

BOT. @ 9'-0" A.F.F.

16"ø

20"ø TIGHT TO BOTTOM OF BEAM

RISE

45° LATERAL TEE WITH 20"ø BRANCH DROP TO BOTTOM AS HIGH AS POSSIBLE

12x8 SR 400 CFM (TYP OF 10

24"ø

18x36 ER TOP @ 5 FT. A.F.F. (TYP OF 2)

TERMINATE AT 6 FT. A.F.F.

RELOCATED HOSE REEL AND SUPPLY AS REQUIRED. COORDINATE WITH OWNER.

PROVIDE STAINLESS STEEL UNISTRUT SUPPORT ANCHORED TO FLOOR AND CEILING. SECURE DUCTWORK TO SUPPORT.

D-1

FILTER NO. 1

FILTER NO. 2

FILTER NO. 3

FILTER NO. 4

FILTER NO. 5

FILTER NO. 6

FILTER GALLERY 200

MECHANICAL ROOM 217

TOOL ROOM 218

CORRIDOR 202

MEN 215

WOMEN 216

OFFICE 213

LAB 205A

LAB 208

RAPID MIX ROOM 212

CONTROL ROOM 203

CORRIDOR 205

OFFICE 204

LAB 205B

LAB 205C

ENTRY 201

ROOF

GENERAL NOTES

1 – ALL ROUND EXPOSED DUCTWORK WITHIN FILTER ROOMS TO BE TYPE 3003–H14 ALUMINUM SPIRAL DUCT WITH TYPE 316 STAINLESS STEEL SUPPORTS AND HANGERS. ISOLATE DISSIMILIAR METAL COMPONENTS WITH NEOPRENE SHEETING OR EQUIPMENT.

ENLARGED SECOND FLOOR PLAN

0 4 8 16

KEY PLAN - SECOND FLOOR

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PROJECT DATE: MARCH 2016	DRAWN BY: SRS	.	.	.	.
F.B. : A79-164	CHECKED BY: TAW	.	.	.	.
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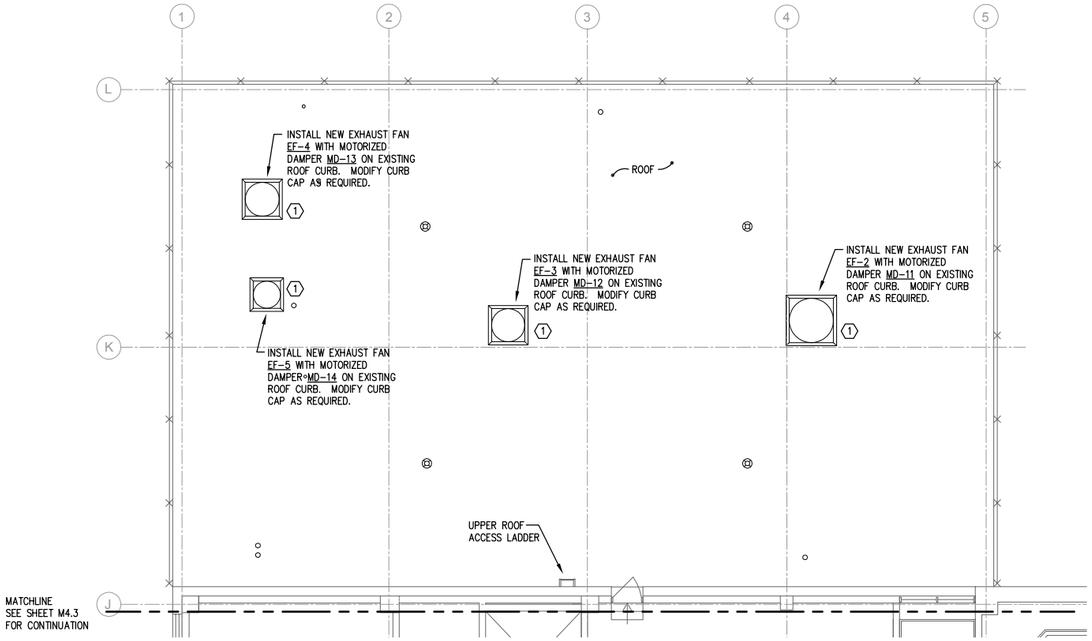
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

SECOND FLOOR SOUTH DUCTWORK PLAN

FILE NO. 00616097

SHEET M4.3



NUMBERED NOTES

(1) PROVIDE CURB ADAPTOR AS REQUIRED FOR NEW EXHAUST FAN. VERIFY EXACT SIZE REQUIRED.

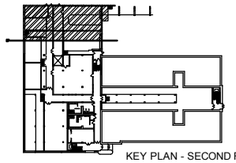
GENERAL NOTES

1 – COORDINATE ALL ROOFING WORK WITH ROOFING SUB-CONTRACTOR.

N

SECOND FLOOR NORTH DUCTWORK PLAN

0 4 8 16



KEY PLAN - SECOND FLOOR

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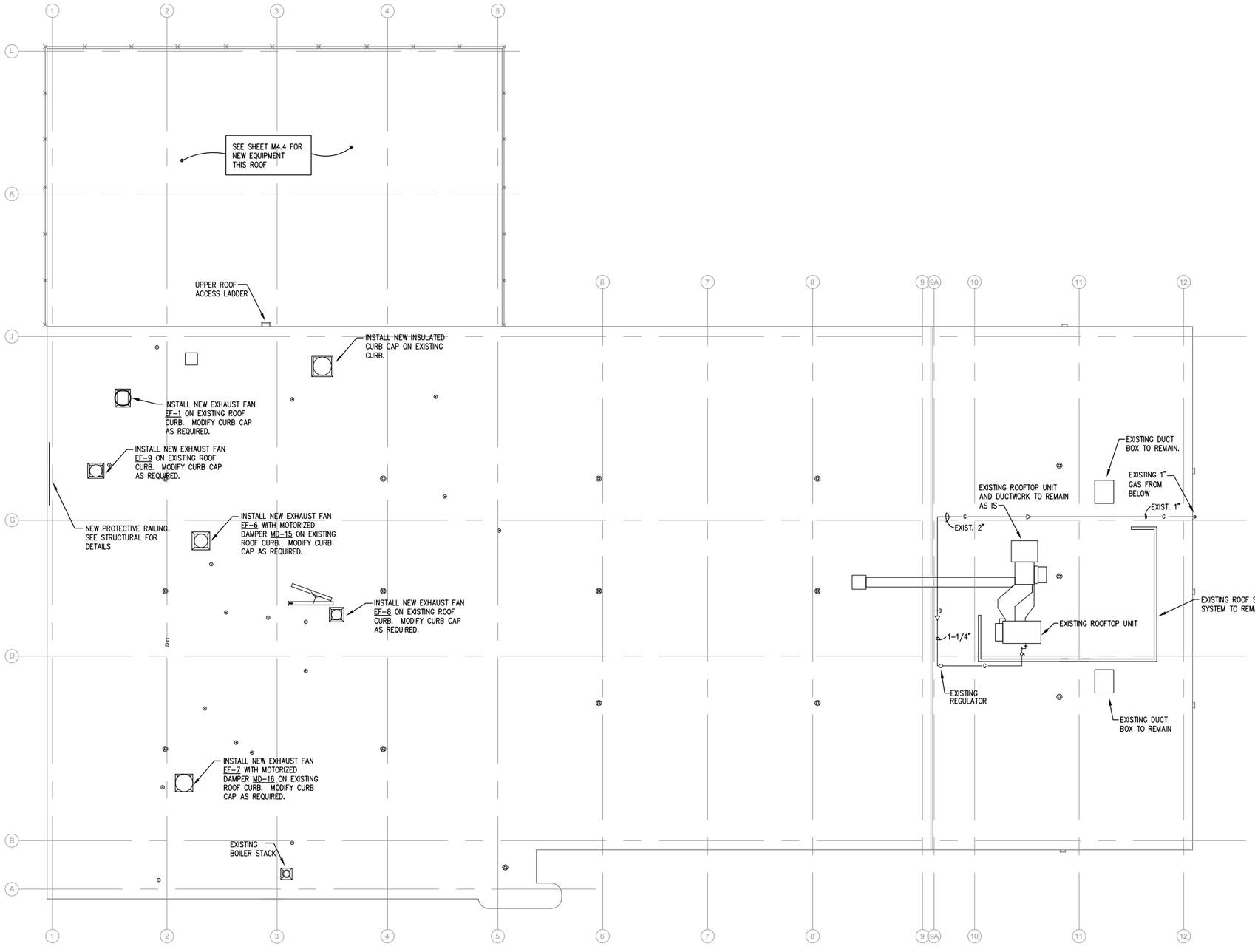
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

SECOND FLOOR NORTH DUCTWORK PLAN

FILE NO. 00616097

SHEET M4.4



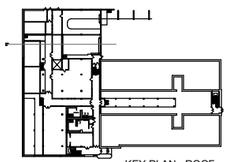
GENERAL NOTES

1 – CONTRACTOR TO VERIFY EXACT SIZE OF EXISTING ROOF CURBS AND PROVIDE CURB TRANSITIONS AS REQUIRED FOR NEW FANS.

N

ROOF MECHANICAL PLAN

0 2 4 6 8 12 16 24 32



KEY PLAN - ROOF

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

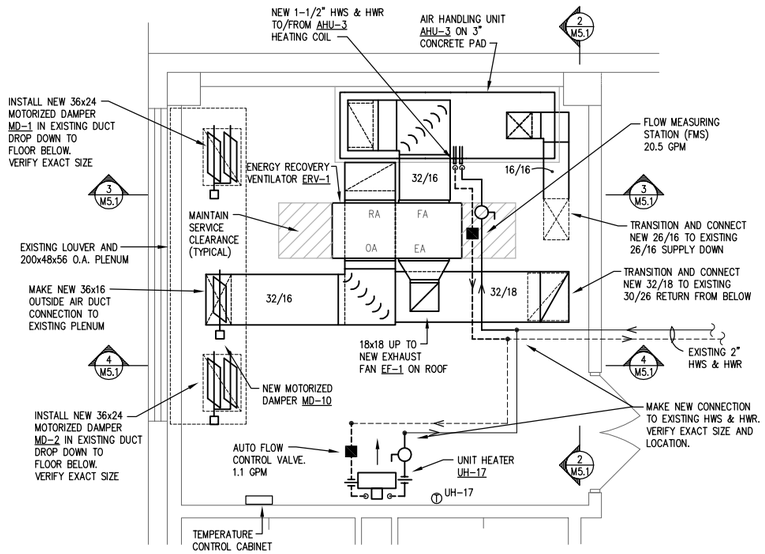
CITY OF DULUTH
LAKEWOOD, MN

ROOF MECHANICAL PLAN

FILE NO. 00616097

SHEET M4.5

CONTRACTOR TO COORDINATE INSTALLATION OF ALL NEW PIPE AND DUCT HANGERS WITH EXISTING REBAR REINFORCING WITH EXISTING WALLS/ FLOORS AND CEILINGS.



1 M5.1 MECHANICAL ROOM PARTIAL PLAN

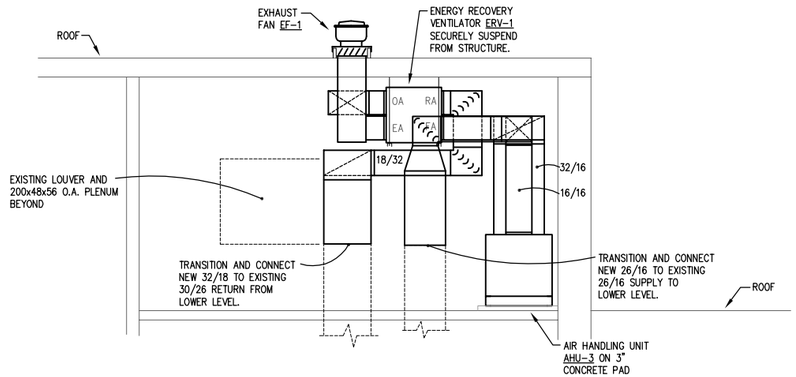
0 1 2 3 4 6 8 12
Graphic Scale

GENERAL NOTES

1 – PROVIDE PROTECTIVE CLOSED CELL BUMPER GUARDS ON EDGES OF ALL DUCTWORK BELOW 7'-0" A.F.F.

2 – VERIFY EXACT SIZE OF ALL NEW MOTORIZED DAMPERS INSTALLED IN EXISTING DUCTWORK AND LOUVERS.

3 – CONTRACTOR TO PROVIDE NEW 3" CONCRETE PAD FOR AHU-3.



2 M5.1 SECTION

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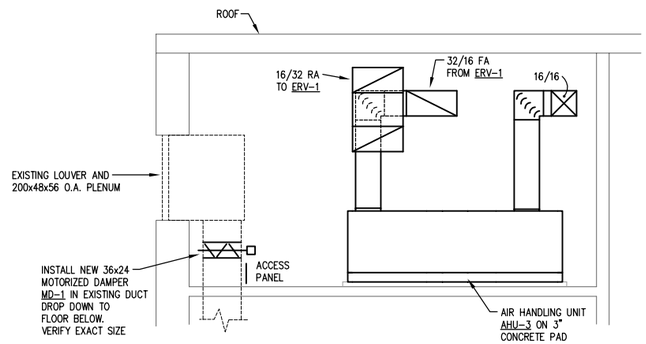
Graphic Scale



3 M5.1 SECTION

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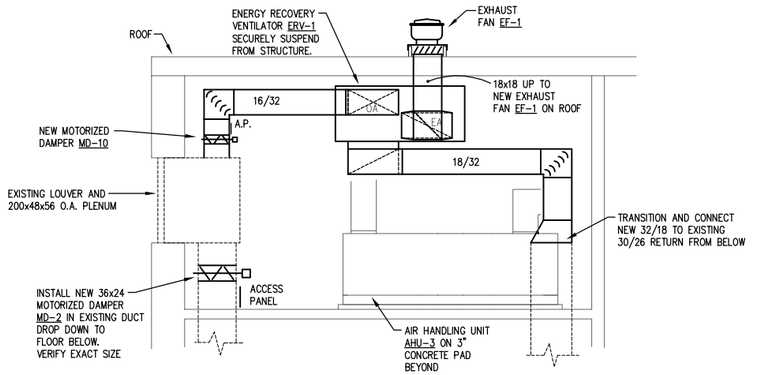
Graphic Scale



4 M5.1 SECTION

0 1 2 3 4 6 8 12
Graphic Scale

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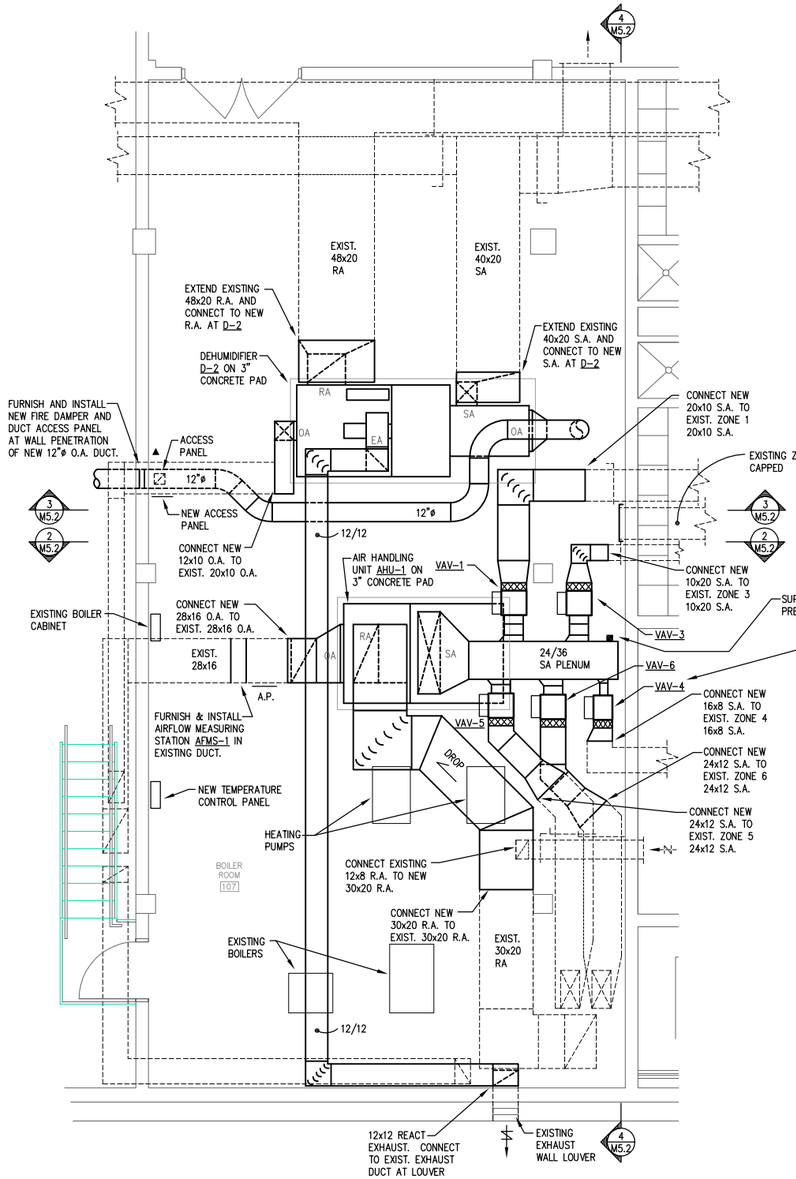
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

MECHANICAL ROOM PARTIAL PLAN

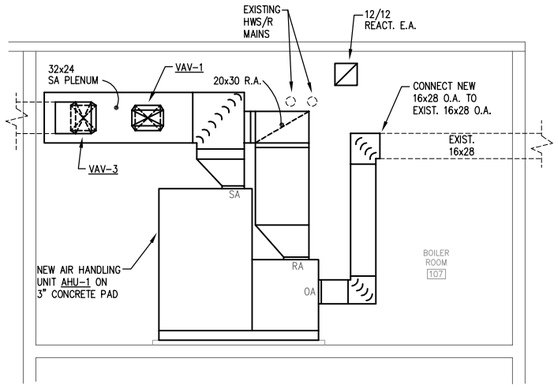
FILE NO. 00616097

SHEET M5.1



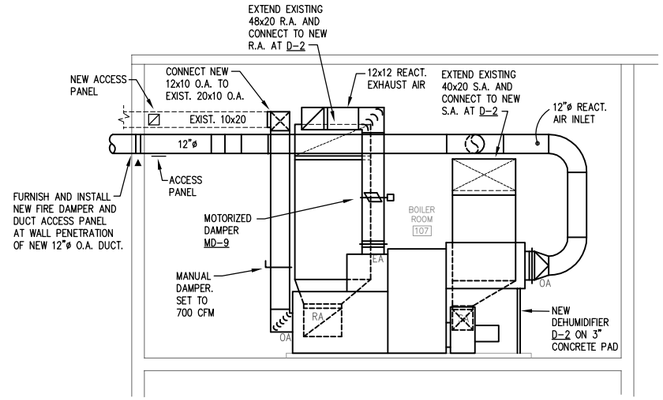
1 M5.2 LOWER LEVEL BOILER ROOM PARTIAL PLAN

0 1 2 3 4 6 8 12
Graphic Scale



2 M5.2 SECTION

0 1 2 3 4 6 8 12
Graphic Scale



3 M5.2 SECTION

0 1 2 3 4 6 8 12
Graphic Scale

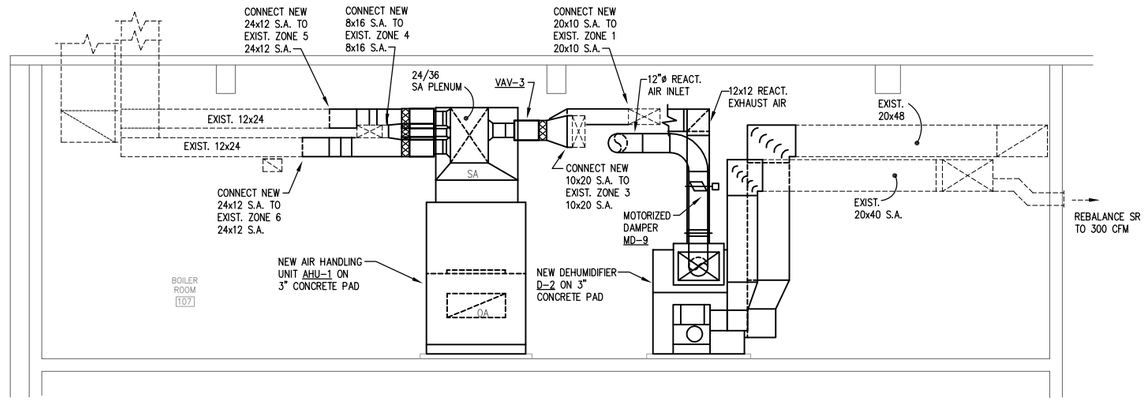
GENERAL NOTES

1 – PROVIDE PROTECTIVE CLOSED CELL BUMPER GUARDS ON EDGES OF ALL DUCTWORK BELOW 7'–0" A.F.F.

2 – ALL NEW DUCT CONNECTIONS TO NEW EQUIPMENT TO BE MADE WITH FLEXIBLE DUCT CONNECTIONS.

3 – CONTRACTOR TO PROVIDE NEW 3" CONCRETE PAD FOR ALL NEW EQUIPMENT. VERIFY EXACT SIZE REQUIRED.

CONTRACTOR TO COORDINATE INSTALLATION OF ALL NEW PIPE AND DUCT HANGERS WITH EXISTING REBAR REINFORCING WITH EXISTING WALLS/ FLOORS AND CEILINGS.



4 M5.2 LOWER LEVEL BOILER ROOM SECTION

0 1 2 3 4 6 8 12
Graphic Scale

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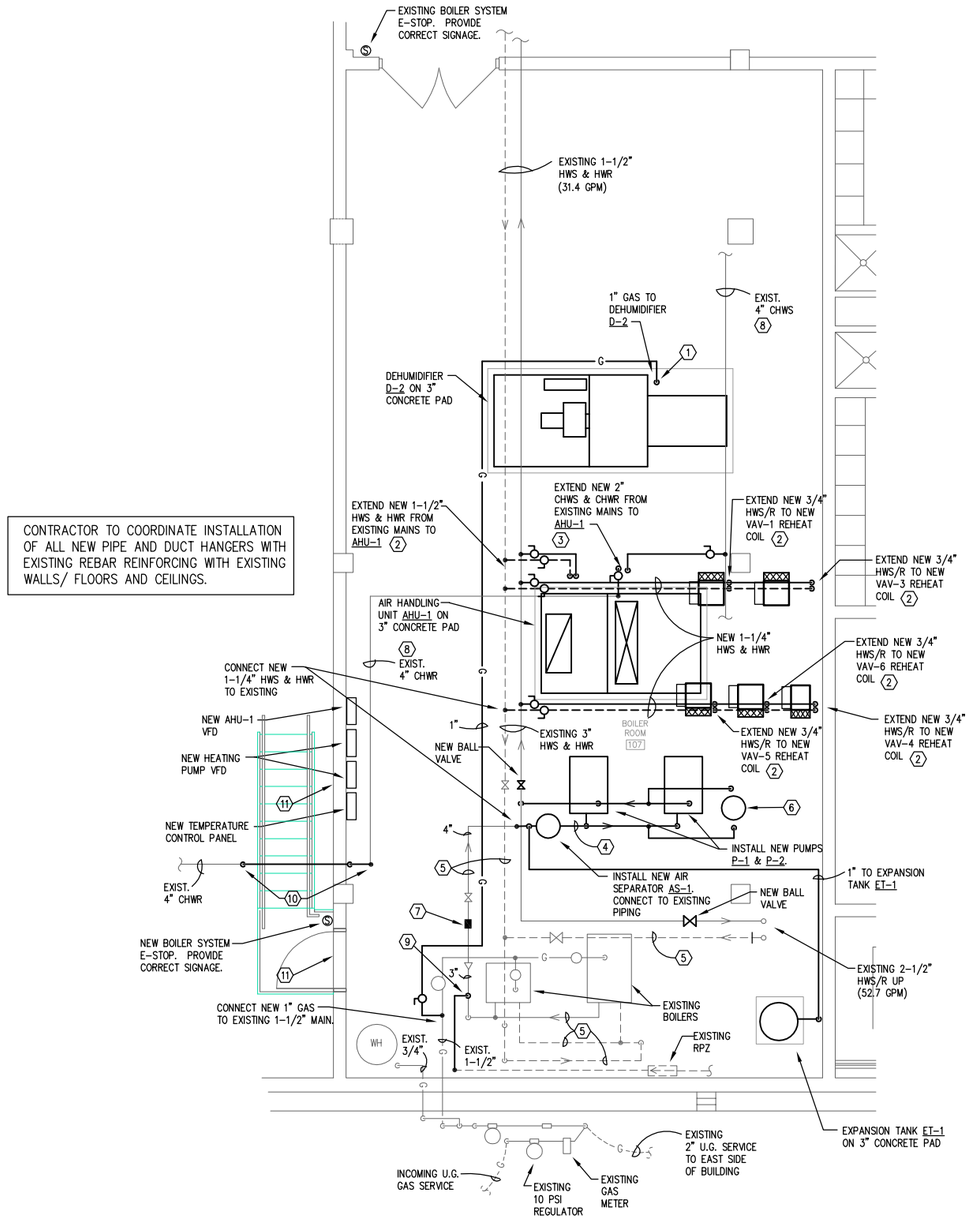
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

MECHANICAL ROOM PARTIAL PLAN

FILE NO. 00616097

SHEET M5.2



CONTRACTOR TO COORDINATE INSTALLATION OF ALL NEW PIPE AND DUCT HANGERS WITH EXISTING REBAR REINFORCING WITH EXISTING WALLS/ FLOORS AND CEILINGS.

1 M5.3 LOWER LEVEL BOILER ROOM PARTIAL PLAN

0 1 2 3 4 6 8 12
Graphic Scale

NUMBERED NOTES

1. MAKE 1" GAS CONNECTION TO MAKE-UP AIR UNIT WITH SHUT-OFF VALVE, GAS PRESSURE REGULATOR AND DIRT LEG.
2. REFER TO COIL PIPING DIAGRAM DETAIL 5/M6.1. PROVIDE AUTO-FLOW CONTROL VALVE FOR EACH HEATING COIL. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES.
3. REFER TO COIL PIPING DIAGRAM DETAIL 4/M6.1. PROVIDE AUTO-FLOW CONTROL VALVE FOR EACH COOLING COIL. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES.
4. FURNISH AND INSTALL NEW HEATING PIPING FROM NEW AIR SEPARATOR TO NEW PUMPS AND FROM NEW PUMPS TO EXISTING HWS MAIN.
5. INSULATE ALL EXISTING UNINSULATED HEATING PIPING IN VICINITY OF BOILERS. APPROX. 100 LINEAR FEET OF 3" PIPE. VERIFY EXACT PIPE SIZE AND LENGTH.
6. FURNISH AND INSTALL NEW CHEMICAL FEEDER SYSTEM FOR HEATING SYSTEM.
7. INSTALL NEW HEATING SYSTEM FLOW METER IN EXISTING 3" HWS PIPE.
8. INSULATE EXISTING CHWS & CHWR PIPING WITHIN BOILER ROOM
9. MAKE CONNECTION OF 3/4" HEATING SYSTEM MAKE-UP WATER TO EXISTING 3" HEATING WATER MAIN. VERIFY CONNECTIONS.
10. CONNECT TO EXISTING 4" CHWR AND ROUTE THRU WALL AT 8 FT. A.F.F. TO PROVIDE REQUIRED CLEARANCE BETWEEN NEW PIPE AND NEW STAIRS. EXTEND NEW PIPE BEYOND NEW STAIRS AND RECONNECT INTO TOP OF EXISTING 4" CHWR PIPE. VERIFY EXTENT OF WORK.
11. DISCONNECT AND RELOCATE EXISTING SAMPLE PUMPS AND ASSOCIATED PIPING AND SUPPORTS AS REQUIRED FOR NEW DOOR AND STAIR INSTALLATION VERIFY EXTENT OF WORK. SEE SHEET M5.5 FOR MORE INFORMATION.

GENERAL NOTES

1 – MAINTAIN MINIMUM OF 42" CLEARANCE IN FRONT OF AND DIRECTLY OVER ALL ELECTRICAL PANELS, FLOOR TO CEILING.

2 – SEAL ALL DUCT AND PIPE OPENINGS THRU EXTERIOR WALL WEATHERTIGHT.

3 – PIPING SHOWN AWAY FROM WALLS FOR CLARITY ONLY. SECURELY RACK PIPING ON WALLS WHERE POSSIBLE.

4 – PROVIDE SHUT-OFF VALVES ON ALL BRANCH PIPING.

5 – ALL EQUIPMENT CONNECTIONS TO BE MADE WITH UNIONS UNLESS NOTED OTHERWISE.

6 – PIPING INSTALLATION TO BE COORDINATED WITH OTHER SERVICES RACKED ON WALLS.

7 – PROVIDE MANUAL AIR VENTS IN HEATING WATER SYSTEM AT ALL HIGH POINTS OF RISERS.

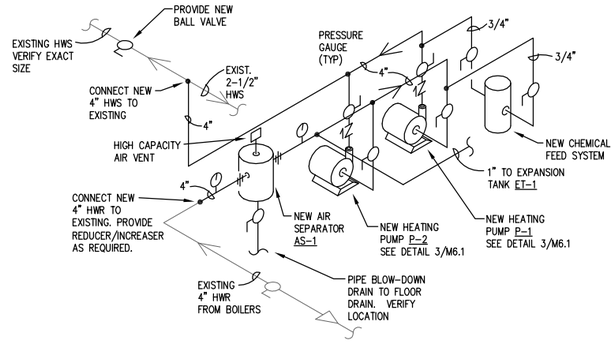
8 – PROVIDE NEW SHUT-OFF VALVES, BALANCING VALVES AND DRAIN VALVES IN ALL BRANCH PIPING TO VAVS

9 – PROVIDE ADDITIONAL UNISTRUT PIPING SUPPORT STANDS AS REQUIRED FOR SMALLER PIPING. COORDINATE WITH FIELD ENGINEER. MAINTAIN ACCESS AND SERVICE CLEARANCES.

10 – ALL BRANCH HEATING WATER SUPPLY AND RETURN PIPING TO VAVS TO BE 3/4" UNLESS NOTED OTHERWISE.

11 – PROVIDE LABOR/MATERIAL FOR INSULATING EQUIVALENT OF 150 L.F. OF ADDITIONAL EXISTING 2" PIPING. PIPING TO BE INSULATED TO BE FIELD LOCATED BY FIELD ENGINEER.

12 – PROVIDE/MODOFY CONCRETE HOUSEKEEPING PADS FOR ALL NEW EQUIPMENT. VERIFY EXACT SIZES REQUIRED.



2 M5.3 HEATING PUMP PIPING DIAGRAM

NO SCALE

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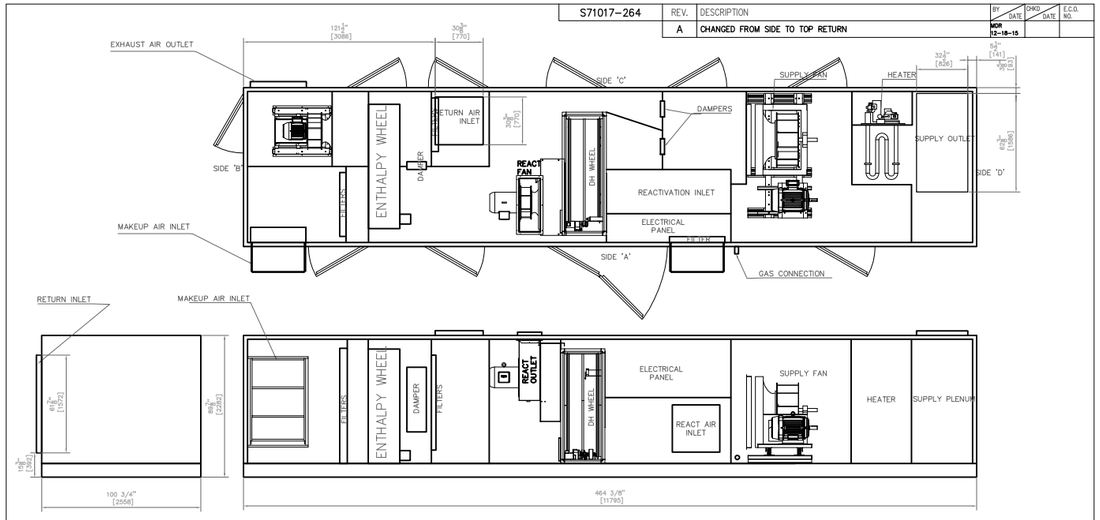
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

MECHANICAL ROOM PARTIAL PLAN

FILE NO. 00616097
SHEET M5.3

S71017-264	REV.	DESCRIPTION	BY / DWD DATE	E.C.O. NO.
	A	CHANGED FROM SIDE TO TOP RETURN	MDR 12-18-15	



SIDE CLEARANCES:
SIDE "A" = 60" [1524]
SIDE "B" = 48" [1219]
SIDE "C" = 48" [1219]
SIDE "D" = 48" [1219]

UNIT WEIGHT = 9470 LB [4295 kg] +/- 10%

PRELIMINARY DRAWING
DRAWING IS SUBJECT TO REVISIONS

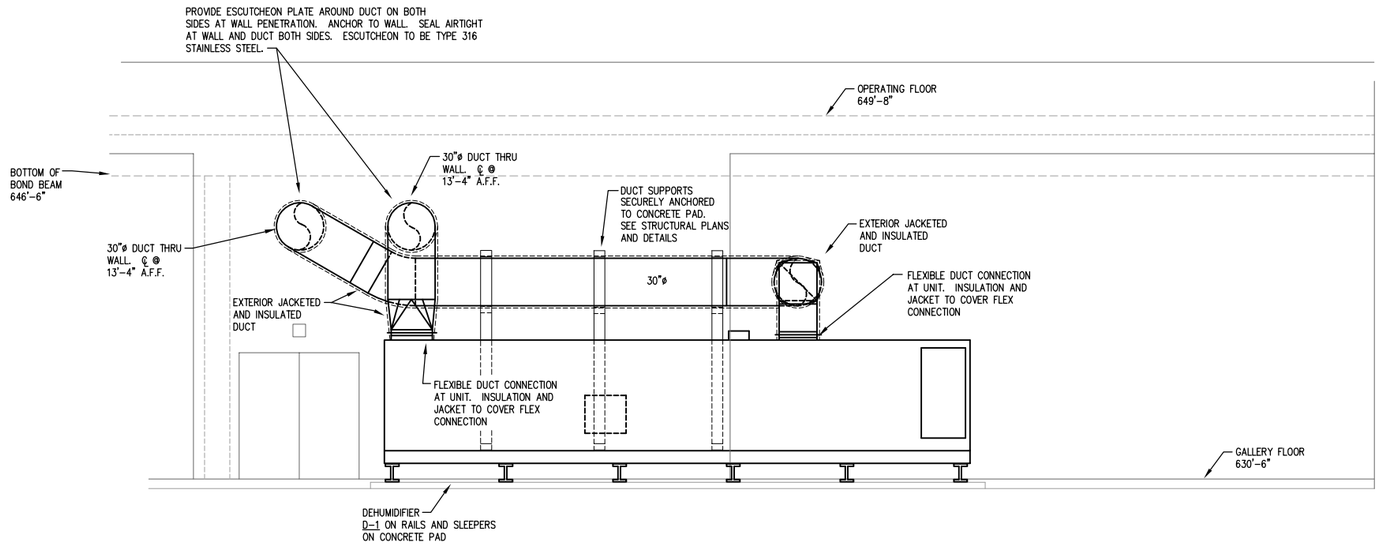
All Dimensions Are In Inches Unless Otherwise Specified
TOLERANCES ARE:
FRACTIONS ± 1/32 DECIMALS ±.005 ANGLES ±1/2 Deg

Munters

DRAWING TITLE: AM201 OUTDOOR

Detailed by: JAK	Date: 11/04/15	SOFTWARE: AUTOCAD	SPEC:
Ck. By: MDR	Date: 11/04/15		
Appr. By: MDR	Date:	SHEET: 1 OF 3	PART NUMBER: S71017-264 SIZE: B

2 / M5.4 DEHUMIDIFIER D-1 BASIS OF DESIGN
NO SCALE



CONTRACTOR TO COORDINATE INSTALLATION OF ALL NEW EXTERIOR DUCT SUPPORTS WITH NEW DEHUMIDIFIER D-1 ACCESS DOOR LOCATIONS

1 / M5.4 EAST ELEVATION PLAN
0 1 2 3 4 6 8 12
Graphic Scale

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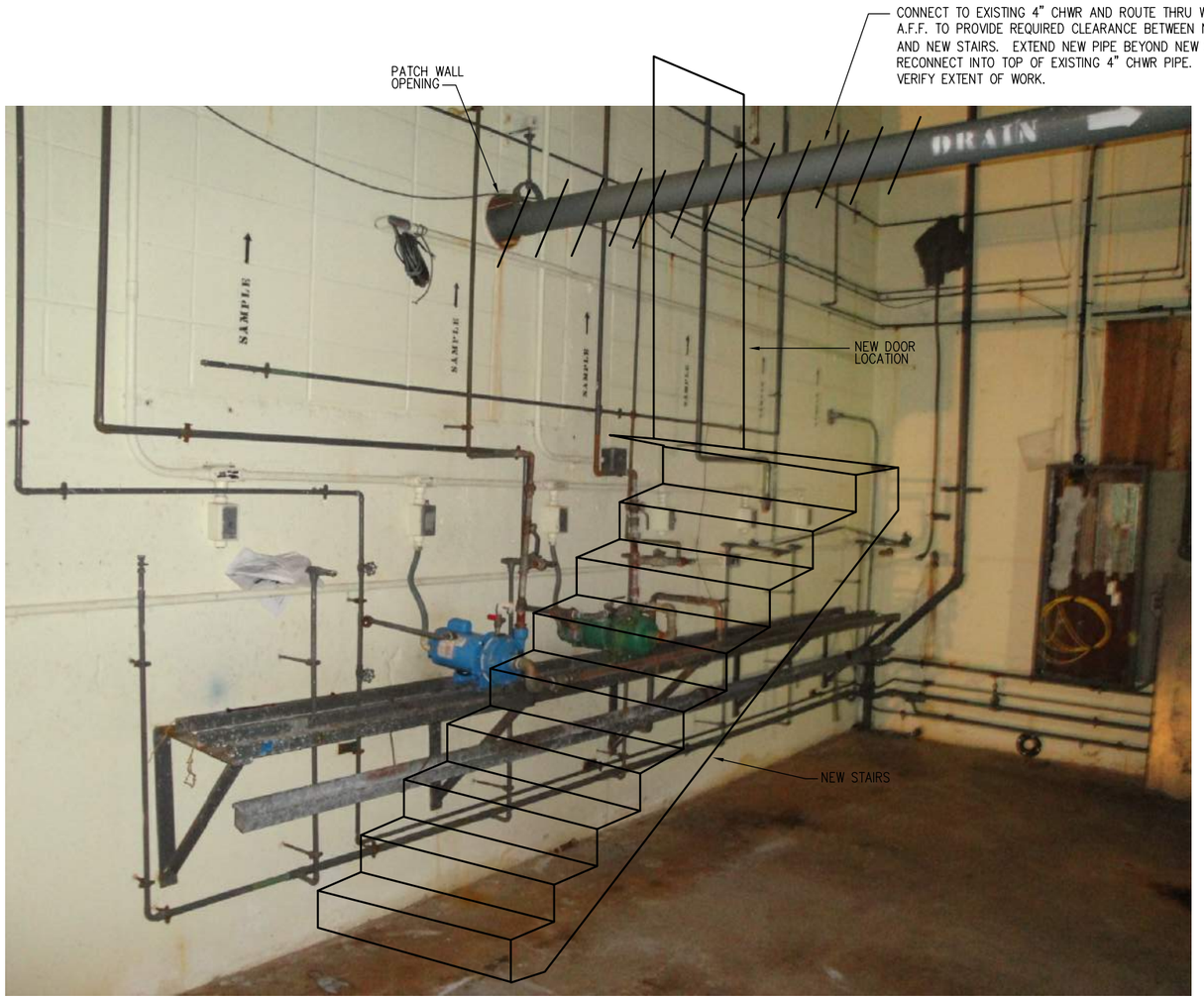
CITY OF DULUTH
LAKEWOOD, MN

EAST ELEVATION
PARTIAL PLAN

FILE NO. 00616097
SHEET M5.4



1 / M5.5 EXISTING RAPID MIX ROOM SAMPLE PUMPS AND PIPING
NO SCALE

DEMOLITION NOTES

1 – CONTRACTOR SHALL VISIT SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS PRIOR TO BIDDING.

2 – REMOVE ITEMS INDICATED AS HACHURED.

3 – CONTRACTOR IS RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED FOR REMOVAL AND INSTALLATION OF MECHANICAL ITEMS. ALL NEW PATCHING SHALL MATCH EXISTING SURFACES.

4 – WHERE EQUIPMENT AND PIPING IS REMOVED AND NO NEW WORK IS INVOLVED, CAP, PATCH AND FILL ALL HOLES TO MATCH ADJACENT SURFACES. COORDINATE WITH NEW CONSTRUCTION PLANS.

5 – WHERE EQUIPMENT IS INDICATED TO BE REMOVED, ALSO REMOVE ALL ASSOCIATED PIPING AND CONTROLS.

6 – WHERE PIPING IS INDICATED TO BE REMOVED OR REPLACED, ALSO REMOVE AND REPLACE ALL ASSOCIATED HANGERS AND SUPPORTS.

7 – COORDINATE DEMO WORK WITH OTHER TRADES.

GENERAL NOTES

1 – REMOVE AND RELOCATE EXISTING SAMPLE PUMPS, ASSOCIATED PIPING AND SUPPORTS AS REQUIRED FOR INSTALLATION OF NEW DOOR AND STAIRS.

2 – SAMPLE PUMPS AND PIPING CAN BE RELOCATED TO NORTH BEYOND LOCATION OF NEW STAIRS. VERIFY.

3 – EXTEND PIPING AS REQUIRED TO NEW LOCATION. VERIFY.

4 – PERMANENTLY REMOVE AND DISCARD ALL NON-FUNCTIONING PIPING. VERIFY WITH FIELD ENGINEER AND CITY'S REPRESENTATIVE.

5 – SEE SHEET ???? FOR ADDITIONAL INFORMATION ON NEW DOOR AND STAIRS INSTALLATION.

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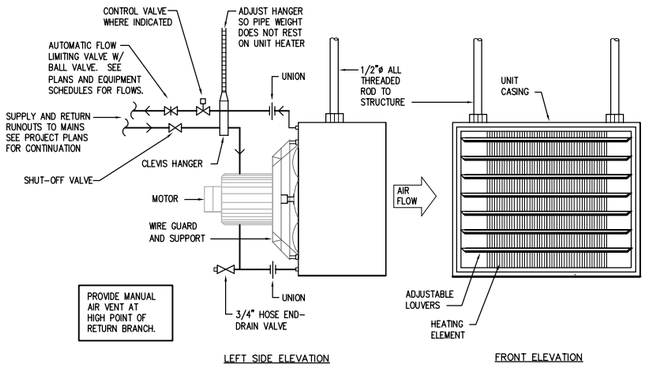
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

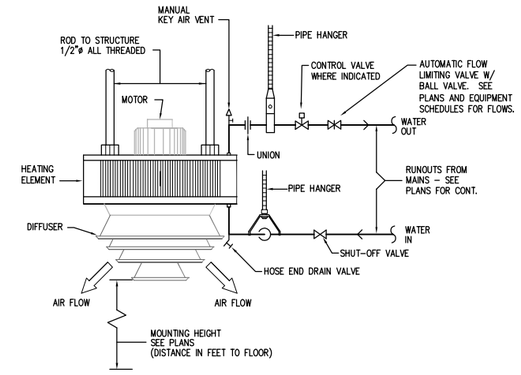
RAPID MIX ROOM
PARTIAL PLAN

FILE NO. 00616097

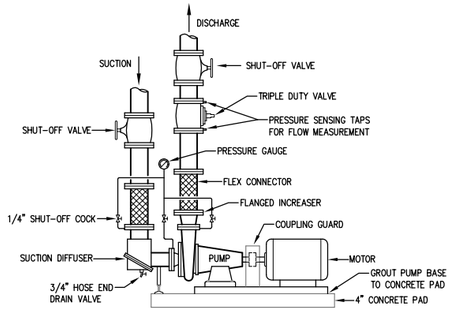
SHEET M5.5



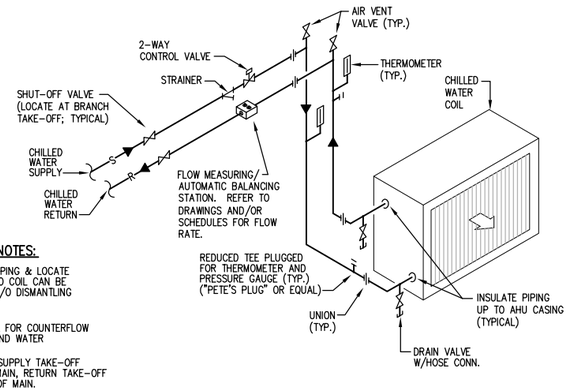
1 M6.1 HORIZONTAL H.W. UNIT HEATER CONNECTIONS
NO SCALE



2 M6.1 VERTICAL H.W. UNIT HEATER CONNECTIONS
NO SCALE



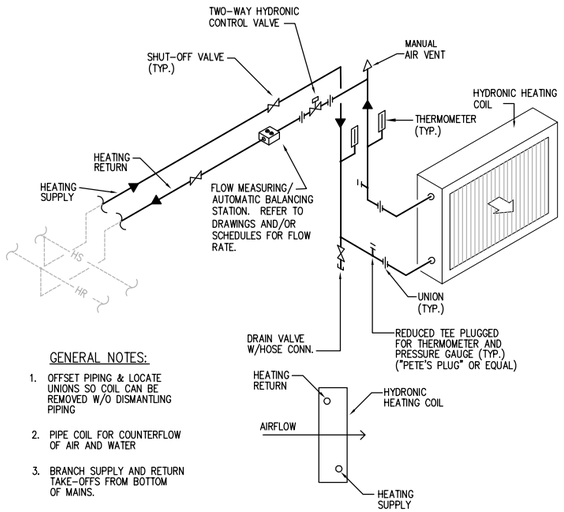
3 M6.1 BASE MOUNTED SINGLE SUCTION PUMP
NO SCALE



GENERAL NOTES:

1. OFFSET PIPING & LOCATE UNIONS SO COIL CAN BE PULLED W/O DISMANTLING PIPING
2. PIPE COIL FOR COUNTERFLOW OF AIR AND WATER
3. BRANCH SUPPLY TAKE-OFF TOP OF MAIN, RETURN TAKE-OFF BOTTOM OF MAIN.

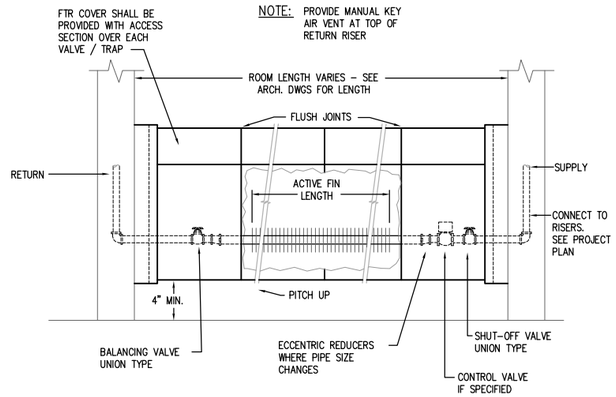
4 M6.1 CHILLED WATER COIL PIPING (AHU-1)
NO SCALE



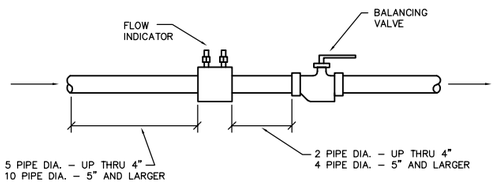
GENERAL NOTES:

1. OFFSET PIPING & LOCATE UNIONS SO COIL CAN BE REMOVED W/O DISMANTLING PIPING
2. PIPE COIL FOR COUNTERFLOW OF AIR AND WATER
3. BRANCH SUPPLY AND RETURN TAKE-OFFS FROM BOTTOM OF MAINS.

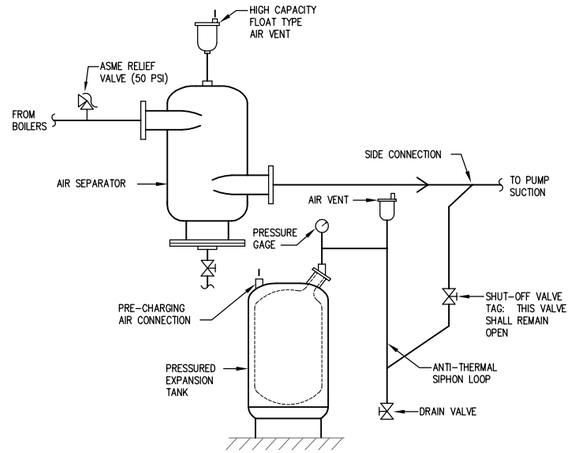
5 M6.1 HYDRONIC HEATING COIL PIPING (AHU-1 & 3)(VAV REHEAT COILS)
NO SCALE
(2-WAY CONTROL VALVE)



6 M6.1 TYPICAL ONE ROW ELEMENT FIN TUBE H.W. RADIATION
NO SCALE



7 M6.1 FLOW MEASURING STATION
NO SCALE



8 M6.1 EXPANSION TANK & AIR SEPARATOR PIPING
NO SCALE

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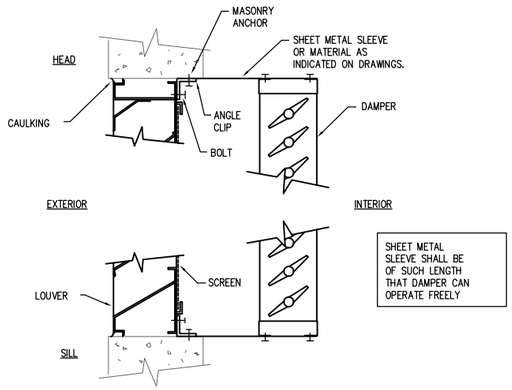
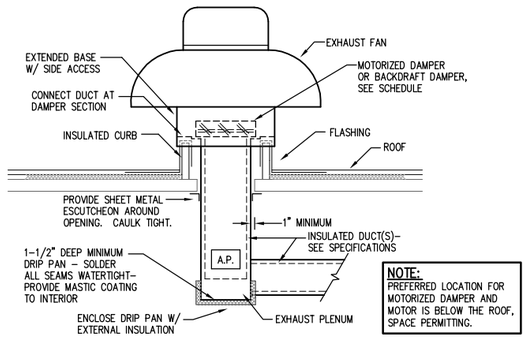
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

MECHANICAL DETAILS

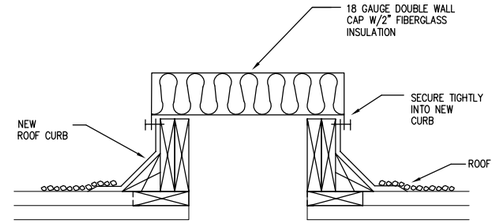
FILE NO. 00616097
SHEET M6.1



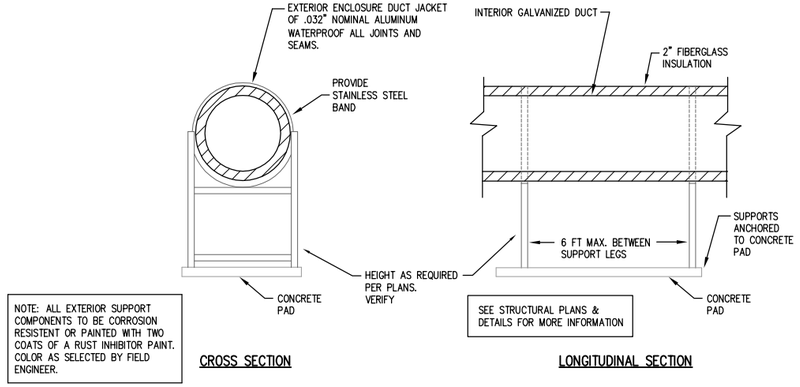
1 M6.2 **LOUVER INSTALLATION**
NO SCALE



2 M6.2 **ROOF MOUNTED EXHAUST FAN**
NO SCALE

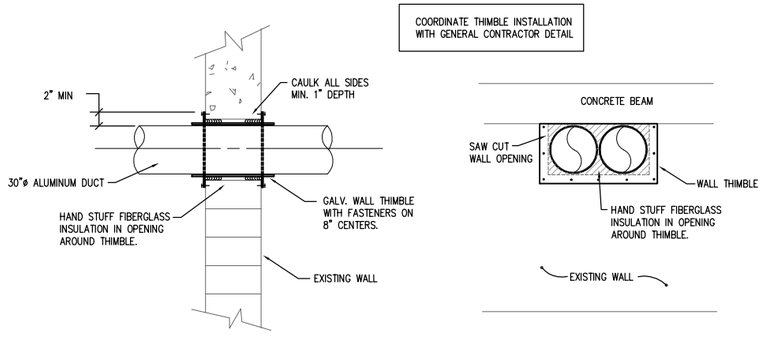


3 M6.2 **ROOF OPENING CAP**
NO SCALE



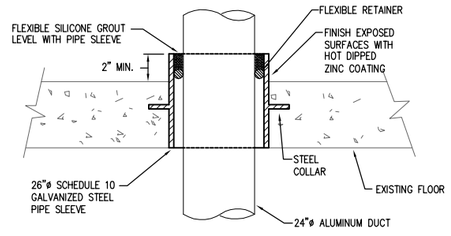
4 6.2 **EXTERIOR DUCT SECTIONS**
NO SCALE

COORDINATE THIMBLE INSTALLATION WITH GENERAL CONTRACTOR DETAIL



5 6.2 **PIPE PENETRATION WALL THIMBLE DETAIL**
NO SCALE

COORDINATE SLEEVE INSTALLATION WITH GENERAL CONTRACTOR DETAIL



6 6.2 **GALLERY DUCT FLOOR SLEEVE DETAIL**
NO SCALE

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: SRS	.	.	.	.
F.B.: A79-164	CHECKED BY: TAW	.	.	.	.
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PLOT DATE: 3/4/16, X:\projects\2014 Projects\14-032B Duluth Lakewood WTP\0DWG\M6.2.dwg

I HEREBY CERTIFY THAT THIS PLAN, REPORT, OR SPECIFICATION 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.

THOMAS A. WENTZ — MARCH 7, 2016 (Date) — 18609 (License No.)

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

MECHANICAL DETAILS

FILE NO. 00616097
SHEET M6.2

EXHAUST FANS

FAN NO.	LOCATION	SERVICE	MODEL NO. *	FAN TYPE	CAPACITY CFM	S.P. "W.G.	ROOF/WALL OPENING SQ. IN.	TIP SPEED FPM	EST. FAN RPM	SONES	DRIVE	MOTOR				ACCESSORIES	INTER-LOCK WITH	REMARKS
												TYPE	H.P.	R.P.M.	ELECTRICAL CHARACTERISTICS			
EF-1	ROOF	ERV-1 EXHAUST	GB-180-15	PRV	3300	1.25	EXISTING	5884	1215	15.8	BELT	ODP	1-1/2	1750	460/60/3	BACKDRAFT DAMPERS, CURB ADAPTOR, EXTENDED BASE W/ SIDE ACCESS	AHU-3	
EF-2	ROOF	CHLORINE STORAGE	GB-480-30	PRV	18,000	0.375	EXISTING	4498	356	15.8	BELT	ODP	3	1750	460/60/3	CURB ADAPTOR, EXTENDED BASE W/ SIDE ACCESS. HERESITE COATED	MD-4, MD-5, MD-14	
EF-3	ROOF	CHLORINE FEED	GB-220-7	PRV	4100	0.375	EXISTING	4032	642	12.1	BELT	ODP	3/4	1750	460/60/3	CURB ADAPTOR, EXTENDED BASE W/ SIDE ACCESS, HERESITE COATED	MD-6, MD-15	
EF-4	ROOF	AMMONIA STORAGE	GB-220-7	PRV	4500	0.375	EXISTING	4288	682	14.2	BELT	ODP	3/4	1750	460/60/3	CURB ADAPTOR, EXTENDED BASE W/ SIDE ACCESS, HERESITE COATED	MD-7, MD-16	
EF-5	ROOF	CHEMICAL STORAGE	GB-200-5	PRV	3250	0.375	EXISTING	4152	742	9.8	BELT	ODP	1/2	1750	115/60/1	CURB ADAPTOR, EXTENDED BASE W/ SIDE ACCESS, HERESITE COATED	MD-17	
EF-6	ROOF	SHOP	G-143-VG-5	PRV	2000	0.25	EXISTING	4555	1190	11.3	DIRECT	ECM	1/2	1190	115/60/1	CURB ADAPTOR, EXTENDED BASE W/ SIDE ACCESS	MD-3, MD-18	
EF-7	ROOF	LAB HOOD	CUE-095-VG-6	UPBLAST	700	0.50	EXISTING	4666	1639	8.9	DIRECT	ECM	1/6	1639	115/60/1	CURB ADAPTOR, EXTENDED BASE W/ SIDE ACCESS	FUME HOOD	
EF-8	ROOF	LOWER LEVEL TOILETS	G-123-VG-4	PRV	1190	0.375	EXISTING	4093	1197	9.0	DIRECT	ECM	1/4	1197	115/60/1	BACKDRAFT DAMPERS, CURB ADAPTOR, EXTENDED BASE W/ SIDE ACCESS		
EF-9	ROOF	UPPER LEVEL TOILETS	G-090-VG-6	PRV	600	0.25	EXISTING	4277	1502	7.0	DIRECT	ECM	1/6	1502	115/60/1	BACKDRAFT DAMPERS, CURB ADAPTOR, EXTENDED BASE W/ SIDE ACCESS		

* BASED ON: GREENHECK

ENERGY RECOVERY VENTILATORS

UNIT NO.	LOCATION	SERVING	TYPE	MODEL NO. *	OUTSIDE AIR TEMP., °F.			RETURN AIR TEMP., °F.			% EFFECTIVENESS			PRESSURE DROP "W.G.	NO. OF MOTORS	H.P. EACH	BLOWER DRIVE	ELECTRICAL		FILTER TYPE	REMARKS
					ENT.	LVG.	CFM	ENT.	LVG.	CFM	SENSIBLE	WINTER ENTHALPIC	SUMMER ENTHALPIC					VOLTAGE	MCA		
ERV-1	MECH ROOM	AHU-3	STATIC PLATE	CA4XIN	-30	40.8	2700	70.0	-	3300	77	76	62	1.0	-	-	-	-	-	2" 30% T.A.	

* BASED ON: RENEWAIRE

AIR HANDLING UNITS - MODULAR

UNIT NO.	LOCATION	SERVICE	MODEL NO. *	TYPE	CFM	ESP "W.G.	HEATING					COOLING COIL											MOTOR					CABINET STYLE	FILTER TYPE	CONTROL VALVE (HTG)			ACCESSORIES	UNIT SECTIONS
							TOTAL MBH	EWT °F.	LWT °F.	GPM	PRESS DROP FT.	FACE VEL.	ENT. AIR °F. D.B.	ENT. AIR °F. W.B.	LVG. AIR °F. D.B.	LVG. AIR °F. W.B.	WATER ENT. °F.	WATER LVG. °F.	WATER GPM	PRESS DROP FT.	COOLING TOTAL MBH	COOLING SENS. MBH	COOLING ROWS	HP	TYPE	RPM	ELECTRICAL	MIN. CIRC. AMPACITY			TYPE	ACTUATOR	SIZE IN.		
AHU-1	L.L. MECH ROOM	ADMIN	XT1-45x60	CONST. AIR VOL	5900	1.25	276.0	160	130	19	5.1	500	82	67	56	55	50	60	45	11.0	220.0	172.8	6	7-1/2	INV. DUTY PREM EFF	1840	460/60/3	.	HORIZ. W/ VERTICAL FAN	T.A.	MODUL.	ELECTRIC	.	PLENUM FAN	OA/RA DAMPERS-MIX BOX-FILTERS-HEATING COIL-COOLING COIL-VERTICAL. FAN
AHU-3	U.L. MECH ROOM	CHEM STG	XT1-39x42	CONST. AIR VOL	2700	1.50	300.0	160	130	20.5	8.7	-	-	-	-	-	-	-	-	-	-	-	-	2	ODP PREM. EFF.	1750	460/60/3	3.3	HORIZ. W/ TOP INLET-TOP DISCH.	T.A.	MODUL.	ELECTRIC	-		FAN-HTG. COIL-INTERNAL FACE & BYPASS-FILTER/MIX BOX

* BASED ON: JOHNSON CONTROLS

DESICCANT DEHUMIDIFIER/VENTILATION UNIT

UNIT NO.	SERVICE	MODEL NO.	SUPPLY FAN						EXHAUST FAN						VENTILATION	REGEN FAN					ENERGY RECOVERY HEAT EXCHANGER, SUMMER				ENERGY RECOVERY HEAT EXCHANGER, WINTER			
			NOM. CFM	STATIC PRESS.		MOTOR			NOM. CFM	STATIC PRESS.		MOTOR			OUTSIDE AIR CFM	NOM. CFM	STATIC PRESS.		MOTOR			SUPPLY		EXHAUST		SUPPLY		EXHAUST	
				TOTAL "W.G.	EXT. "W.G.	TYPE	H.P.	R.P.M.		TOTAL "W.G.	EXT. "W.G.	TYPE	H.P.	R.P.M.			TOTAL "W.G.	EXT. "W.G.	TYPE	H.P.	R.P.M.	E.A.T (db/gr, °F.)	L.A.T (db/gr, °F.)	E.A.T (db/gr, °F.)	L.A.T (db/gr, °F.)	E.A.T (db., °F.)	L.A.T (db., °F.)	E.A.T (db., °F.)	L.A.T (db., °F.)
D-1	UL FILTER ROOMS	AM20	8000	5.60	1.5	BAF	15	1750	8000	2.25	1.0	BAF	3	1750	4000	1300	.	-	BAF	3	3450	80/133	70/63	65/29	78/98	2	49.8	65	18
D-2	LL PIPE GALLERY	HCD-4500-DGA-SMFB	4500	.	1.0	TEFC	10	3450	-	-	-	-	-	-	700	888	.	0.75	TEFC	3	3450	-	-	-	-	-	-	-	-

* BASED ON: MUNTERS

DESICCANT WHEEL								REACTIVATION HEATER				POST HEATING SECTION							FILTERS		UNIT ELECTRICAL DATA							
PROCESS				REGEN			CAPACITY LBS./HR	GAS	INLET PRESS. PSI	INPUT MBH	GAS	INLET PRESS. PSI	INPUT MBH	OUTPUT MBH	ENT. AIR,°F.	LVG. AIR,°F.	TYPE	ASHRAE EFF. %	VOLTS/ HZ/PHASE	FLA (AMPS)	MCA (AMPS)	MAX FUSE (AMPS)	CONTROLS	EST. WEIGHT LB.	REMARKS
E.A.T (db/gr, °F.)	L.A.T (db/gr, °F.)	CFM	BY-PASS CFM	E.A.T (db/gr, °F.)	L.A.T (db/gr, °F.)	CFM																					
68/46	100/13	5000	3000	250/162	130/286	1300	180	NAT	2 PSI	400	NAT	2	400	320	57	94	2" T.A.	30%	460/60/3	29.3	33.8	.	SEE SPECS.	.	
67/45	113/5	4500	1544	80/133	134/304	888	75	NAT	CONTR. TO CONFIRM	212	-	-	-	-	-	-	2" T.A.	30%	460/60/3	19.9	-	-	SEE SPECS.	2300	

AIR FLOW MEASURING STATIONS

UNIT NO.	LOCATION	SERVICE	MODEL NO. *	NO. OF PROBES	AIR FLOW CFM	DUCT SIZE		ELECTRICAL	ACCESSORIES	REMARKS
						WIDTH INCHES	HEIGHT INCHES			
AFMS-1	BOILER ROOM	AHU-1 O.A.	IAQ-TEK	1	1860/2560	28	16	24 VAC	TRANSDUCER AND MONITOR	.

* BASED ON: ACCUTROL

VAV CONTROL UNITS

UNIT NO.	LOCATION	MODEL NO. *	SIZE	AIR VOLUME CFM		HEATING COIL							MIN. INLET STATIC PRESS. @ MAX. CFM "W.G.	NOM. INLET SIZE IN.	NO. OF OUTLETS	NOM. OUTLET H. X W. IN.	ACTUATOR TYPE	AHU SYSTEM NO.	REMARKS
				MAX.	MIN.	EWT °F	LWT °F	EAT °F	MBH	NO. ROWS	WPD /FT.	GPM							
VAV-1	L.L. MECH RM	SDR-WC	12	1330	665	160	130	55	45	2	5.0	4.0	0.40	12	1	15x16	DDC	1	
NOT USED																			NOT USED
VAV-3	L.L. MECH RM	SDR-WC	12	1470	1190	160	130	55	70	2	5.0	4.0	0.40	12	1	15x16	DDC	1	
VAV-4	L.L. MECH RM	SDR-WC	5	250	125	160	130	55	2	1	1.0	1.0	0.16	5	1	10x10	DDC	1	
VAV-5	L.L. MECH RM	SDR-WC	12	1515	750	160	130	55	34	2	0.4	1.0	0.40	12	1	15x16	DDC	1	
VAV-6	L.L. MECH RM	SDR-WC	12	1500	750	160	130	55	56	2	5.0	4.0	0.40	12	1	15x16	DDC	1	

* BASED ON: ENVIRO-TECH

MOTORIZED DAMPERS

DAMPER NO.	LOCATION	SERVING	DESIGN CFM	SIZE		BLADE TYPE	ACTUATOR TYPE	CONTROL		REMARKS
				WIDTH INCHES	HEIGHT INCHES			ACTION	POS.	
MD-1	UL MECH ROOM	O.A.	.	36	24	OPPOSED	120V	2-POS	N.C.	
MD-2	UL MECH ROOM	O.A. D-2	890	36	24	OPPOSED	120V	2-POS	N.C.	INTERLOCK W/ D-2
MD-3	N WALL	TOOL ROOM	2000	64	60	OPPOSED	120V	2-POS	N.C.	
MD-4	N WALL	CHLORINE STORAGE	9000	72	96	OPPOSED	120V	2-POS	N.C.	MULTIPLE ACTUATORS
MD-5	N WALL	CHLORINE STORAGE	9000	72	96	OPPOSED	120V	2-POS	N.C.	MULTIPLE ACTUATORS
MD-6	N WALL	CHLORINE FEED	4100	96	36	OPPOSED	120V	2-POS	N.C.	
MD-7	N WALL	AMMONIA STORAGE	4500	96	36	OPPOSED	120V	2-POS	N.C.	
MD-8	CORRIDOR/202	AHU-1 RELIEF	.	30	30	OPPOSED	24V	MOD.	N.C.	
MD-9	LL MECH ROOM	D-2 E.A.	890	12	12	OPPOSED	120V	2-POS	N.C.	INTERLOCK W/ D-2
MD-10	UL MECH ROOM	ERV-1 O.A.	3000	32	16	OPPOSED	120V	2-POS	N.C.	INTERLOCK W/ AHU-3
MD-11	ROOF	EF-2	18,000	48	48	OPPOSED	120V	2-POS	N.C.	
MD-12	ROOF	EF-3	4100	24	24	OPPOSED	120V	2-POS	N.C.	
MD-13	ROOF	EF-4	4500	24	24	OPPOSED	120V	2-POS	N.C.	
MD-14	ROOF	EF-5	3250	18	18	OPPOSED	120V	2-POS	N.C.	
MD-15	ROOF	EF-6	2000	16	16	OPPOSED	120V	2-POS	N.C.	
MD-16	ROOF	EF-7	700	10	10	OPPOSED	120V	2-POS	N.C.	

* BASED ON: RUSKIN CD50

PROJECT NO.:	00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE:	MARCH 2016	DRAWN BY: SRS	.	.	.	.
F.B.:	A79-164	CHECKED BY: TAW	.	.	.	.
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PLOT DATE: 3/4/16, X:\projects\2014 Projects\14-032B Duluth Lakewood WTP\0DWG\M7.1.dwg

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

MECHANICAL EQUIPMENT SCHEDULES

FILE NO. 00616097
SHEET M7.1

PUMPS

PUMP NO.	LOCATION	SERVICE	MODEL NO. *	TYPE	FLUID	DESIGN GPM	DESIGN HEAD FT.	SUCT. SIZE IN.	DISCH. SIZE IN.	MOTOR				REMARKS
										TYPE	H.P.	R.P.M.	ELECTRICAL CHARACTERISTICS	
P-1	BOILER ROOM	HTG SYSTEM	2 BD	BASE MTD. 1510	WATER	117	52	2-1/2	2	INV DUTY	3	1750	208/60/3	
P-2	BOILER ROOM	HTG SYSTEM	2 BD	BASE MTD. 1510	WATER	117	52	2-1/2	2	INV DUTY	3	1750	208/60/3	

* BASED ON: BELL & GOSSETT

FINNED TUBE RADIATION

TYPE	MODEL NO. *	ENCLOSURE			ELEMENTS			FINS			MATERIAL		ENT. AIR °F.	WATER		HEATING OUTPUT BTU/HR./FT.	TOP OF COVER MOUNTING HT., IN.	ACCESSORIES	REMARKS
		STYLE	HT. IN.	W. IN.	ROWS HIGH	ROWS WIDE	TUBE IN.	IN.	THICK.	PER FT.	TUBE	FINS		AVG. TEMP. °F.	TEMP. DROP °F.				
'A'	JVA-S-C3/4-35	SLOPED TOP	14	4-3/8	1	1	3/4	3-1/4 SQ.	0.02	50	CU	AL	60	145	30	612	18		

* BASED ON: STERLING

HOT WATER UNIT HEATERS

UNIT NO.	LOCATION	MODEL NO. *	UNIT TYPE	FAN TYPE	CFM	AIR ENT. °F.	WATER			HEATING CAPACITY MBH	MOTOR			CONTROLS	REMARKS
							ENT. °F.	LVG. °F.	GPM		H.P.	RPM	ELECTRICAL CHARACTERISTICS		
UH-1	CHLORINE STORAGE	HS-72	HORIZ	PROPELLER	1100	60	160	130	3.1	33.5	1/20	1000	115/60/1	REMOTE T-STAT	HERESITE COATED
UH-2	CHLORINE STORAGE	HS-72	HORIZ	PROPELLER	1100	60	160	130	3.1	33.5	1/20	1000	115/60/1	REMOTE T-STAT	HERESITE COATED
UH-3	CHLORINE STORAGE	HS-72	HORIZ	PROPELLER	1100	60	160	130	3.1	33.5	1/20	1000	115/60/1	REMOTE T-STAT	HERESITE COATED
UH-4	GARAGE	HS-72	HORIZ	PROPELLER	1100	60	160	130	3.1	33.5	1/20	1000	115/60/1	REMOTE T-STAT	
UH-5	GARAGE	VS-104	VERT	PROPELLER	1528	60	160	130	4.1	43.7	1/8	1070	115/60/1	REMOTE T-STAT	
UH-6	TOOL ROOM	HS-48	HORIZ	PROPELLER	750	60	160	130	2.1	22.3	1/20	1000	115/60/1	REMOTE T-STAT	
UH-7	TOOL ROOM	HS-48	HORIZ	PROPELLER	750	60	160	130	2.1	22.3	1/20	1000	115/60/1	REMOTE T-STAT	
UH-8	TOOL ROOM	HS-48	HORIZ	PROPELLER	750	60	160	130	2.1	22.3	1/20	1000	115/60/1	REMOTE T-STAT	
UH-9	PIPE GALLERY	HS-36	HORIZ	PROPELLER	550	60	160	130	1.6	16.7	25W	1550	115/60/1	REMOTE T-STAT	
UH-10	PIPE GALLERY	HS-36	HORIZ	PROPELLER	550	60	160	130	1.6	16.7	25W	1550	115/60/1	REMOTE T-STAT	
UH-11	E. ENTRY	VS-62	VERT	PROPELLER	989	60	160	130	2.4	25.3	1/20	1550	115/60/1	REMOTE T-STAT	
UH-12	CHEMICAL STORAGE	VS-62	VERT	PROPELLER	989	60	160	130	2.4	25.3	1/20	1550	115/60/1	REMOTE T-STAT	HERESITE COATED
UH-13	CHLORINE FEED	VS-62	VERT	PROPELLER	989	60	160	130	2.4	25.3	1/20	1550	115/60/1	REMOTE T-STAT	HERESITE COATED
UH-14	AMMONIA ROOM	VS-77	VERT	PROPELLER	1200	60	160	130	2.9	31.0	1/20	1550	115/60/1	REMOTE T-STAT	HERESITE COATED
UH-15	RAPID MIX ROOM	HS-36	HORIZ	PROPELLER	550	60	160	130	1.6	16.7	25W	1550	115/60/1	REMOTE T-STAT	
UH-16	RAPID MIX ROOM	HS-36	HORIZ	PROPELLER	550	60	160	130	1.6	16.7	25W	1550	115/60/1	REMOTE T-STAT	
UH-17	2ND FL MECH ROOM	HS-24	HORIZ	PROPELLER	450	60	160	130	1.1	11.1	16W	1550	115/60/1	REMOTE T-STAT	
UH-18	N. FILTER GALLERY	HS-60	HORIZ	PROPELLER	900	60	160	130	2.6	27.9	1/20	1550	115/60/1	REMOTE T-STAT	
UH-19	N. FILTER GALLERY	HS-60	HORIZ	PROPELLER	900	60	160	130	2.6	27.9	1/20	1550	115/60/1	REMOTE T-STAT	
UH-20	N. FILTER GALLERY	HS-60	HORIZ	PROPELLER	900	60	160	130	2.6	27.9	1/20	1550	115/60/1	REMOTE T-STAT	
UH-21	N. FILTER GALLERY	HS-60	HORIZ	PROPELLER	900	60	160	130	2.6	27.9	1/20	1550	115/60/1	REMOTE T-STAT	
UH-22	S. FILTER GALLERY	HS-60	HORIZ	PROPELLER	900	60	160	130	2.6	27.9	1/20	1550	115/60/1	REMOTE T-STAT	
UH-23	S. FILTER GALLERY	HS-60	HORIZ	PROPELLER	900	60	160	130	2.6	27.9	1/20	1550	115/60/1	REMOTE T-STAT	
UH-24	S. FILTER GALLERY	HS-60	HORIZ	PROPELLER	900	60	160	130	2.6	27.9	1/20	1550	115/60/1	REMOTE T-STAT	
UH-25	S. FILTER GALLERY	HS-60	HORIZ	PROPELLER	900	60	160	130	2.6	27.9	1/20	1550	115/60/1	REMOTE T-STAT	
UH-26	CHEMICAL STORAGE	HS-36	HORIZ	PROPELLER	550	60	160	130	1.6	16.7	25W	1550	115/60/1	REMOTE T-STAT	HERESITE COATED

* BASED ON: STERLING

AIR SEPARATORS

UNIT NO.	LOCATION	SERVICE	MODEL NO. *	CAPACITY GPM	HEIGHT IN.	DIA. IN.	PIPE CONNECTION SIZE IN.	DRAIN SIZE IN.	AIR OUTLET SIZE IN.	REMARKS
AS-1	BOILER ROOM	HTG SYSTEM	CRS-4F	245	29	8	4	4	1/2	W/ STRAINER AND MANUAL BLOWDOWN VALVE

* BASED ON: BELL & GOSSETT

EXPANSION TANKS

TANK NO.	LOCATION	SERVICE	MODEL NO. *	TYPE	CAPACITY GALLONS	ACCEPTANCE VOLUME GALLONS	SIZE		WORKING PRESSURE PSIG	STAMP	TAPPINGS		ACCESSORIES	REMARKS
							DIA. IN.	HEIGHT OR LENGTH IN.			SYSTEM IN.	CHARGING IN.		
ET-1	BOILER ROOM	HTG SYSTEM	B-400	VERT	106	106	24	64	125	ASME	1	0.302	HIGH CAPACITY AIR VENT	

* BASED ON: BELL & GOSSETT

PROJECT NO.:	00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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F.B.:	A79-164	CHECKED BY: TAW	.	.	.	.
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PLOT DATE: 3/4/16, X:\projects\2014 Projects\14-032B Duluth Lakewood WTP\0DWG\M7.2.dwg

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THOMAS A. WENTZ | MARCH 7, 2016 (Date) | 18609 (License No.)

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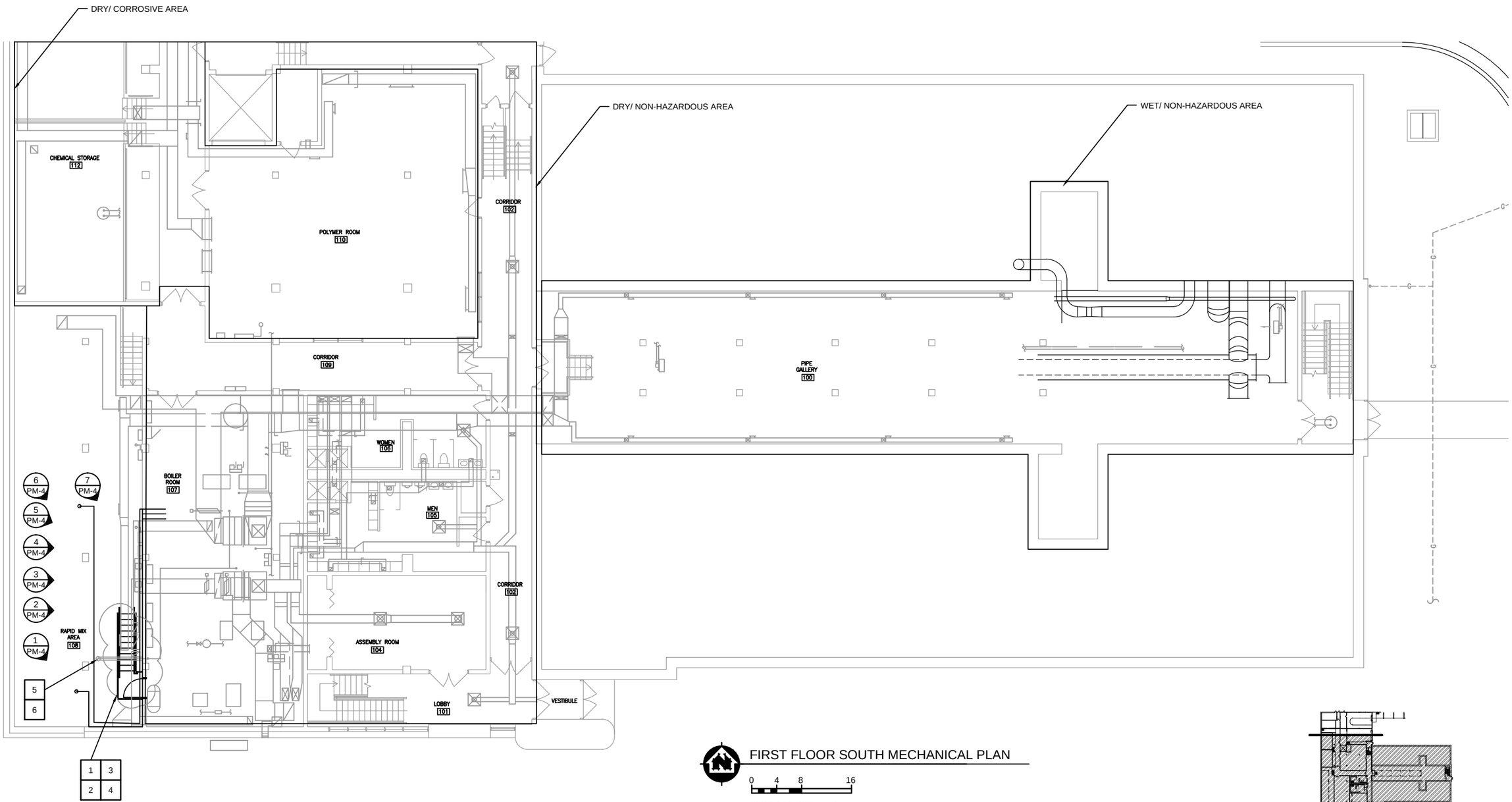
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

MECHANICAL EQUIPMENT SCHEDULES

FILE NO. 00616097
SHEET M7.2

KEY NOTES: XXX

1. RELOCATE EXISTING SAMPLE PUMP(S): SP-1, SP2
2. RELOCATED AND RECONFIGURE SAMPLE PIPING TO ACCOMMODATE THE NEW DOOR AND ACCESS STAIRS
3. RELOCATE SP-1. CONNECT (TYP). RELOCATE ELECTRICAL CONNECTIONS
4. RELOCATE SP-2. CONNECT (TYP). RELOCATE ELECTRICAL CONNECTIONS
5. RELOCATE EXISTING 8" DIP DRAIN LINE VERTICALLY TO ACCOMMODATE NEW BOILER ROOM ACCESS (2) NEW FLANGED ADAPTOR, (3) 90° FLxFL BENDS. NEW 8" DIP, NEW CORROSION RESISTANT HANGERS AND SUPPORTS. PIPING SHALL BE PAINTED AND LABELED.
6. OFFSET AND SUPPORT EXISTING 8" DIP DRAIN LINE. RECONENCT TO EXISTING PIPE. (COMPLETE)



FIRST FLOOR SOUTH MECHANICAL PLAN

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)

KEY PLAN - FIRST FLOOR

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. : .	CHECKED BY: SRC	.	.	.	.
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PLOT DATE: 3/7/16 , P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 MECH FLOOR PLAN.dwg

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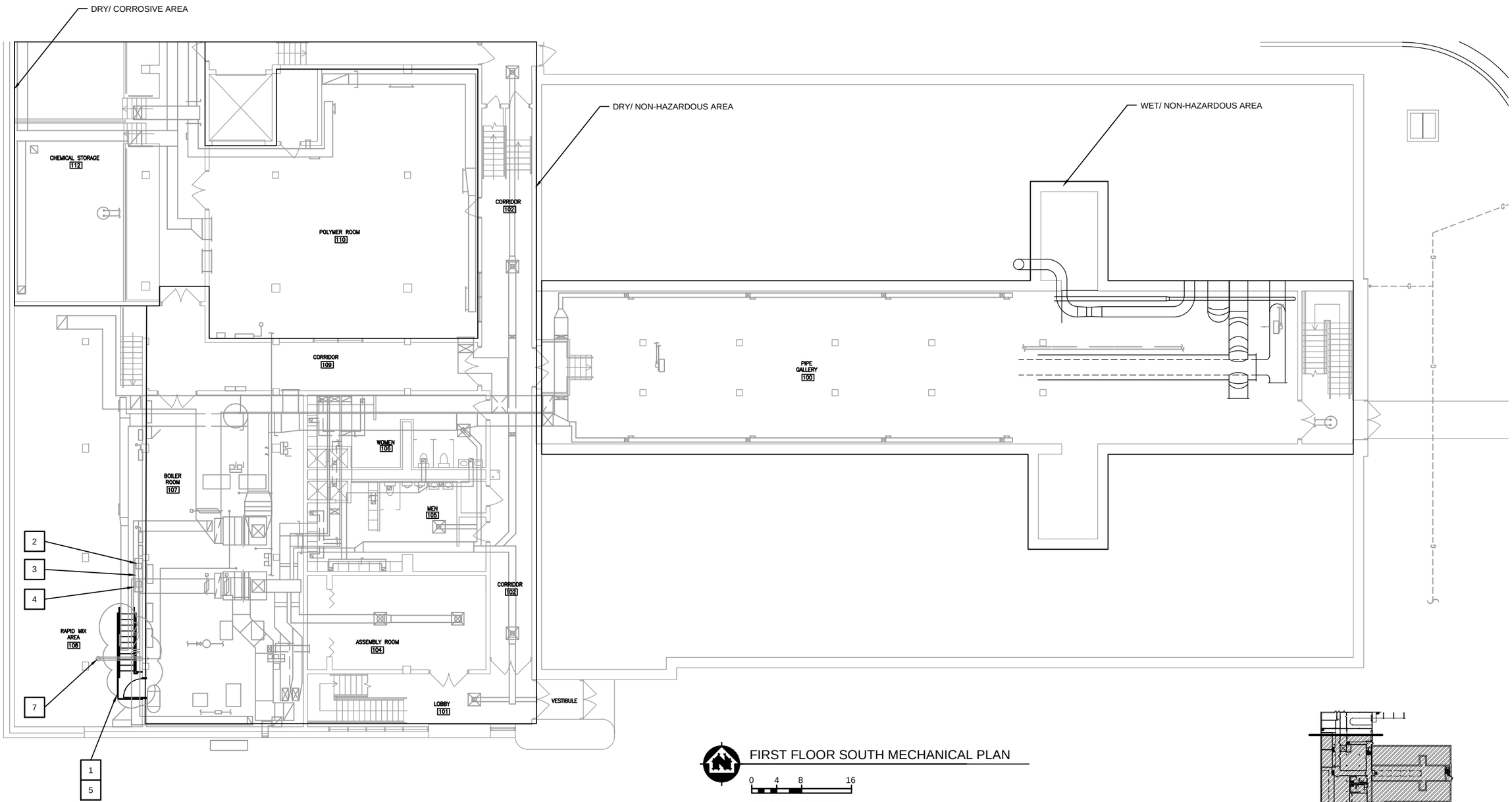
LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

MECHANICAL FLOOR PLAN REMOVAL

FILE NO. 00616097
SHEET PM-1

KEY NOTES: XXX

1. RELOCATE EXISTING SAMPLE PUMP(S): SP-1, SP2
2. NEW FABRICATED GALVANIZED STEEL PUMP SHELF W/ DRIP PAN
3. RELOCATE SP-1. CONNECT (TYP). RELOCATE ELECTRICAL CONNECTIONS
4. RELOCATE SP-2. CONNECT (TYP). RELOCATE ELECTRICAL CONNECTIONS
5. RELOCATED AND RECONFIGURE SAMPLE PIPING TO ACCOMMODATE THE NEW DOOR AND ACCESS STAIRS
6. RELOCATE EXISTING 8" DIP DRAIN LINE VERTICALLY TO ACCOMMODATE NEW BOILER ROOM ACCESS (2) NEW FLANGED ADAPTOR, (3) 90° FLxFL BENDS. NEW 8" DIP, NEW CORROSION RESISTANT HANGERS AND SUPPORTS. PIPING SHALL BE PAINTED AND LABELED.
7. OFFSET AND SUPPORT EXISTING 8" DIP DRAIN LINE. RECONENCT TO EXISTING PIPE. (COMPLETE)



FIRST FLOOR SOUTH MECHANICAL PLAN

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)

KEY PLAN - FIRST FLOOR

PROJECT NO.:	00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE:	MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. :	.	CHECKED BY: SRC	.	.	.	.
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PLOT DATE: 3/7/16 , P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 MECH FLOOR PLAN DEMO.dwg

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

MECHANICAL FLOOR PLAN

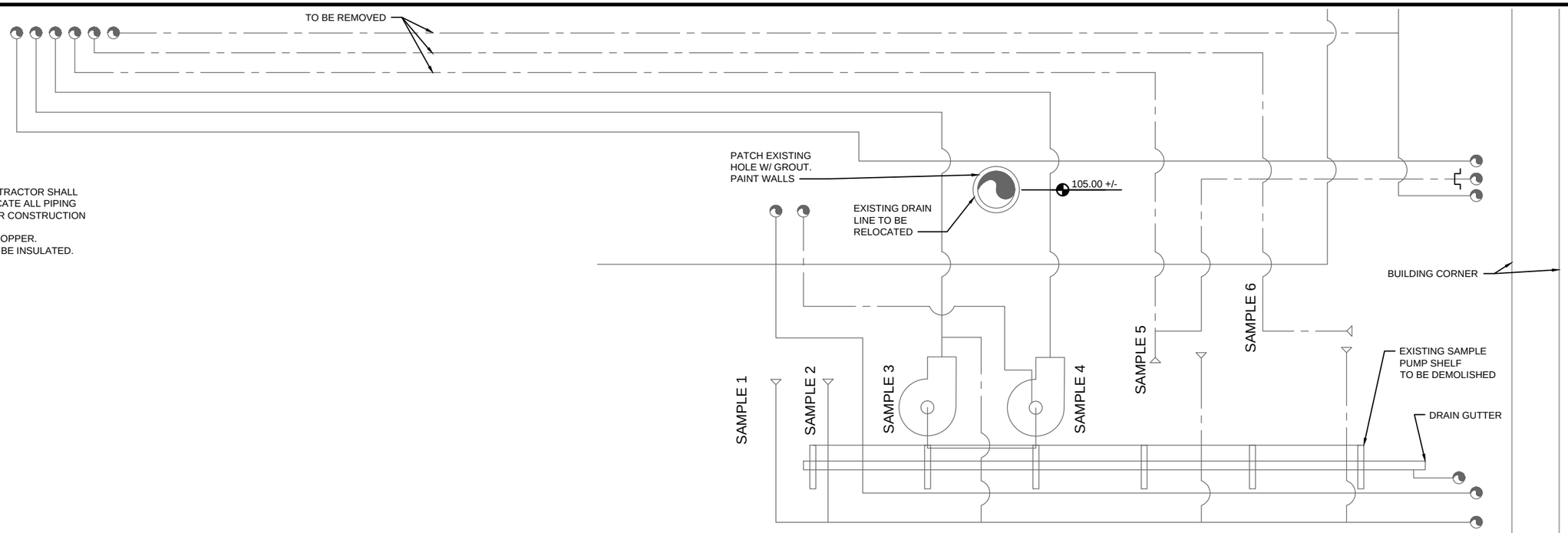
FILE NO. 00616097
SHEET PM-2

GENERAL NOTES:

1. DIAGRAM ARE IN INTENT. THE CONTRACTOR SHALL VERIFY ACTUAL PIPING AND RELOCATE ALL PIPING AND EQUIPMENT AS REQUIRED FOR CONSTRUCTION OF NEW DOOR AND STAIRS.
2. NEW SAMPLING PIPING SHALL BE COPPER.
3. NEW SAMPLING PIPING SHALL NOT BE INSULATED.

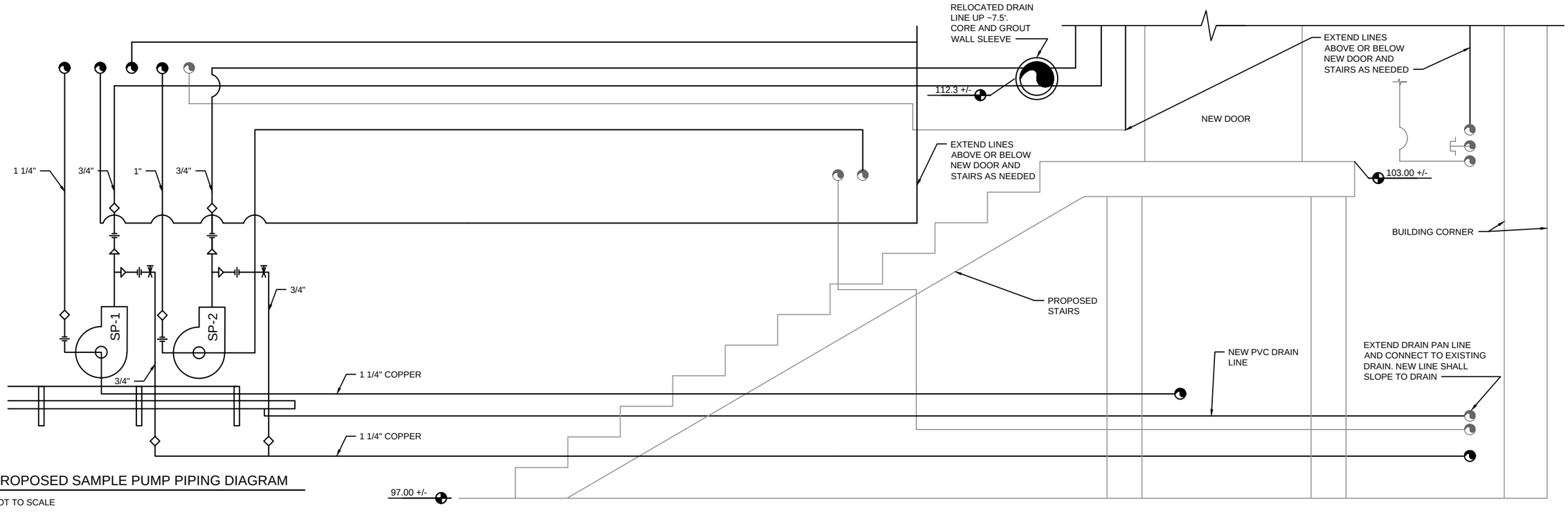
SYMBOLS

- PLUG
- CHECK VALVE
- UNION
- NEEDLE VALVE
- BALL VALVE



EXISTING SAMPLE PUMP PIPING DIAGRAM-REMOVAL

NOT TO SCALE



PROPOSED SAMPLE PUMP PIPING DIAGRAM

NOT TO SCALE

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PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 SAMPLE PUMP PIPING DIAGRAM.dwg

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

SAMPLE PUMP PIPING DIAGRAM

FILE NO. 00616097

SHEET PM-3

1 SAMPLE PUMP PIPING

2 SAMPLE PUMP PIPING

3 SAMPLE PUMP PIPING

4 SAMPLE PUMP PIPING

5 SAMPLE PUMP PIPING

OFFSET 4" DIP DRAIN TO ACCOMMODATE NEW BOILER ROOM ACCESS

6 SAMPLE PUMP PIPING

RECONFIGURE SAMPLE PIPING AND SAMPLE PUMPS AS REQ'D

7 SAMPLE PUMP PIPING

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

SAMPLE PUMP PIPING PHOTOS

FILE NO. 00616097
SHEET PM-4

ABBREVIATIONS (NOT ALL NECESSARILY USED HEREIN)

@	AT
AE	ARCHITECT / ENGINEER
A	AMPERES (AMPS)
AC	ABOVE COUNTER APPROX 44" AFF
ACCU	AIR-COOLED CONDENSING UNIT
AD	AIR DEVICE
ADA	AMERICAN W/ DISABILITIES ACT
ADJ	USER-ADJUSTABLE
AFF	ABOVE FINISH FLOOR
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APPROX	APPROXIMATELY
ARCH	ARCHITECT / ARCHITECTURAL
ARI	AMERICAN REFRIGERATION INSTITUTE
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
BF	BACKFLOW PREVENTER
BLDG	BUILDING
BOB	BOTTOM OF BEAM
BOC	BOTTOM OF CONDUIT
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BSMT	BASEMENT
BTU	BRITISH THERMAL UNIT
C	CONDUIT
COND	CONDUIT, CONDENSATE
CAP	CAPACITY
CB	CIRCUIT BREAKER
CFM	CUBIC FEET PER MINUTE
CHS, R	CHILLED WATER SUPPLY, RETURN
CKT	CIRCUIT
CLG	CEILING
CO	CLEAN OUT
CONT	CONTINUATION
CU	COPPER
CR	CONDENSER RETURN
CS	CONDENSER SUPPLY
D	CONDENSATE DRAIN
DC	DIRECT CURRENT
DCW	DOMESTIC COLD WATER
DEMO	DEMOLITION
DHW	DOMESTIC HOT WATER
DIA	DIAMETER
DWH	DOMESTIC WATER HEATER
ELEC	ELECTRICAL, ELECTRICIAN
EF	EXHAUST FAN
ESP	EXTERNAL STATIC PRESSURE
EM	LIGHTING FIXTURE W/INTEGRAL EMERGENCY BATTERY OPERATION
ETC	ETCETERA
EWH	ELECTRIC WALL HEATER
EXH	EXHAUST
FACP	FIRE ALARM CONTROL PANEL
FAS	FIRE ALARM SYSTEM
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FD	FIRE DAMPER
FLA	FULL LOAD AMPS
FLEX	FLEXIBLE
FLUOR	FLUORESCENT
FP	FIRE PROTECTION
FPM	FEET PER MINUTE
FPT	FEMALE PIPE THREAD
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GFI	GROUND FAULT CIRCUIT INTERRUPTED
GSHP	GROUND SOURCE HEAT PUMP
GWB	GYPSUM WALL BOARD ("SHEET ROCK")
HACR	HEATING, AIR-CONDITIONING, REFRIGERATION
HB	HOSE BIB
HID	HIGH INTENSITY DISCHARGE
HOA	HAND/OFF/AUTO
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HTW	HIGH TEMP WATER
HWR	HOT WATER RECIRCULATION (DOMESTIC)
HWS	HEATING HOT WATER SUPPLY
IAC	ILLINOIS ACCESSIBILITY CODE
IG	ISOLATED GROUND
INT'L	INTERLOCK/INTERLOCKED
JBOX	JUNCTION BOX
KTR	CONTRACTOR
KVA	KILO VOLT AMPERES
L	LAVATORY
LED	LIGHT EMITTING DIODE
LF	LINEAR FEET
LCR	LOW PRESSURE CONDENSATE RETURN
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MECH	MECHANICAL
MFR	MANUFACTURER
MH	METAL HALIDE
MIN	MINIMUM
MOCP	MAXIMUM OVERCURRENT PROTECTION
MOD	MOTOR OPERATED DAMPER
MS	MOP SINK
NAIMA	NORTH AMERICAN INSULATION MFR'S ASSOCIATION
NC	NORMALLY CLOSED
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT FIXTURE
NO	NORMALLY OPEN
NPT	NATIONAL PIPE THREAD
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OC	ON CENTER
PC	PHOTO CELL
PLBG	PLUMBING
PR	PUMPED CONDENSATE RETURN
PREP	PREPARATION
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH, GAUGE
PVC	POLYVINYL CHLORIDE
QTY	QUANTITY
RA	RETURN AIR
REC	RECEPTACLE, RECOMMENDATION
REFR	REFRIGERATION/REFRIGERANT
RHG	REFRIGERANT HOT GAS LINE
RL	REFRIGERANT LIQUID LINE
RLA	RUNNING LOAD AMPS
RS	REFRIGERANT SUCTION LINE
S	SINK
SF	SQUARE FEET
SA	SUPPLY AIR
SAN	SANITARY
SAT	SUSPENDED ACOUSTIC TILE
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SO	SCREENED OPENING
SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
SPEC	PROJECT SPECIFICATIONS
SS	SERVICE SINK
STM	STORM
STRUCT	STRUCTURAL
T&P	TEMPERATURE & PRESSURE
TAB	TEST & BALANCE
TRANS	TRANSITION
TXV	THERMAL EXPANSION VALVE
TYP	TYPICAL
UC	UNDER COUNTER
UL	UNDERWRITERS LABORATORIES
UON	UNLESS OTHERWISE NOTED
V	VENT, VOLTS
VAC	VOLTS ALTERNATING CURRENT
VERT	VERTICAL
VD	VOLUME DAMPER (MANUAL, LOCKING TYPE)
VR	VACUUM (CONDENSATE) RETURN
VTR	VENT THRU ROOF
W	WATTS
W/	WITH
W/O	WITHOUT
WC	WATER COLUMN
WCO	WALL CLEAN OUT
WH	WALL HYDRANT
WP	WEATHERPROOF
YCO	YARD CLEAN OUT

SYMBOLS (NOT ALL NECESSARILY USED HEREIN)

AHU-1 — EQUIPMENT MARKER
EQUIPMENT TAG

SECTION CUT MARKER
SHEET WHERE SECTION IS SHOWN
SHEET WHERE SECTION IS CUT

"P-1" 33 B-08
EQUIPMENT SERVED
CIRCUIT NUMBER
ELEC PANEL TAG

POINT OF CONNECTION:
NEW WORK TO EXISTING

EQUIPMENT TO BE DEMOLISHED
SHOWN W/THIN DOTTED LINES
AND/OR HATCH

EXISTING TO REMAIN
SHOWN W/THIN SOLID LINES

NEW WORK INSTALLED UNDER
THIS CONTRACT SHOWN
W/THICK SOLID LINES

T — THERMOSTAT

F — COMBINATION MAGNETIC MOTOR STARTER AND SAFETY SWITCH. PROVIDE WHERE SHOWN, SUFFICIENT FOR VOLTAGE AND MOCP SHOWN HEREIN. PROVIDE W/ HACR TYPE FUSES SIZED TO MOCP SHOWN HEREIN.
F- DENOTES FUSED SWITCH

F — SAFETY SWITCH. PROVIDE WHERE SHOWN, SUFFICIENT FOR VOLTAGE AND MOCP SHOWN HEREIN. PROVIDE AS NONFUSED SWITCH, UON. IF PROVIDING A FUSED SWITCH PROVIDE W/ HACR TYPE FUSES SIZED TO MOCP SHOWN HEREIN.
F- DENOTES FUSED SWITCH

TRANSFORMER FOR LOW VOLTAGE LIGHTING

F — FIRE ALARM MANUAL PULL STATION

F — FIRE ALARM AUDIO-VISUAL ALARM - 89DBA UON. 15 CD REFERS TO CANDELA RATING.

F — FIRE ALARM VISUAL ONLY ALARM - 15 CD REFERS TO CANDELA RATING.

S — FIRE ALARM IONIZATION TYPE SMOKE DETECTOR

S — COMBINATION SMOKE/CARBON MONOXIDE DETECTOR

T — FIRE ALARM HEAT DETECTOR

ELECTRIC PANEL

WALL MOUNTED FIXTURE - AS SCHEDULED

WALL MOUNTED SCONCE FIXTURE - AS SCHEDULED

"CAN"-TYPE DOWNLIGHT MOUNTED IN CEILING - AS SCHEDULED

F3 / 25 / a — FLUORESCENT LIGHTING FIXTURE - AS SCHEDULED.
"F3" FIXTURE TAG
"25" CIRCUIT NUMBER
"a" SWITCH

EMERGENCY LIGHT-AS SCHEDULED

WALL / CEILING MOUNTED EXIT SIGN FIXTURE SHADED AREA INDICATES FACE LOCATION. ARROW DENOTES DIRECTION OF EXIT. PUNCHOUT ARROW IN FIELD.

MOTOR CONNECTION (MOTOR BY OTHERS)

JUNCTION BOX - WALL, CEILING, OR FLOOR MOUNTED AS REQUIRED

G — EXPOSED CONDUIT WITH WIRING - LINE, NEUTRAL, SWITCH LEG AND GROUND INDICATED

CONDUIT TURN DOWN
GROUND
SWITCH LEG
NEUTRAL
LINE
CONDUIT TURN UP
} #12 AWG UON

TC — CONCEALED TELECOMM CONDUIT
T = TELEPHONE ONLY
TC = COMBINATION TELEPHONE/COMPUTER

C — CONCEALED COMPUTER/DATA SYSTEM CONDUIT

CONCEALED CONDUIT IN WALL OR CEILING CONSTRUCTION

CONDUIT UNDER FLOOR OR GRADE

FLEXIBLE CONDUIT CONNECTION

CENTER OF ALL SWITCHES IN NON-ADA AREAS = 54" AFF, UON.
CENTER OF ALL SWITCHES IN ADA AREAS = 48" AFF, UON.

SINGLE POLE SWITCH
3 — THREE WAY SWITCH
4 — FOUR WAY SWITCH
AS — AUTOMATIC WALL SWITCH W/ MANUAL OVERRIDE
OC — CEILING MOUNTED OCCUPANCY SENSOR.
PC — CEILING MOUNTED PHOTOCELL SENSOR.
T — MANUAL MOTOR STARTER (TT SWITCH)

CENTER OF REC = 18" AFF, UON. MINIMUM HEIGHT OF ALL REC'S SHALL BE 15" AFF IN ALL ADA DESIGNATED AREAS, UON.

12O VOLT DUPLEX RECEPTACLE
A — 12O VOLT RECEPTACLE PROTECTED BY ARC-FAULT CIRCUIT BREAKER IN PANEL
12O VOLT DOUBLE DUPLEX (QUADPLEX) RECEPTACLE
12O VOLT DUPLEX RECEPTACLE, MOUNTED FLUSH WITH FLOOR LEVEL.
GFI — 12O VOLT GFI TYPE DUPLEX RECEPTACLE
GFI — 12O VOLT GFI TYPE DUPLEX RECEPTACLE, MOUNTED FLUSH WITH FLOOR LEVEL.
WP GFI — 12O VOLT GFI TYPE DUPLEX RECEPTACLE WITH WEATHERPROOF COVER PLATE
IG — 12O VOLT, ISOLATED GROUND TYPE DUPLEX RECEPTACLE
SPECIAL USE RECEPTACLE, TYPE AS NOTED ON DRAWINGS

PROVIDE JBOX FOR TELECOMM OUTLETS SIZED AS NOTED & COVERED BY BLANKOFF. ROUTE 1" CONDUIT W/PULLSTRINGS FROM JBOX INSIDE WALL AND ABOVE CEILING, TO TERMINATE WITHIN 6LF OF THE ABOVE CEILING CABLE TRAY. PROVIDE BUSHING ON END OF CONDUIT.

TELEPHONE OUTLET, MOUNT AS NOTED
DATA OUTLET, MOUNT AS NOTED
COMBINATION DATA/TELEPHONE OUTLET, MOUNT AS NOTED.
TELEVISION OUTLET, MOUNT AS NOTED

GENERAL NOTES

1. THIS DRAWING IS A STANDARD LEGEND. SYMBOLS SHOWN MAY NOT ALL APPEAR ON DRAWINGS FOR THIS PROJECT.
2. ALL CONTACTS ARE SHOWN IN THE DE-ENERGIZED (SHELF) POSITION. BI-STABLE RELAYS ARE SHOWN IN THE RESET POSITION.
3. ONE-LINE DIAGRAMS FOR POWER SWITCHGEAR, USE ANSI STANDARD SYMBOLS AND ABBREVIATIONS.
4. SEE INSTRUMENTATION DRAWINGS FOR INSTRUMENTATION SYMBOLS AND DETAILS.
5. OTHER ABBREVIATIONS PER ANSI Z32.13 AND ISA S5.1
6. ELEVATIONS ADJACENT TO SYMBOLS ARE BASED ON STATION DATUM. HEIGHTS ADJACENT TO SYMBOLS (+4.0) ARE REFERENCED TO FINISHED FLOOR GRADE.
7. THE LETTERS "GFI" ADJACENT TO A RECEPTACLE INDICATES A GROUND FAULT INTERRUPTER FEED-THROUGH RECEPTACLE ASSEMBLY. THE LETTERS ADJACENT TO A PANELBOARD CIRCUIT BREAKER INDICATES A GROUND FAULT CIRCUIT BREAKER. THE LETTERS "IG" INDICATE AN ISOLATED GROUND RECEPTACLE, PROVIDE SEPARATE GROUND WIRE.
8. SEE SPECIFICATIONS AND SCHEDULES FOR COMPONENT REQUIREMENTS FOR MOTOR CONTROLLERS AND FOR CONTACTORS.
9. DO NOT SCALE DRAWINGS, IF DIMENSIONS ARE IN QUESTION, THE ONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING CLARIFICATION FROM ENGINEER PRIOR TO PROCEEDING WITH WORK.
10. EFFORT WAS MADE IN THE PREPARATION OF THE CONTRACT DOCUMENTATION TO COORDINATE CONNECTIONS WITH ALL DISCIPLINES. HOWEVER THE EC IS RESPONSIBLE TO REVIEW ENTIRE PLANS AND THE SPECIFICATIONS AND INCLUDE ALL WORK REQUIRED TO PROVIDE A COMPLETE PROJECT.
11. SIZE HOMERUN WIRING PER ONE-LINE DIAGRAM AND NEC GUIDELINES.
12. REFER TO INSTRUMENTATION DEVICE SCHEDULE ON SCHEDULE SHEET FOR CONNECTION REQUIREMENTS OF INSTRUMENTATION AND CONTROL DEVICES, EQUIPMENT, ETC.
13. OBSERVE APPLICABLE CODE REQUIREMENTS FOR ELECTRICAL INSTALLATIONS WITHIN HAZARDOUS AREAS NOTED ON PLAN.
14. MINIMUM CONDUIT SIZE 3/4", UNLESS OTHERWISE NOTED.
15. ALL BRANCH CIRCUIT HOMERUNS TO BE (2)#12 & #12G IN 3/4"C MINIMUM UNLESS OTHERWISE NOTED OR REQUIRED. MOTOR WIRING AS INDICATED ON ONE-LINE DIAGRAM.
16. ALL DEVICE/SIGNAL CIRCUIT HOMERUNS TO BE (2)#14 & IN 3/4"C MINIMUM.
17. PROVIDE ALL MOTOR AND SIGNAL CIRCUIT HOMERUNS RELATED TO PROCESS EQUIPMENT.
18. COORDINATE EXACT LOCATION OF ALL EQUIPMENT AND FIXTURES WITH GC, OWNER, AND ENGINEER PRIOR TO ROUGH-IN.
19. EC SHALL MODIFY WIRE AND CIRCUIT SIZES BASED ON ACTUAL EQUIPMENT SUPPLIED.
20. CONTRACTOR SHALL REVIEW TYPICAL DETAILS AND ALL CONSTRUCTION SHALL COMPLY WITH ALL TYPICAL DRAWINGS AND DETAILS.
21. FUTURE EQUIPMENT AND DEVICES SHALL BE ROUGH IN CONDUIT FOR CONTROL AND POWER CABLES TO BOXES. ROUGH-IN CONDUIT AND MAKE PROVISION FOR FUTURE WIRING AND CABLING FOR POWER AND CONTROL, (TYP.)
22. DISCONNECTS RELATED TO PROCESS CONNECTIONS SHALL BE PROVIDED AND INSTALLED BY THE EC.
23. CONTRACTOR SHALL BE RESPONSIBLE FOR DOCUMENTING AND LABELING ALL COMMUNICATIONS SYSTEM CABLING.
24. THE CONTRACTOR SHALL REVIEW AND FOLLOW GUIDELINES OF THE TYPICAL DETAILS.
25. CONSTRUCTION AND DEMOLISHION SHALL BE COMPLETE AND COORDINATE WITH ALL OTHER TRADES.
26. EC SHALL REVIEW CONTRACT DOCUMENT AND PROVIDE ALL WORK, MATERIALS, AND EQUIPMENT FOR A COMPLETE AND OPERABLE PROJECT.
27. EXTERIOR RECEPTACALES SHALL BE METALLIC INSERVICE WEATHER PROOF COVERS AND GFI REC.
28. PROVIDE CONCRETE HOUSEKEEP PAD FOR ALL FLOOR MOUNTED EQUIPMENT.
29. ALL EXTERIOR RACEWAYS THAT EXTEND FROM BELOW GRADE TO ABOVE GRADE SHALL BE INSTALLED WITH EXPANSION COLLAR SLEEVES.
30. EXTERIOR PEDISTALS SHALL BE INSTALLED TO A FROST PROTECTED STRUCTURE OR BE PROVIDED WITH MFR RECOMMENDED GROUND RATED GREEN TREAT FOUNDATION.
31. COORDINATE ACTUAL LOCATIONS OF ALL EQUIPMENT WITH GC, OWENER, AUTHORITY WITH JURISDICTION, OTHER TRADES, AND ENGINEER PRIOR TO ROUGH-IN. ACTUAL LAYOUT MAY VARY. ALL CHANGES SHALL BE JUSTIFIED AND COORDINATED.
32. OBSERVE ENVIRONMENT AND AREA CLASIFICATIONS AS REQUIRED. FOLLOW ALL APPLICABLE CODES.
33. SERVICE SHALL BE INSTALL COMPLETE AND IN COMPLIANCE TO THE UTILITY APPROVED REQUIREMENTS. ONLY DIRECTLY FROM THE UTILITY MAYBE APPLIED TO THE UTILITY ALLOWANCE. ALL OTHER WORK, LABOR, MATERIALS SHALL BE INCLUSIVE TO THE CONTRACT.
34. WORK INCLUDED SHALL INCLUDE ALL DECOMMISSIONING, REMOVAL, AND DISPOSAL AS REQUIRED TO PROVIDE COMPLETE AND OPERABLE SYSTEM AS SHOWN HEREIN.
35. ALL WALL SLEEVES SHALL BE LOCATED PER ACTUAL EQUIPMENT AND COORDINATED W/GC. AND BUILDING MANUFACTURER.

FEEDER SCHEDULE (600 V)

FEEDER AMPACITY	CONDUCTOR SIZE (kcmil)		CONDUIT SIZE	
	Ø & N	GRD	3Ø & GRD.	3Ø & N & GRD.
20	#12	#12	3/4"	3/4"
30	#10	#10	3/4"	3/4"
40	#8	#10	3/4"	1"
50	#6	#10	1"	1"
70	#4	#8	1-1/4"	1-1/4"
80	#3	#8	1-1/4"	1-1/4"
100	#1	#8	1-1/2"	2"
110	#2	#6	1-1/4"	1-1/2"
125	#1	#6	1-1/2"	2"
150	#1/0	#6	1-1/2"	2"
175	#2/0	#6	2"	2"
200	#3/0	#6	2"	2-1/2"
225	#4/0	#4	2"	2-1/2"
250	#250	#4	2-1/2"	3"
300	#350	#4	3"	3"
350	#500	#3	3"	3-1/2"
380	#500	#3	3"	3-1/2"
400	(2) # 3/0	(2) # 3	(2) 2"	(2) 2-1/2"
450	(2) # 4/0	(2) # 2	(2) 2"	(2) 2-1/2"
500	(2) # 250	(2) # 2	(2) 2-1/2"	(2) 3"
600	(2) # 350	(2) # 1	(2) 3"	(2) 3"
700	(2) # 500	(2) # 1/0	(2) 3"	(2) 3-1/2"
800	(2) # 600	(2) # 1/0	(2) 3-1/2"	(2) 4"
1000	(3) # 400	(3) # 2/0	(3) 3"	(3) 3-1/2"
1200	(3) # 600	(3) # 3/0	(3) 3-1/2"	(3) 4"
1600	(4) # 600	(4) # 4/0	(4) 3-1/2"	(4) 4"
2000	(5) # 600	(5) # 250	(5) 3-1/2"	(5) 4"

GENERAL NOTES:

1. THE ABOVE FEEDER SCHEDULE IS A SCHEDULE OF TYPICAL FEEDERS AND SOME SIZES MAY NOT BE UTILIZED.
2. ALL CONDUCTOR AMPACITIES ARE BASED ON TABLE 310-16 OF THE NEC FOR COPPER CONDUCTOR TYPE THW/THWN.
3. FEEDER SIZES SHOWN ON THE RISER DIAGRAM INDICATE FEEDER AMPACITIES AND DO NOT NECESSARILY CORRESPOND TO CIRCUIT BREAKER AMPACITIES. CERTAIN FEEDERS MAY BE SIZED FOR THE DERATION FACTORS REQUIRED BY CODE AND/OR ARE OVERSIZED FOR VOLTAGE DROP.
4. WHERE MULTIPLE CONDUITS ARE INDICATED FOR A SINGLE FEEDER EACH CONDUIT SHALL CONTAIN AN AØ, BØ, CØ, GROUND CONDUCTOR, AND NEUTRAL CONDUCTOR.

200 – 4G — FEEDER DESIGNATION

SYSTEM DESCRIPTION
(2G) 1Ø, 2W + GRD
(3G) 3Ø, 3W + GRD OR 1Ø, 3W + GRD
(4G) 3Ø, 4W + GRD

CONDUCTOR AMPACITY
(SEE FEEDER SCHEDULE)

PROJECT NO.:	00616097	SCALE: AS SHOWN	NO.	DATE	REVISION
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PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\E-1 ELECTRICAL SYMBOLS, & ABBREVIATIONS.dwg

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CITY OF DULUTH
LAKEWOOD, MN

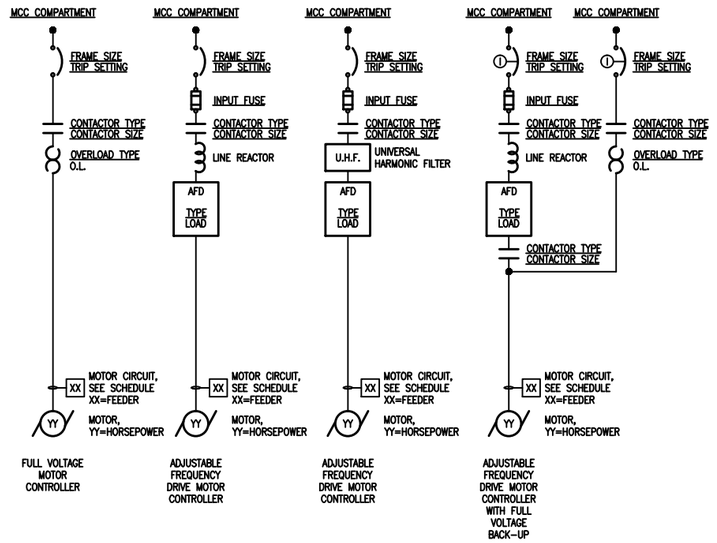
ELECTRICAL SYMBOLS, & ABBREVIATIONS

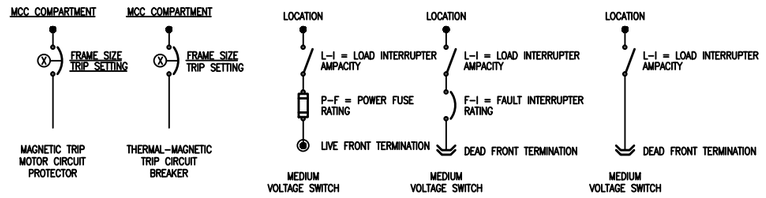
FILE NO. 00616097
SHEET E-1

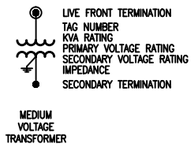
INSTRUMENT SOCIETY OF AMERICA INSTRUMENT IDENTIFICATION

	FIRST LETTER(S)		SUCCEEDING LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSOUT FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	
D	USER'S CHOICE	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO(FRACTION)			
G	USER'S CHOICE		GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	MOISTURE				
N	TORQUE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, RESTRICTION		
P	PRESSURE (OR VACUUM)		POINT, TEST CONNECTION		
Q	QUANTITY	INTEGRATE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION				
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE	Y AXIS		RELAY OR COMPUTE	
Z	POSITION, DIMENSION	Z AXIS		DRIVE ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

MOTOR CONTROL CENTER (MCC) SYMBOLS







P&ID SYMBOLS (TYPICAL)

A: DESCRIPTION, TOP LINE

B: DESCRIPTION, BOTTOM LINE

TRS: FIRST LETTER(S) AND SUCCEEDING LETTERS OF INSTRUMENT IDENTIFICATION, REFER TO ISA TABLE

W: UNIT PROCESS NUMBER

X: LOOP NUMBER

Y: UNIT NUMBER, USED FOR MULTIPLE SETS WITH THE SAME X-Y DESIGNATION

Z: SET NUMBER, USED FOR MULTIPLE SETS OF UNITS WITH THE SAME W-X-Y DESIGNATION

N: NUMBER OF UNITS

C: INSTALLATION REQUIREMENT:
e.p.: CLASS I, DIVISION 1 HAZARDOUS LOCATION
i.s.: INTRINSICALLY SAFE, INSTALLED IN CLASS I, DIVISION 1 HAZARDOUS LOCATION

Q: PROVISION REQUIREMENT:
✱: EXISTING, RE-USED EQUIPMENT
✱✱: EQUIPMENT SPECIFIED UNDER DIVISION OTHER THAN 26
✱✱✱: FUTURE EQUIPMENT
BLANK: EQUIPMENT SPECIFIED UNDER DIVISION 26

FIELD DEVICE

CONTROL PANEL DEVICE, FRONT-OF-PANEL, NORMALLY ACCESSIBLE

CONTROL PANEL DEVICE, BACK-OF-PANEL, NOT NORMALLY ACCESSIBLE

MCC DEVICE, FRONT-OF-PANEL, NORMALLY ACCESSIBLE

MCC DEVICE, BACK-OF-PANEL, NOT NORMALLY ACCESSIBLE

SOFTWARE DEVICE OR FUNCTION, NORMALLY ACCESSIBLE

SOFTWARE DEVICE OR FUNCTION, NOT NORMALLY ACCESSIBLE

SOFTWARE ALARM FUNCTION, NORMALLY ACCESSIBLE

INTERLOCK FUNCTION, REFER TO SPECIFICATIONS

NON-CONNECTING LINES

CONNECTING LINES

(2) PARALLEL LINES (PARENTHETICAL NUMBER INDICATES THE NUMBER OF SIGNALS REPRESENTED)

PROGRAMMABLE LOGIC CONTROLLER
INPUT/OUTPUT POINT
WHERE Y=QUANTITY AND XX
DI: DIGITAL INPUT
DI: DIGITAL OUTPUT
AI: ANALOG INPUT
AO: ANALOG OUTPUT

NETWORK (DEVICENET, ETC) CONTROL SYSTEM
INPUT/OUTPUT POINT WHERE Y=QUANTITY AND XX
DI: DIGITAL INPUT
DI: DIGITAL OUTPUT
AI: ANALOG INPUT
AO: ANALOG OUTPUT

FULL VOLTAGE MOTOR CONTROLLER, XX INDICATES LOCATION

MOTOR CONTROLLER, XX INDICATES TYPE OF CONTROLLER AND YY INDICATES LOCATION

LINETYPE LEGEND

Ax = 2C#16 SHIELDED, TWISTED PAIR CABLE

Dx = #14 THHN WIRE (x = NUMBER OF WIRES)

Mx = 1" CONDUIT FOR CABLE SUPPLIED BY MANUFACTURER BY MFG. (x=NUMBER OF CONDUITS)

Ex = 3/4" CONDUIT AND CAT5e(x) CABLE(S) (x = NUMBER OF CABLES)

FO = CONDUIT AND FIBER OPTIC CABLE

SOFTWARE SIGNAL/FUNCTION

ANALOG SIGNAL, 4-20mADC OR PULSE FREQUENCY

PULSE FREQUENCY

DISCRETE SIGNAL, DRY CONTACT

MANUFACTURER'S SIGNAL

PNEUMATIC SIGNAL

MAJOR PROCESS

MINOR PROCESS

PROCESS NOTES:

1. SIZE CONDUIT PER NEC. MINIMUM SIZE 3/4".
2. PROVIDE SEPARATE CONDUITS FOR THE FOLLOWING:
   a. 4-20mADC
   b. 120 VOLT CONTROL
   c. 120 VOLT POWER
   d. 480 VOLT POWER
   e. LOW VOLTAGE INSTRUMENTATION
   f. COMMUNICATION
3. REFER TO SPECIFICATION 16900 FOR DETAILS ON VARIOUS LOOP FUNCTIONS AS WELL AS DETAILS REGARDING OPERATOR INTERFACE FUNCTIONS.
4. REFER TO DIVISION 11000, 13000, 15000 FOR ADDITIONAL DETAILS REGARDING INSTRUMENTATION AND CONTROL EQUIPMENT FURNISHED UNDER THOSE SPECIFICATIONS.
5. (1) 1-1/2"C REFERS TO NUMBER OF WIRES AND SIZE OF WIRE REQUIRED, WHERE AS:
   (1) = ONE WIRE
   1-1/2"C = THE SIZE OF WIRE REQUIRED

WIRING & CONDUIT (TYPICAL)

1. (X) #12 & #12G
   REFERS TO NUMBER OF WIRE(S) AND SIZE OF WIRE(S) REQUIRED, WHERE AS:
   (1) = ONE WIRE
   #12 = THE SIZE OF WIRE REQUIRED
   G = GROUND WIRE
2. (X) 1-1/2"C
   REFERS TO NUMBER OF CONDUIT(S) AND SIZE OF CONDUIT(S) REQUIRED, WHERE AS:
   (1) = ONE CONDUIT
   1-1/2"C = THE SIZE OF CONDUIT REQUIRED

✱ REFER TO DRAWINGS FOR REQ'D WIRE AND CONDUIT SIZES AND AMOUNTS

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

ELECTRICAL SYMBOLS, & ABBREVIATIONS

FILE NO. 00616097

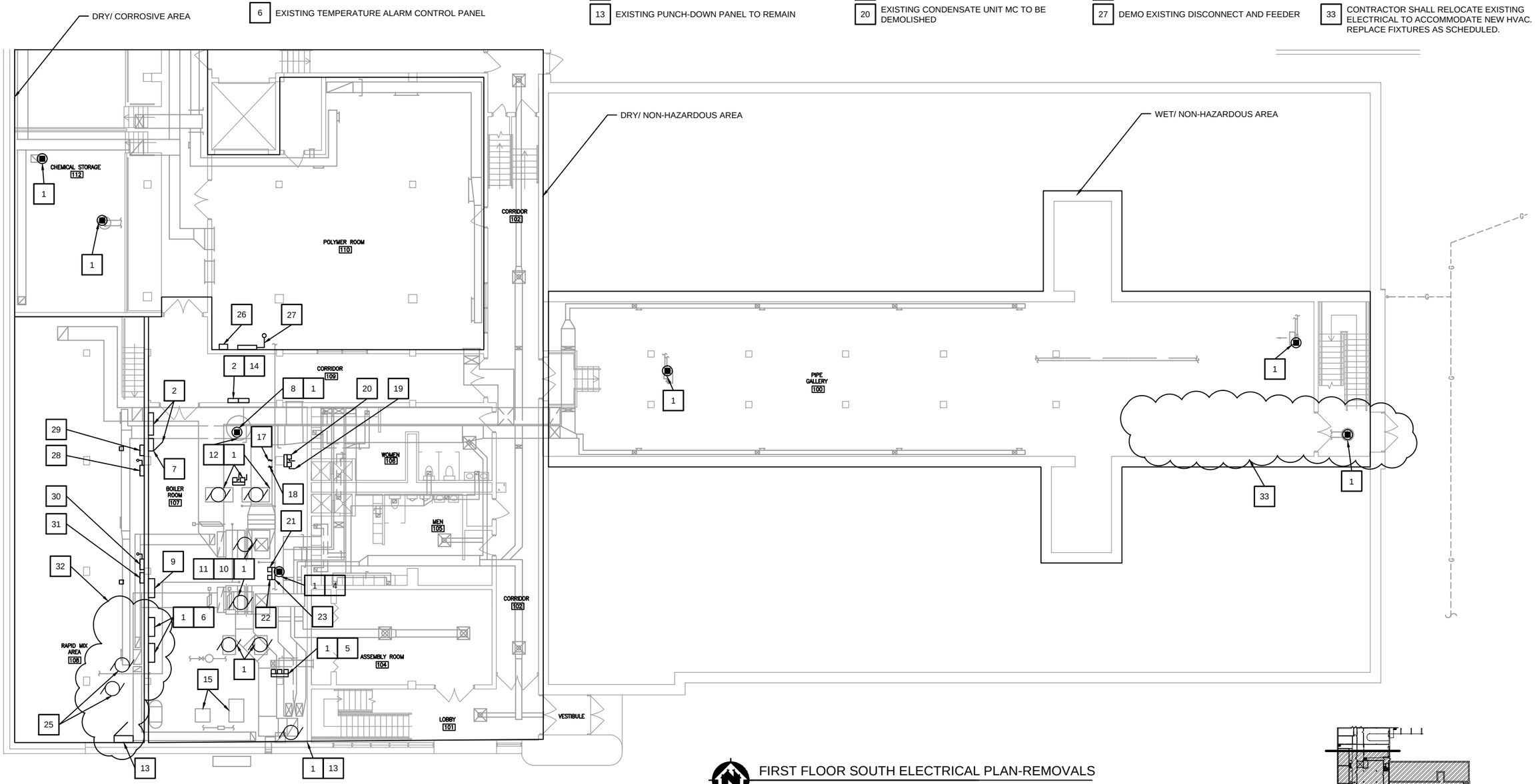
SHEET E-2

GENERAL NOTES:

1. REFER TO AND COORDINATE WITH M-DRAWINGS.
2. DEMO ALL INSTRUMENTATION, CONNECTIONS, AND EQUIPMENT AS REQUIRED FOR PROJECT COMPLETION.
3. INTENT DIVISION OF DEMOLITION: IT IS THE INTENT OF THE EC SHALL DECOMMISSION, DISCONNECT, AND DEMOLISH ALL EQUIPMENT DEVICES, MATERIAL, ETC RELATED TO ALL POWER CONNECTIONS. HVAC CONTRACTOR SHALL BE RESPONSIBLE FOR DEMO OF EQUIPMENT, MATERIALS, DEVICES, CONTROL, ETC.
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

1. DECOMMISSION, DISCONNECT, AND DEMOLISH EQUIPMENT COMPLETE (ALL CONNECTIONS). REMOVE CONTROL AND POWER CIRCUITS
2. EXISTING ELECTRICAL TO REMAIN
3. EXISTING EF
4. EXISTING VFD
5. EXISTING CIRCULATING PUMP AND OLD BOILER, VFD. DISCONNECTS, MC, ETC TO BE DEMOLISHED
6. EXISTING TEMPERATURE ALARM CONTROL PANEL
7. EXISTING LP - 4A. REFER TO E-19
8. EXISTING WATER HEATER
9. EXISTING STORAGE CABINET TO BE DEMOLISHED
10. EXISTING AIR HANDLER TO BE DEMOLISHED
11. DISCONNECT ALL DEVICES
12. DEMO EXISTING CONDENSATION PUMP AND DEVICES
13. EXISTING PUNCH-DOWN PANEL TO REMAIN
14. LP - 3A & 3B
15. EXISTING BOILER TO REMIAN
16. RELOCATE EXISTING LIGHT FIXTURES AS REQUIRED FOR NEW DUCT WORK
17. EXISTING VACUUM PUMP DISCONNECT TO BE DEMOLISHED
18. EXISTING AIR DRYER DISCONNECT TO BE DEMOLISHED
19. EXISTING CONDENSATE UNIT MC TO BE DEMOLISHED
20. EXISTING CONDENSATE UNIT MC TO BE DEMOLISHED
21. EXISTING AC DISCONNECT TO BE DEMOLISHED
22. EXISTING AHU2 DISCONNECT / MC TO BE DEMOLISHED
23. EXISTING AHU1 DISCONNECT / MC TO BE DEMOLISHED
24. EXISTING VFD TO BE DEMOLISHED
25. EXISTING SAMPLE PUMP TO BE RELOCATED REFER TO PM DRAWINGS
26. DEMO EXISTING XFMR-L3
27. DEMO EXISTING DISCONNECT AND FEEDER
28. DEMO EXISTING XFMR-L4
29. DEMO EXISTING L4 DISCONNECT
30. DEMO EXISTING XFMR-L-3
31. DEMO EXISTING L3 DISCONNECT AND FEEDER
32. IDENTIFY, DISCONNECT AND RELOCATE EXISTING ELECTRICAL FOR CONSTRUCTION NEW ACCESS DOOR AND STAIRS. REFER TO ARCH DRAWINGS.
33. CONTRACTOR SHALL RELOCATE EXISTING ELECTRICAL TO ACCOMMODATE NEW HVAC. REPLACE FIXTURES AS SCHEDULED.



FIRST FLOOR SOUTH ELECTRICAL PLAN-REMOVALS

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)

KEY PLAN - FIRST FLOOR

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CITY OF DULUTH
LAKEWOOD, MN

FIRST FLOOR SOUTH ELECTRICAL PLAN - REMOVAL

FILE NO. 00616097

SHEET E-3

GENERAL NOTES:

1. REFER TO AND COORDINATE WITH M-DRAWINGS.
2. DEMO ALL INSTRUMENTATION, CONNECTIONS, AND EQUIPMENT AS REQUIRED FOR PROJECT COMPLETION.
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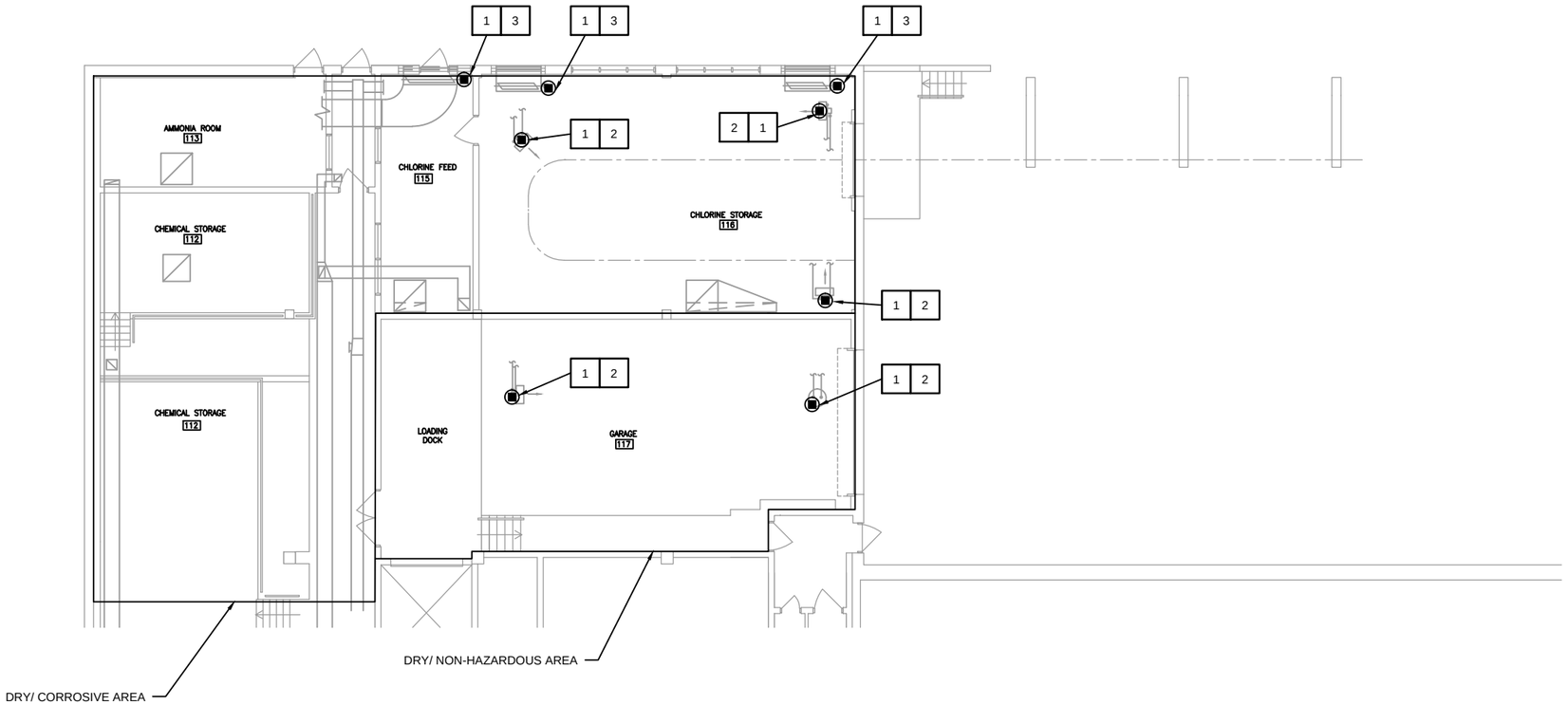
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

1 DECOMMISSION, DISCONNECT, AND DEMOLISH EQUIPMENT COMPLETE (ALL CONNECTIONS). REMOVE CONTROL AND POWER CIRCUITS

2 DEMO EXISTING UNIT HEATER

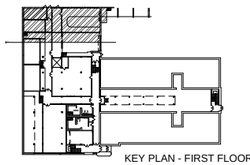
3 EXISTING DAMPERS & ACTUATORS



FIRST FLOOR NORTH ELECTRICAL PLAN - REMOVALS

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)



KEY PLAN - FIRST FLOOR

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

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LAKEWOOD, MN

FIRST FLOOR NORTH ELECTRICAL PLAN - REMOVALS

FILE NO. 00616097

SHEET E-4

GENERAL NOTES:

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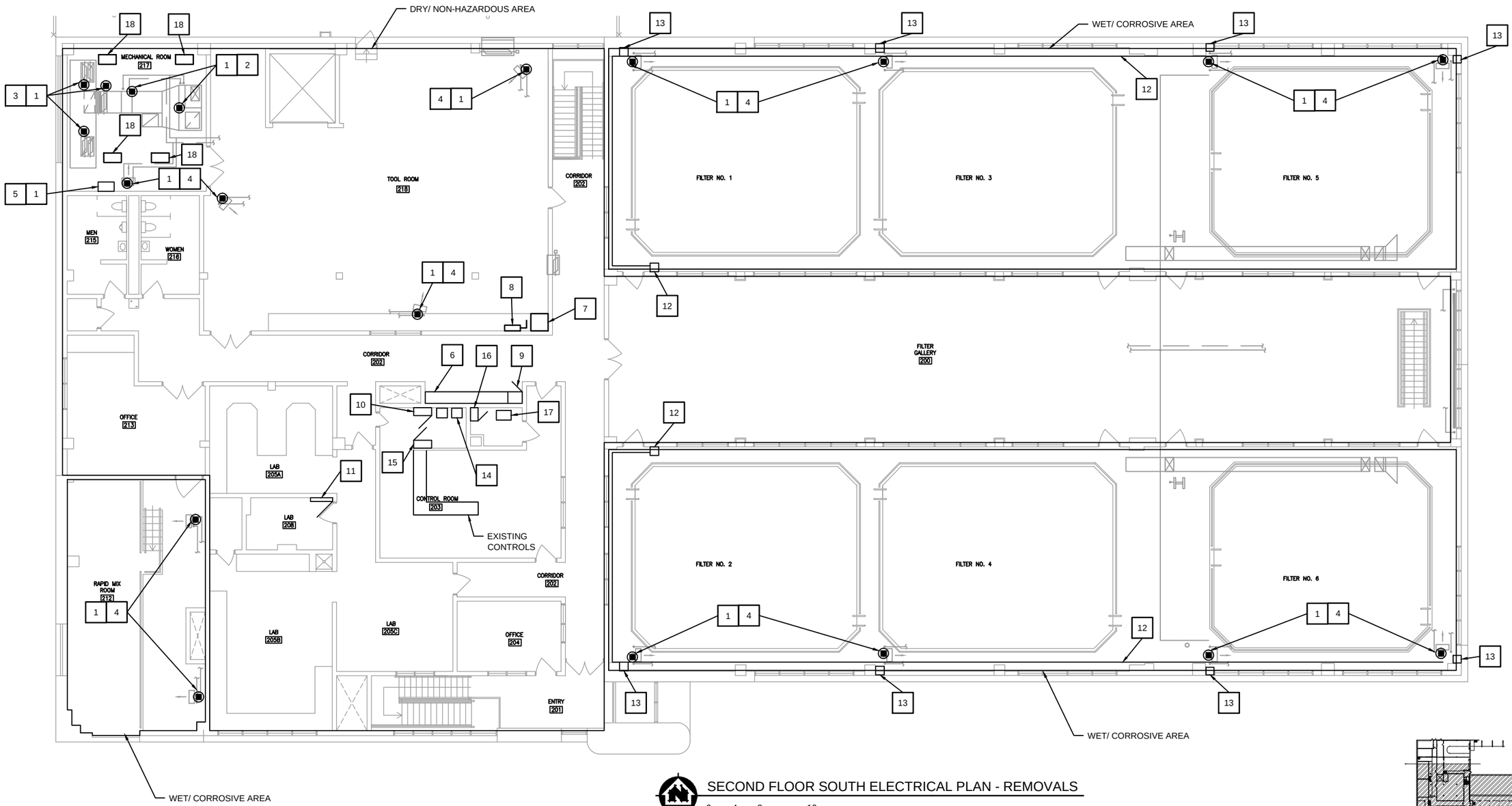
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

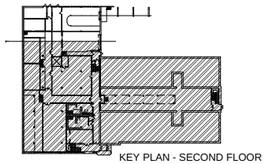
1. DECOMMISSION, DISCONNECT, AND DEMOLISH EQUIPMENT COMPLETE (ALL CONNECTIONS). REMOVE CONTROL AND POWER CIRCUITS
2. DEMO POWER EXISTING REHEAT AND AIR HANDLING UNIT
3. DEMO POWER EXISTING ACTUATORS
4. DEMO POWER TO UNIT HEATER AND EQUIPMENT, DISCONNECTS AND FEEDERS
5. DEMO TEMP CONTROL PANEL
6. EXISTING MCC TO REMAIN BUT TO BE MODIFIED. REFER TO ONE LINE DIAGRAMS
7. XFMR-L2 TO REMIAN
8. DISCONNECT FOR LP-L2
9. LP-L2 TO REMAIN TO BE MODIFIED AS REQ'D
10. DEMO DC, FEEDERS AND BRANCH CIRCUITS
11. LP-L TO BE REFED TO REMAIN REFER TO E-19
12. DEMO FEEDER AND CONDUIT
13. DEMO DISCONNECT
14. DEMO BATTERY CHANGER FEEDERS, AND BRANCH CIRCUITS
15. SCADA CONTROL PANEL TO REMAIN
16. DATA/COMM SERVICE AND SWITCH TO REMAIN. CONNECT HVAC PDC TO THE SWITCH COORDINATE W/ CITY IT DEPARTMENT
17. EXISTING SERVER TO REMAIN
18. DEMO/REPLACE LIGHT FIXTURES



SECOND FLOOR SOUTH ELECTRICAL PLAN - REMOVALS

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)



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SECOND FLOOR SOUTH ELECTRICAL PLAN - REMOVALS

FILE NO. 00616097
SHEET E-5

GENERAL NOTES:

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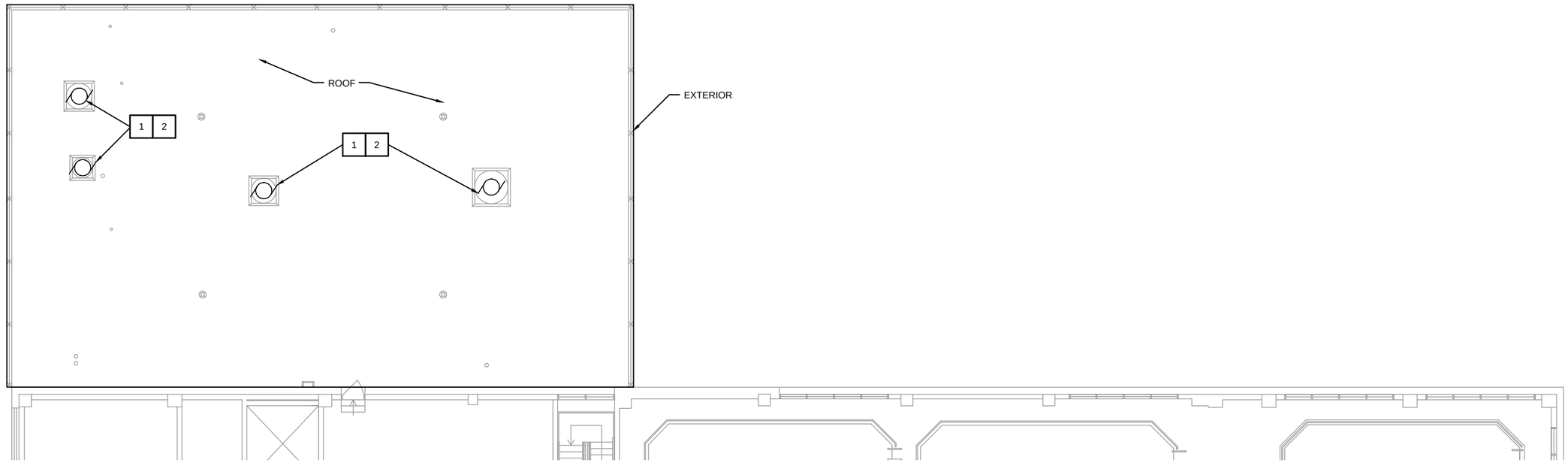
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

1 DECOMMISSION, DISCONNECT, AND DEMOLISH EQUIPMENT COMPLETE (ALL CONNECTIONS). REMOVE CONTROL AND POWER CIRCUITS

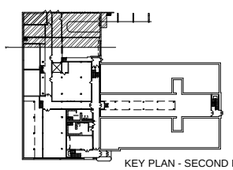
2 DEMO / REPLACE EXISTING EF



SECOND FLOOR NORTH ELECTRICAL PLAN - REMOVALS

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)



KEY PLAN - SECOND FLOOR

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. : .	CHECKED BY: SRC	.	.	.	.
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PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 ELECTRICAL PLAN 4.dwg

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SCOTT R. CHILSON — MARCH 7, 2016 (Date) — 44287 (License No.)

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

SECOND FLOOR NORTH ELECTRICAL PLAN - REMOVLAS

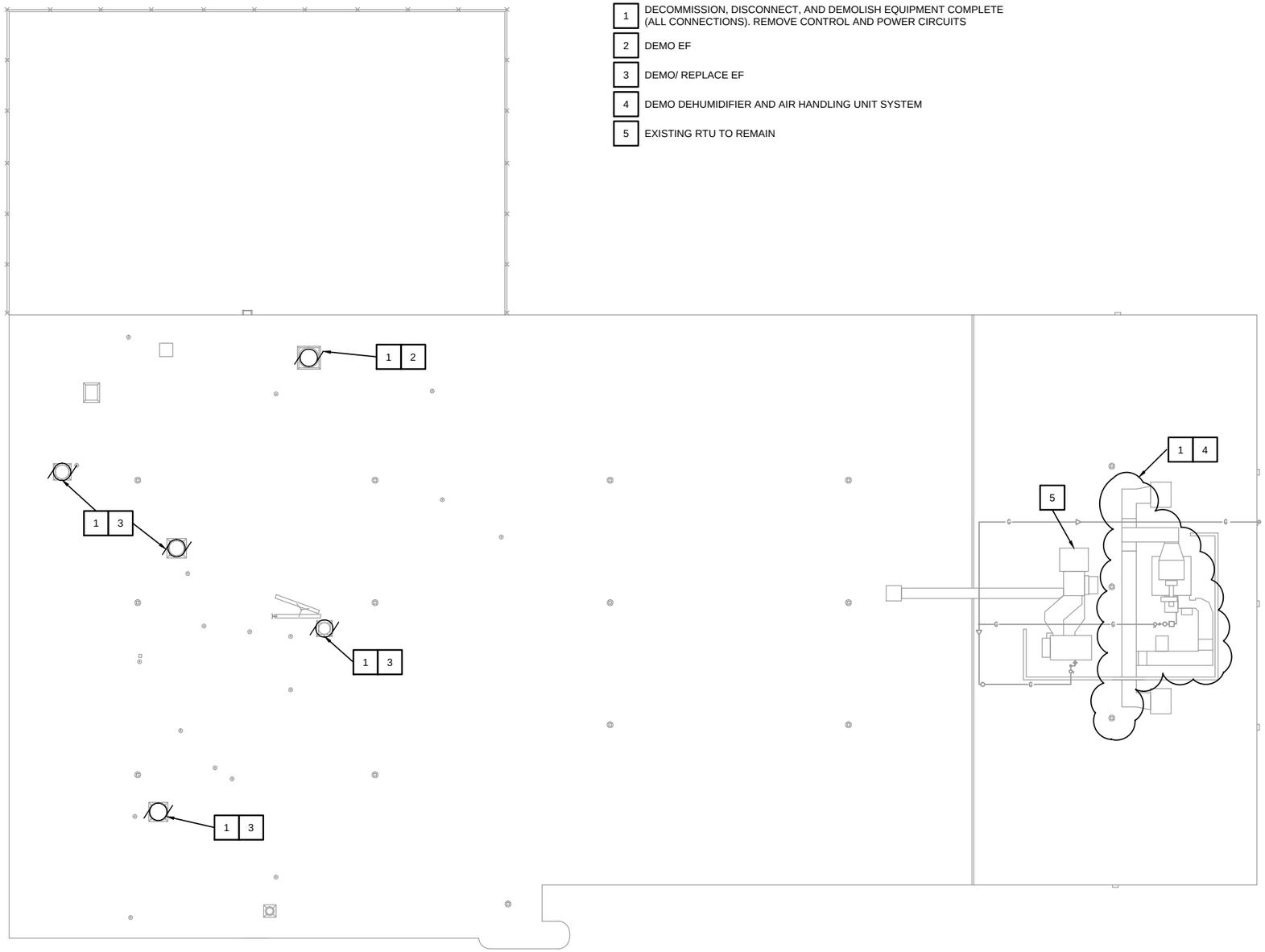
FILE NO. 00616097
SHEET E-6

GENERAL NOTES:

1. REFER TO AND COORDINATE WITH M-DRAWINGS.
2. DEMO ALL INSTRUMENTATION, CONNECTIONS, AND EQUIPMENT AS REQUIRED FOR PROJECT COMPLETION.
3. INTENT DIVISION OF DEMOLITION: IT IS THE INTENT OF THE EC SHALL DECOMMISSION, DISCONNECT, AND DEMOLISH ALL EQUIPMENT DEVICES, MATERIAL, ETC RELATED TO ALL POWER CONNECTIONS. HVAC CONTRACTOR SHALL BE RESPONSIBLE FOR DEMO OF EQUIPMENT, MATERIALS, DEVICES, CONTROL, ETC.
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

1. DECOMMISSION, DISCONNECT, AND DEMOLISH EQUIPMENT COMPLETE (ALL CONNECTIONS). REMOVE CONTROL AND POWER CIRCUITS
2. DEMO EF
3. DEMO/ REPLACE EF
4. DEMO DEHUMIDIFIER AND AIR HANDLING UNIT SYSTEM
5. EXISTING RTU TO REMAIN



ROOF ELECTRICAL PLAN - REMOVALS

0 5 10 20

SCALE: 3/32 " = 1'-0" (22x34)
SCALE: 3/64 " = 1'-0" (11x17)

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. : .	CHECKED BY: SRC	.	.	.	.
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PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 ELECTRICAL PLAN 5.dwg					

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

ROOF ELECTRICAL PLAN - REMOVALS

FILE NO. 00616097
SHEET E-7

GENERAL NOTES:

1. REFER TO AND COORDINATE WITH M-DRAWINGS.
2. DEMO ALL INSTRUMENTATION, CONNECTIONS, AND EQUIPMENT AS REQUIRED FOR PROJECT COMPLETION.
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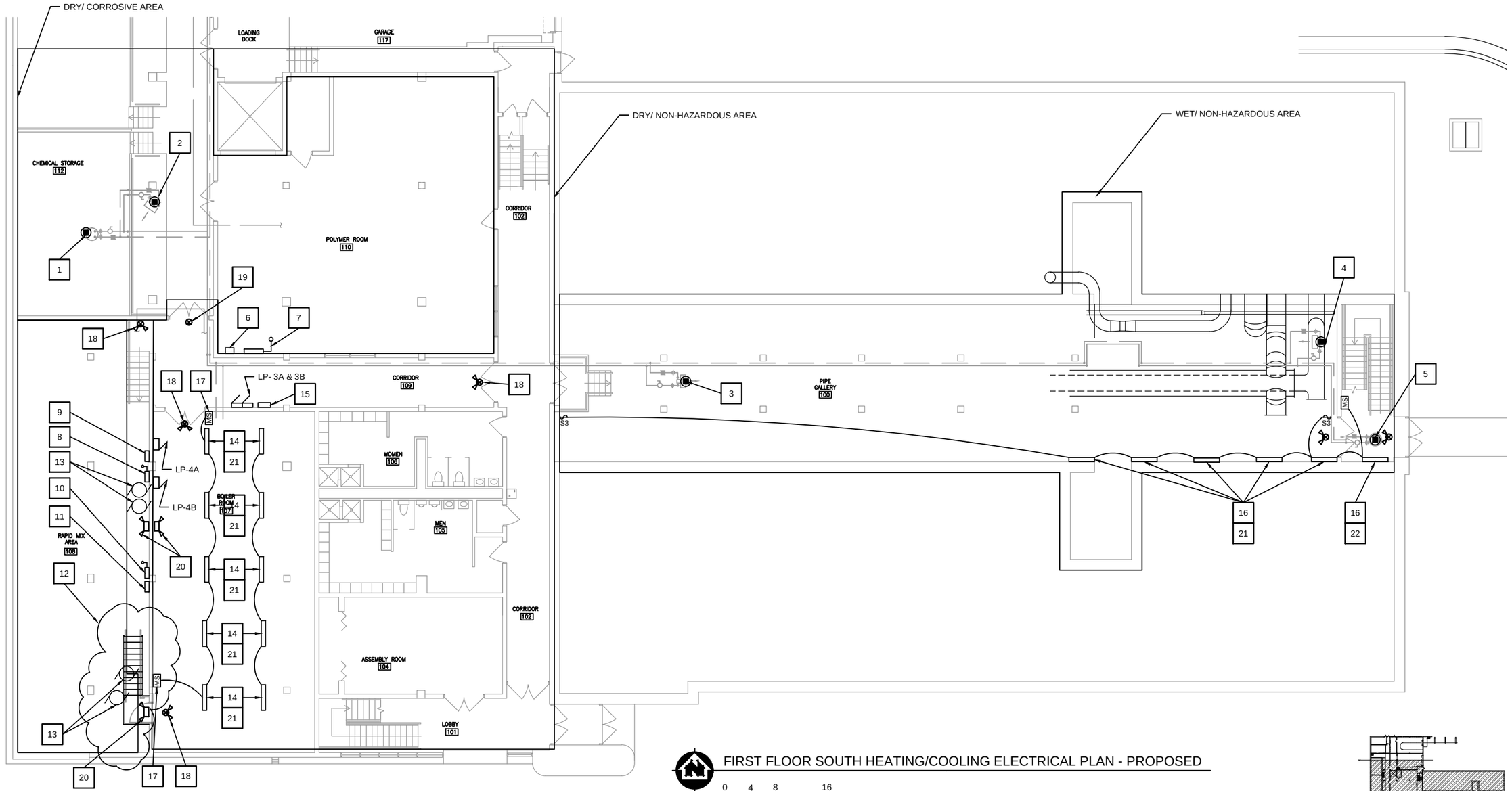
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

1. CONNECT POWER UH-12, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
2. CONNECT POWER UH-26, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
3. CONNECT POWER UH-9, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
4. CONNECT POWER UH-10, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
5. CONNECT POWER UH-11, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
6. EXISTING XFMR LP-1A&1B DISCONNECT TO BE DEMOLISHED
7. EXISTING XFMR LP-1A&1B TO BE DEMOLISHED
8. DEMOLISH XFMR-L4
9. DEMOLISH L4 DISCONNECT
10. DEMOLISH XFMR-LP/L
11. DEMOLISH LP-LP/L DISCONNECT
12. IDENTIFY, DISCONNECT AND RELOCATE EXISTING ELECTRICAL FOR CONSTRUCTION NEW ACCESS DOOR AND STAIRS. REFER TO ARCH DRAWINGS.
13. EXISTING SAMPLE PUMP AND ELECTRICAL TO BE RELOCATED REFER TO PM DRAWINGS
14. NEW STRUT MOUNTED FIXTURE. MOUNT 8'-10" AFF.
15. REFEED LP-3A/3B
16. NEW WALL MOUNTED FIXTURE REFEED INTO EXISTING CIRCUITS
17. NEW MOTION CONTROL SENSOR
18. NEW BATTERY BU EXIT AND SPOTS
19. NEW BATTERY BU EXIT SIGN
20. EM1 - REFER TO SCHEDULE
21. V1 - REFER TO SCHEDULE
22. V2 - REFER TO SCHEDULE
23. NEW LP-3A/B DISCONNECT REFER TO E-19



FIRST FLOOR SOUTH HEATING/COOLING ELECTRICAL PLAN - PROPOSED

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)

KEY PLAN - FIRST FLOOR

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. : .	CHECKED BY: SRC	.	.	.	.
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PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 ELECTRICAL PLAN 6.dwg

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

FIRST FLOOR SOUTH HEATING AND COOLING
ELECTRICAL PLAN - PROPOSED

FILE NO. 00616097

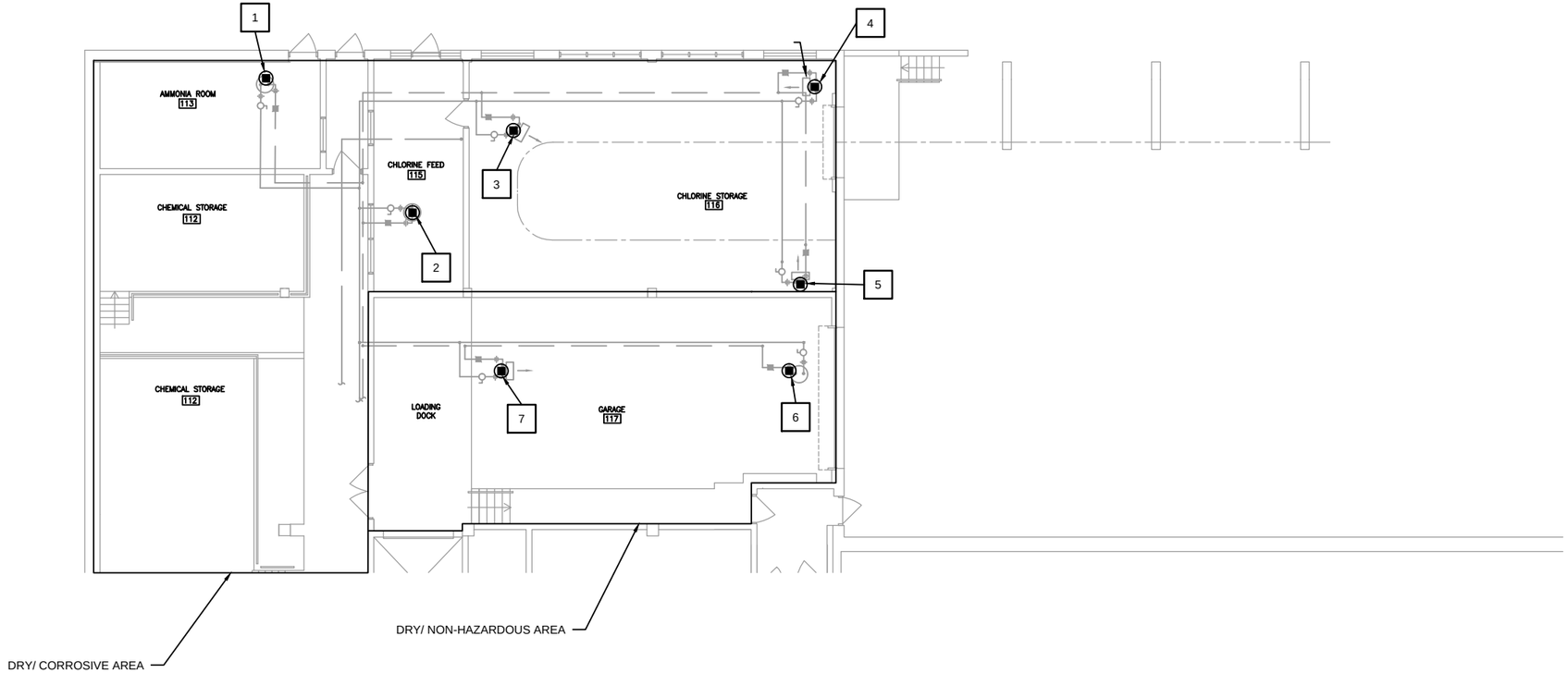
SHEET E-8

GENERAL NOTES:

1. REFER TO AND COORDINATE WITH M-DRAWINGS.
2. DEMO ALL INSTRUMENTATION, CONNECTIONS, AND EQUIPMENT AS REQUIRED FOR PROJECT COMPLETION.
3. INTENT DIVISION OF DEMOLITION: IT IS THE INTENT OF THE EC SHALL DECOMMISSION, DISCONNECT, AND DEMOLISH ALL EQUIPMENT DEVICES, MATERIAL, ETC RELATED TO ALL POWER CONNECTIONS. HVAC CONTRACTOR SHALL BE RESPONSIBLE FOR DEMO OF EQUIPMENT, MATERIALS, DEVICES, CONTROL, ETC.
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

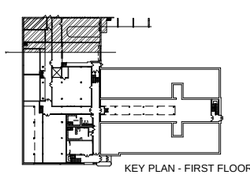
1. CONNECT POWER UH-14, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
2. CONNECT POWER UH-13, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
3. CONNECT POWER UH-1, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
4. CONNECT POWER UH-2, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
5. CONNECT POWER UH-3, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
6. CONNECT POWER UH-5, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
7. CONNECT POWER UH-4, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH



FIRST FLOOR NORTH HEATING/COOLING ELECTRICAL PLAN - PROPOSED

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)



KEY PLAN - FIRST FLOOR

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. : .	CHECKED BY: SRC	.	.	.	.
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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

FIRST FLOOR NORTH HEATING AND COOLING
ELECTRICAL PLAN - PROPOSED

FILE NO. 00616097
SHEET E-9

GENERAL NOTES:

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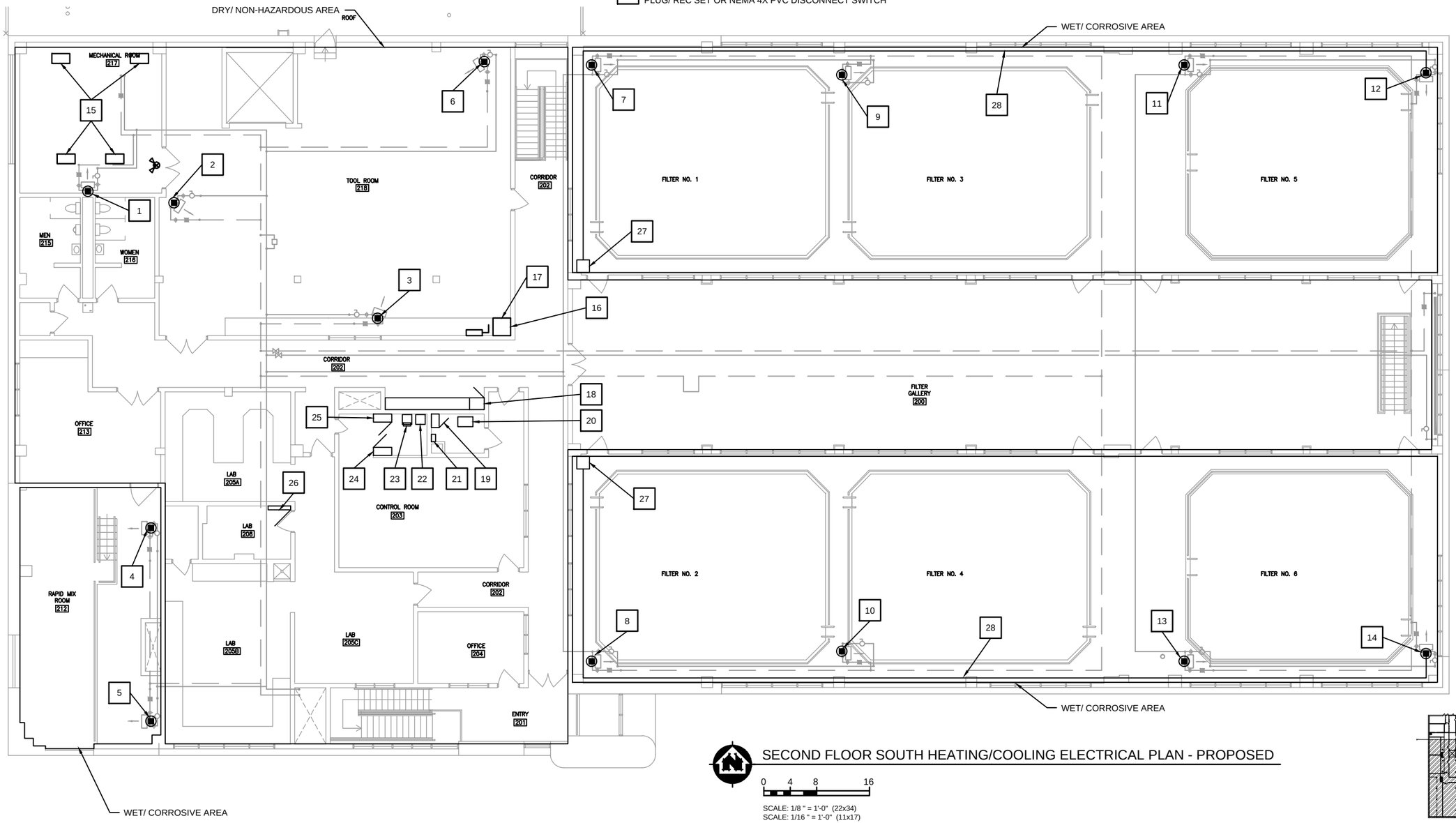
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

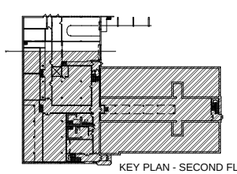
1. CONNECT POWER UH-17, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
2. CONNECT POWER UH-7, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
3. CONNECT POWER UH-8, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
4. CONNECT POWER UH-15, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
5. CONNECT POWER UH-16, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
6. CONNECT POWER UH-6, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
7. CONNECT POWER UH-18, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
8. CONNECT POWER UH-25, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
9. CONNECT POWER UH-19, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
10. CONNECT POWER UH-24, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
11. CONNECT POWER UH-20, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
12. CONNECT POWER UH-21, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
13. CONNECT POWER UH-23, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
14. CONNECT POWER UH-22, FURNISH WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
15. NEW LIGHT FIXTURE (TYP)
16. EXISTING XFMR-LP/L2 TO REMAIN
17. EXISTING XFMR-LP/L2 DISCONNECT TO REMAIN
18. LP-L2 TO REAMIN-PROVIDE NEW BRANCH FEEDER TO MASTER PPC CONTROLLER AND SERVER
19. EXISTING DATA/ COMM SERVICE AND SWITCH -CONNECT NETWORK MASTER PPC CONTROLS
20. EXISTING SERVER TO REMAIN
21. NEW MASTER PPC CONTROLLER AND NEW SERVER. (FURNISH AND INSTALL NETWORK DATA/COMM/PWR LOOP TO AL HVAC CONTROL DEVICES AND EQUIPMENT PER MC
22. NEW XFMR-LP-L3A/3B HOMERUN FROM PPP1 FEED LP-L3A/3B
23. NEW XFMR-LP-L HOMERUN FROM PP1 FEED ENCLOSED CB DISCONNECT, TO HOMERUN FEED TO LP-L1
24. EXISTING SCADA CONTROL PANEL TO REMAIN
25. FURNISH, INSTALL, AND CONNECT PP1
26. EXISTING LP-L1 TO BE REFED FROM NEW ENCLOSED CB DISCONNECT AND XFMR-LP-L1
27. NEW NEMA 4X PVC BOX, EXTEND UH POWER CIRCUIT
28. NEW 3/4" PVC UH FEEDER CIRCUIT



SECOND FLOOR SOUTH HEATING/COOLING ELECTRICAL PLAN - PROPOSED

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)



KEY PLAN - SECOND FLOOR

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. : .	CHECKED BY: SRC	.	.	.	.
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PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 ELECTRICAL PLAN 8.dwg					

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

SECOND FLOOR SOUTH HEATING AND COOLING
ELECTRICAL PLAN - PROPOSED

FILE NO. 00616097
SHEET E-10

GENERAL NOTES:

1. REFER TO AND COORDINATE WITH M-DRAWINGS.
2. DEMO ALL INSTRUMENTATION, CONNECTIONS, AND EQUIPMENT AS REQUIRED FOR PROJECT COMPLETION.
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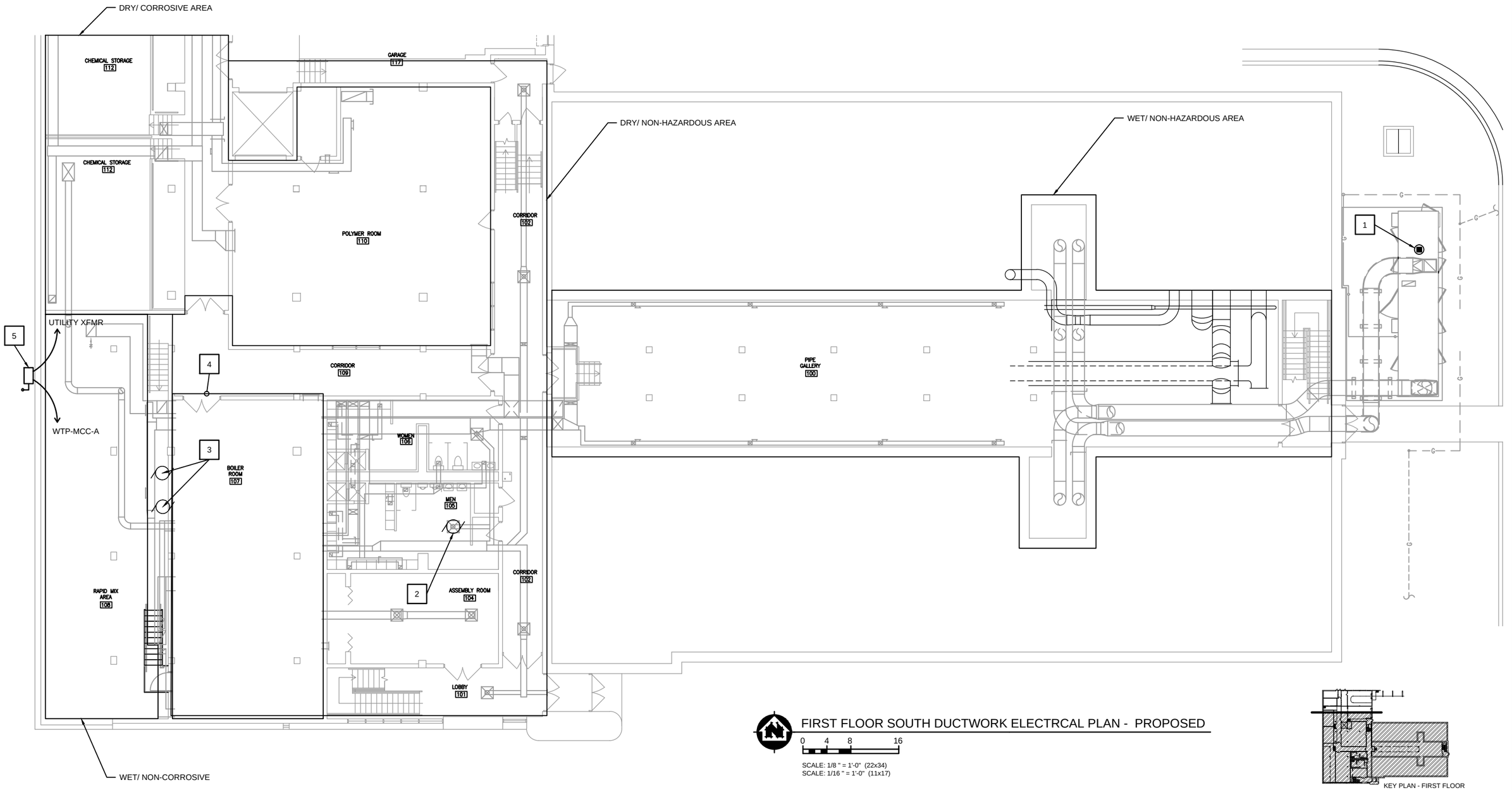
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

1. D-1, FURNISH AND CONNECT WITH DISCONNECT. EACH MOTOR AND CONNECTION HALL HAVE DISCONNECT PLUG SET
2. EF-8, FURNISH AND CONNECT WITH DISCONNECT RATED PLUG/ REC SET OR NEMA 4X PVC DISCONNECT SWITCH
3. RELOCATE AND CONNECT SAMPLE PUMPS(TYP) REFER TO 2/E-16
4. FURNISH NEW CONDUIT AND FEEDER IN THIS SPACE
5. FURNISH AND INSTALL NEW WTP-MDS-1. REFER TO ONE-LINE



FIRST FLOOR SOUTH DUCTWORK ELECTRCAL PLAN - PROPOSED

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)

KEY PLAN - FIRST FLOOR

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. :	CHECKED BY: SRC	.	.	.	.
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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
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LAKEWOOD, MN

FIRST FLOOR SOUTH DUCTWORK ELECTRICAL PLAN - PROPOSED

FILE NO. 00616097
SHEET E-11

GENERAL NOTES:

1. REFER TO AND COORDINATE WITH M-DRAWINGS.
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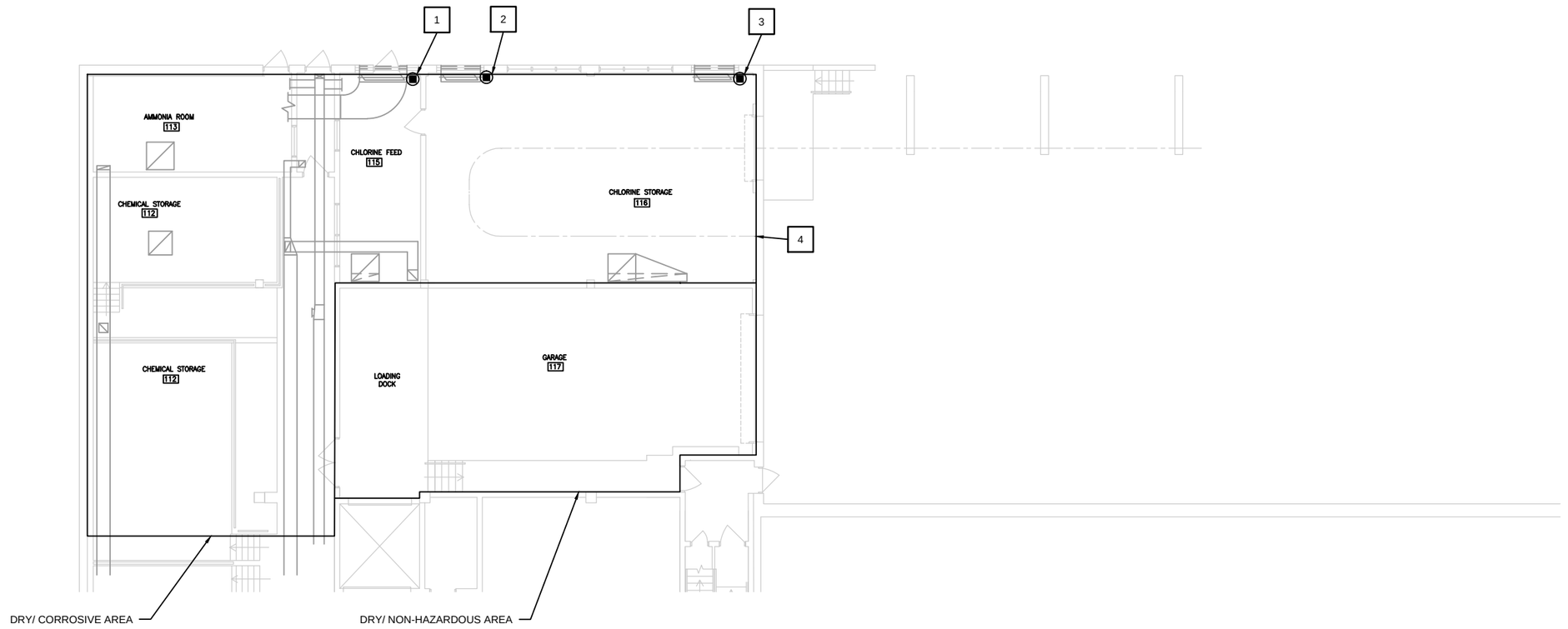
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

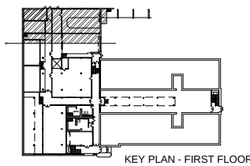
1. CONNECT POWER MD-4, FURNISH WITH DISCONNECT RATED PLUG/ REC SET
2. CONNECT POWER MD-5, FURNISH WITH DISCONNECT RATED PLUG/ REC SET
3. CONNECT POWER MD-6 & MD-7, FURNISH WITH DISCONNECT RATED PLUG/ REC SET
4. FURNISH NEW CONDUIT AND FEEDERS IN THE CORROSIVE AREA



FIRST FLOOR NORTH DUCTWORK ELECTRCAL PLAN - PROPOSED

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)



KEY PLAN - FIRST FLOOR

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PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. : .	CHECKED BY: SRC	.	.	.	.
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PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 ELECTRICAL PLAN 10.dwg

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

FIRST FLOOR NORTH DUCTWORK ELECTRICAL PLAN - PROPOSED

FILE NO. 00616097
SHEET E-12

GENERAL NOTES:

1. REFER TO AND COORDINATE WITH M-DRAWINGS.
2. DEMO ALL INSTRUMENTATION, CONNECTIONS, AND EQUIPMENT AS REQUIRED FOR PROJECT COMPLETION.
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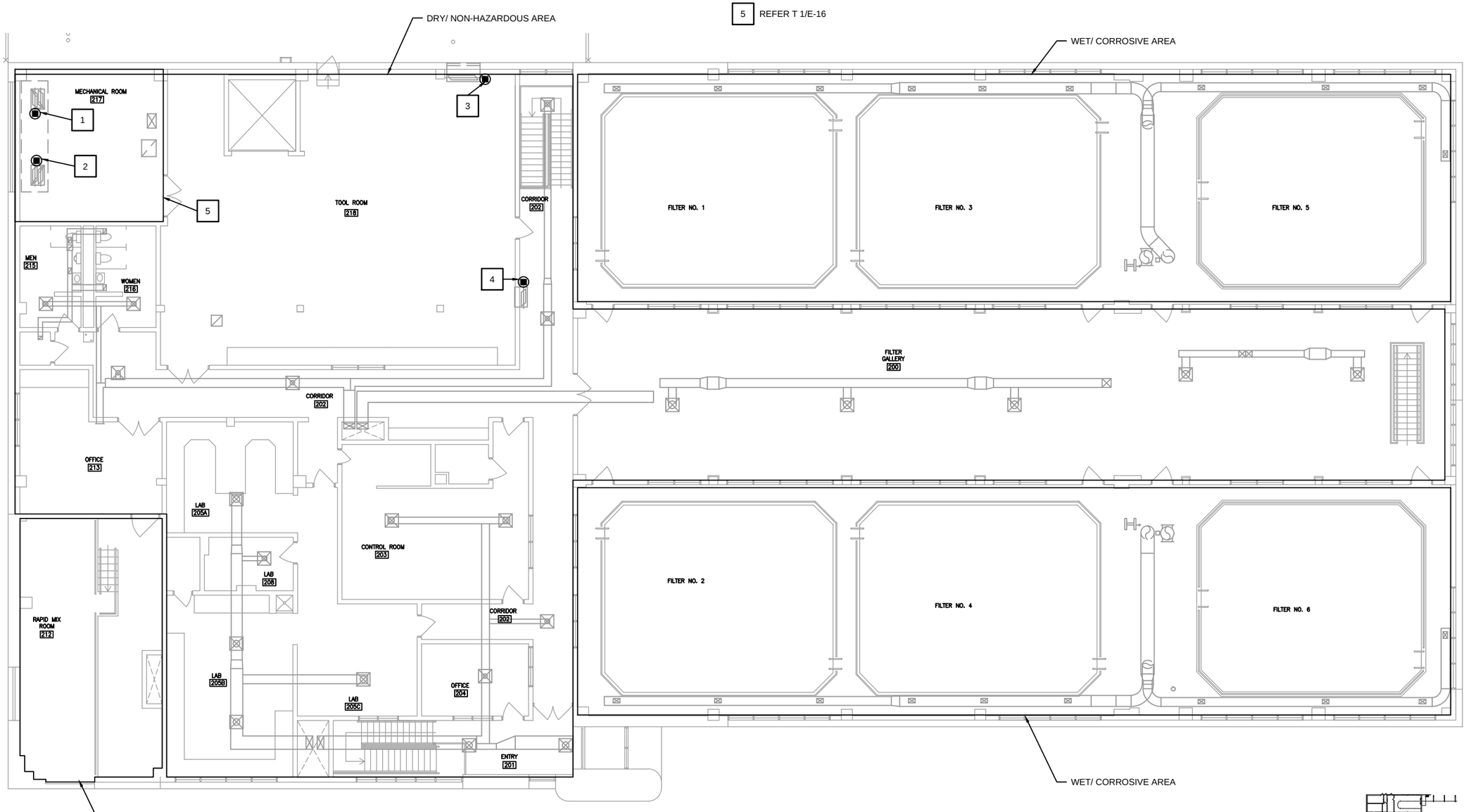
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

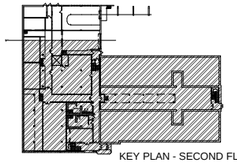
1. CONNECT POWER MD-1, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)
2. CONNECT POWER MD-2, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)
3. CONNECT POWER MD-3, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)
4. CONNECT POWER MD-8, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)
5. REFER T 1/E-16



SECOND FLOOR SOUTH DUCTWORK ELECTRCAL PLAN - PROPOSED

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)



KEY PLAN - SECOND FLOOR

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. : .	CHECKED BY: SRC	.	.	.	.
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PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 ELECTRICAL PLAN 11.dwg					

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

SECOND FLOOR SOUTH DUCTWORK ELECTRICAL PLAN - PROPOSED

FILE NO. 00616097
SHEET E-13

GENERAL NOTES:

1. REFER TO AND COORDINATE WITH M-DRAWINGS.
2. DEMO ALL INSTRUMENTATION, CONNECTIONS, AND EQUIPMENT AS REQUIRED FOR PROJECT COMPLETION.
3. INTENT DIVISION OF DEMOLITION: IT IS THE INTENT OF THE EC SHALL DECOMMISSION, DISCONNECT, AND DEMOLISH ALL EQUIPMENT DEVICES, MATERIAL, ETC RELATED TO ALL POWER CONNECTIONS. HVAC CONTRACTOR SHALL BE RESPONSIBLE FOR DEMO OF EQUIPMENT, MATERIALS, DEVICES, CONTROL, ETC.
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

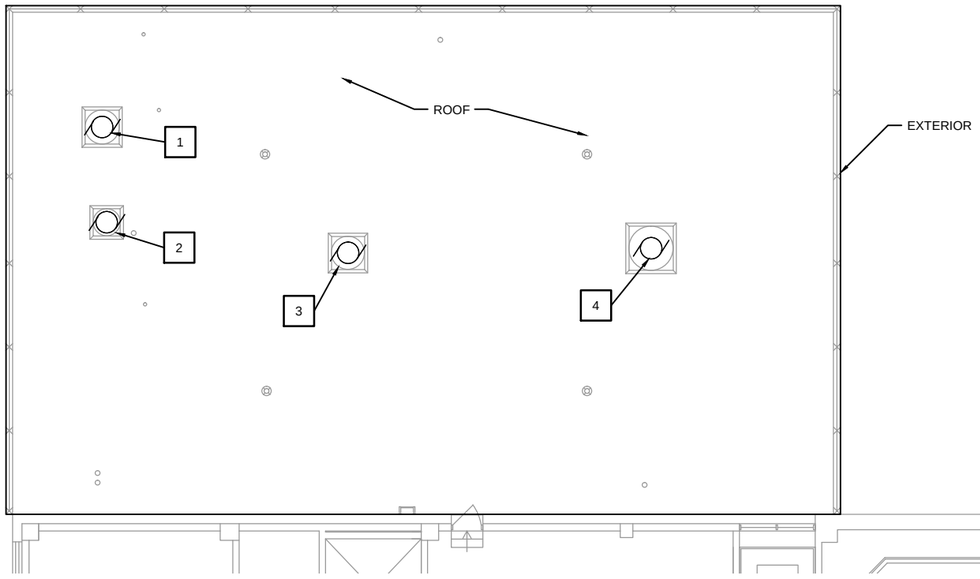
KEY NOTES: XXX

1 CONNECT POWER EF-4, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)

2 CONNECT POWER EF-5, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)

3 CONNECT POWER EF-3, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)

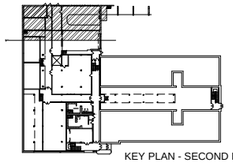
4 CONNECT POWER EF-2, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)



SECOND FLOOR SOUTH DUCTWORK ELECTRCAL PLAN - PROPOSED

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)



KEY PLAN - SECOND FLOOR

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
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SECOND FLOOR NORTH DUCTWORK
ELECTRICAL PLAN - PROPOSED

FILE NO. 00616097
SHEET E-14

GENERAL NOTES:

1. REFER TO AND COORDINATE WITH M-DRAWINGS.
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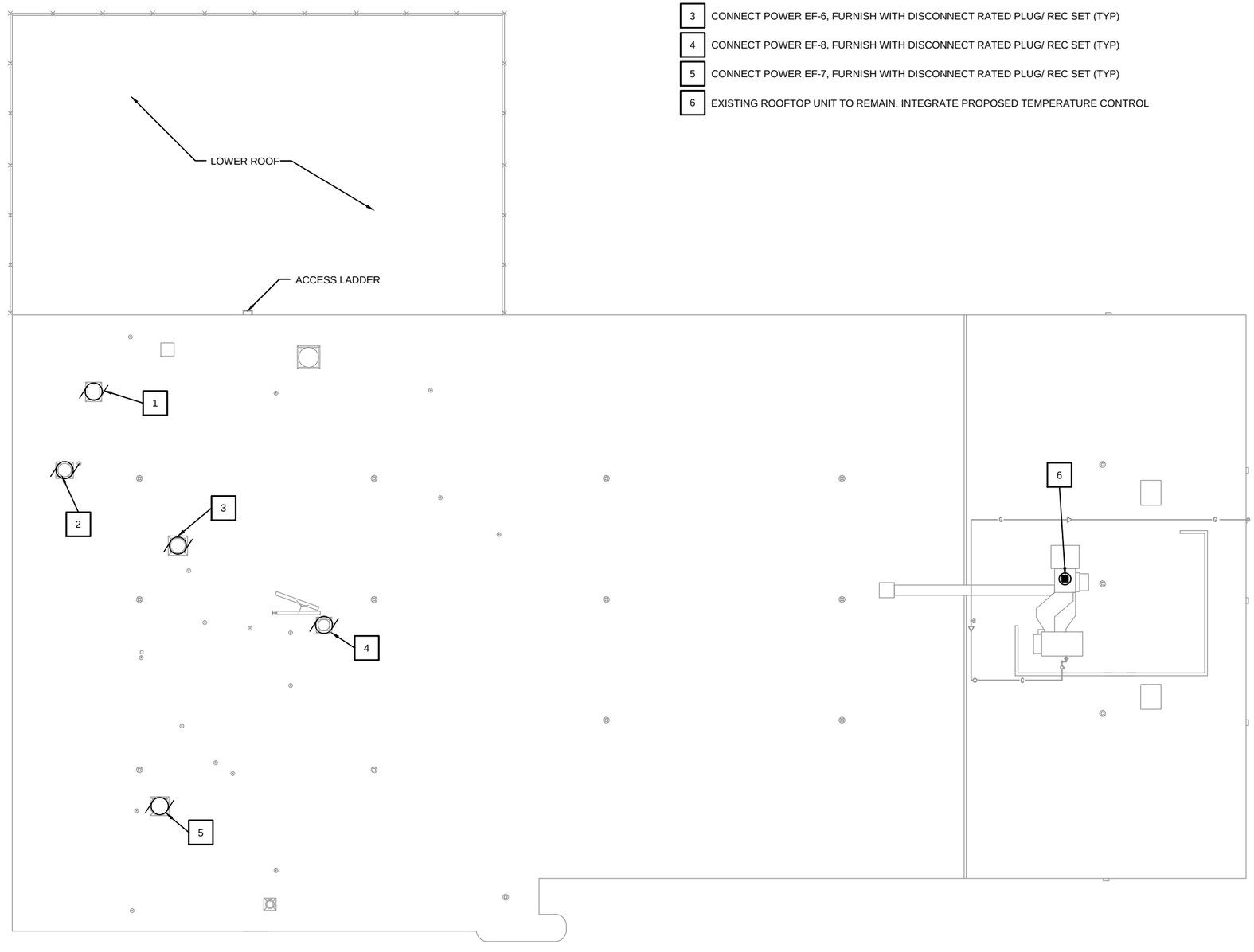
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

1. CONNECT POWER EF-1, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)
2. CONNECT POWER EF-9, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)
3. CONNECT POWER EF-6, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)
4. CONNECT POWER EF-8, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)
5. CONNECT POWER EF-7, FURNISH WITH DISCONNECT RATED PLUG/ REC SET (TYP)
6. EXISTING ROOFTOP UNIT TO REMAIN. INTEGRATE PROPOSED TEMPERATURE CONTROL



ROOF DUCTWORK ELECTRCLA PLAN- PROPOSED

0 4 8 16

SCALE: 1/8 " = 1'-0" (22x34)
SCALE: 1/16 " = 1'-0" (11x17)

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LAKEWOOD, MN

ROOF DUCTOWRK
ELECTRICAL PLAN - PROPOSED

FILE NO. 00616097
SHEET E-15

GENERAL NOTES:

1. REFER TO AND COORDINATE WITH M-DRAWINGS.
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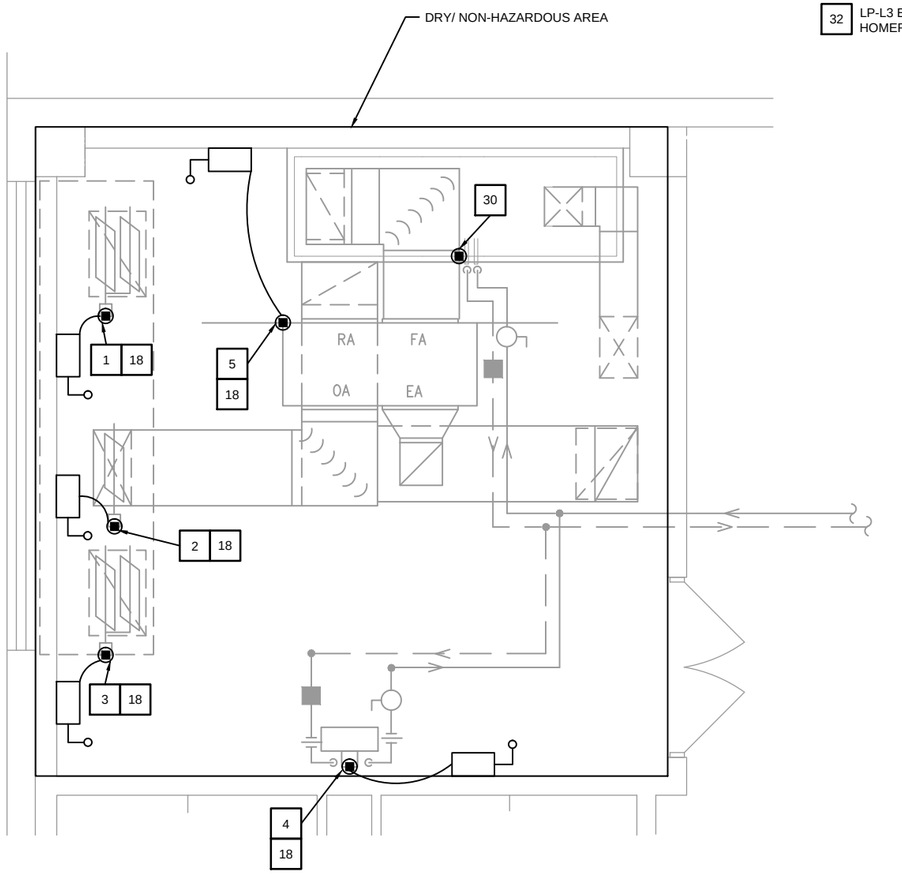
4. REFER TO SCHEDULES FOR WORK.

KEY NOTES: XXX

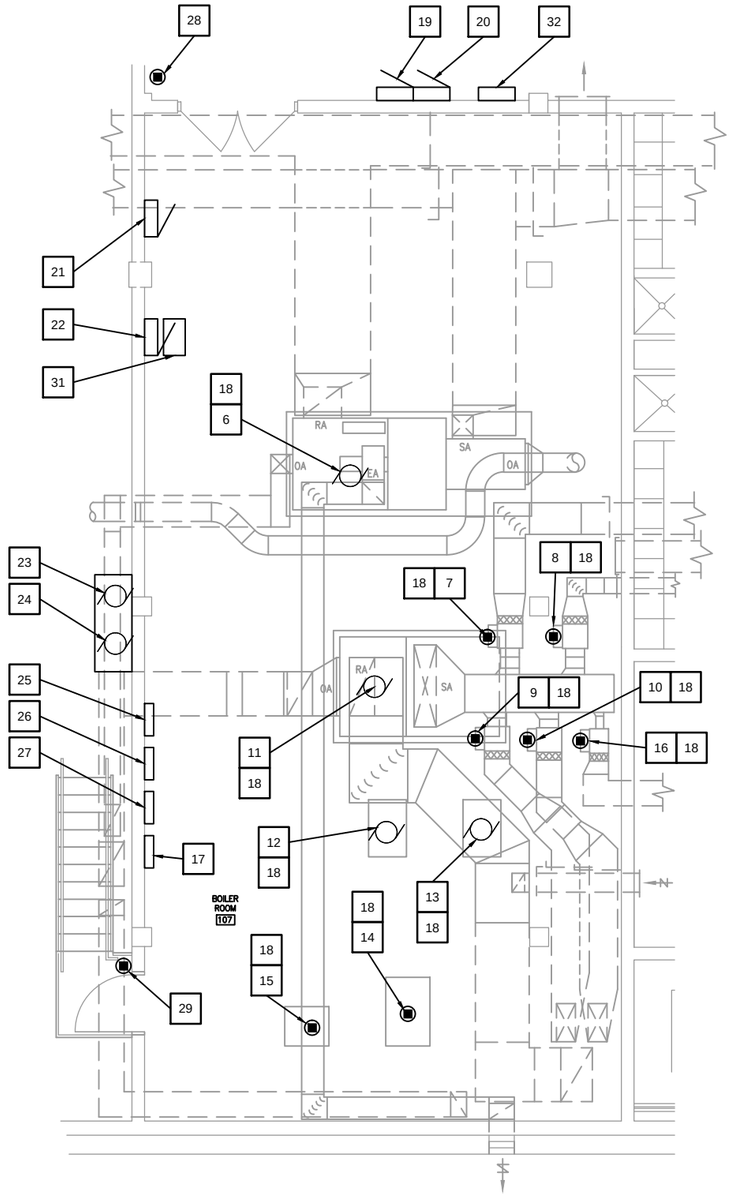
1 MD-1
2 MD-10
3 MD-2
4 UH-17
5 ENV-1
6 D-2
7 VAV-1
8 VAV-2
9 VAV-4
10 VAV-6
11 AHU-1
12 H-1
13 H-2
14 B-1 EXISTING TO REMAIN. CONNECT SIGNALS FOR AUTOMATIC CONTROL
15 B-2 EXISTING TO REMAIN.CONNECT SIGNALS FOR AUTOMATIC CONTROL
16 VAV-5
17 TEMPERATURE CONTROL CABINET
18 DISCONNECTS SHALL BE DISCONNECT RATED PLUG/ REC SET. WALL DISCONNECT ARE SHOW FOR CLARITY ONLY
19 LP-1A
20 LP-1B
21 LP-4A
22 LP-4B
23 SAMPLE PUMP 1 SP-1
24 SAMPLE PUMP 2 SP-2
25 AHU-VFD
26 P-VDF-1
27 P-VFD-2
28 EXISTING BOILER E-STOP
29 FURNISH AND INSTALL NEW BOILER E-STOP
30 AHU-3
31 XFMR-LP-L4B WALL MOUNT ABOVE LP-L4B
32 LP-L3 ENCLOSED CB DISCONNECT HOMERUN TO XFMR-LP-L3



1 UPPER MECHANICAL ROOM ENLARGED PLAN
E-16

0 1 2 4 6

SCALE: 3/8" = 1'-0" (22x34)
SCALE: 3/16" = 1'-0" (11x17)



2 LOWER LEVEL BOILER ROOM ENLARGED PLAN - PROPOSED
E-16

0 2 4 8

SCALE: 3/8" = 1'-0" (22x34)
SCALE: 3/16" = 1'-0" (11x17)

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
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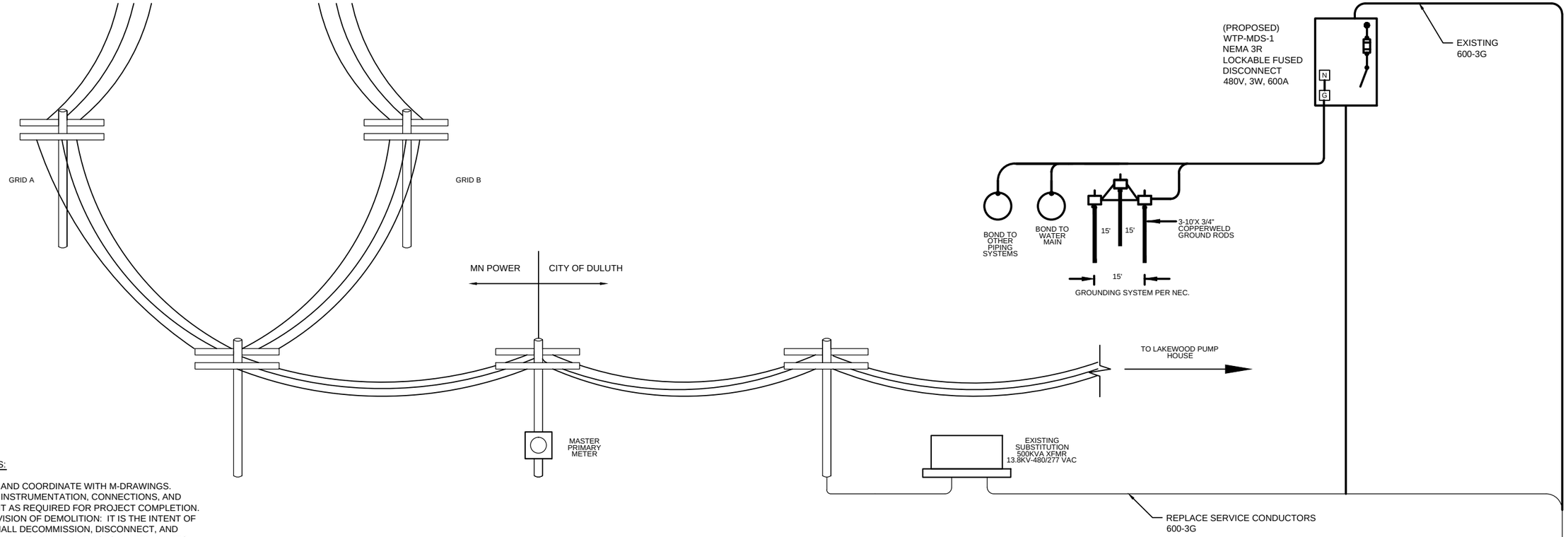
LAKEWOOD, MN

ELECTRCLA PLANS ENLARGED

FILE NO. 00616097
SHEET E-16



GENERAL NOTES:

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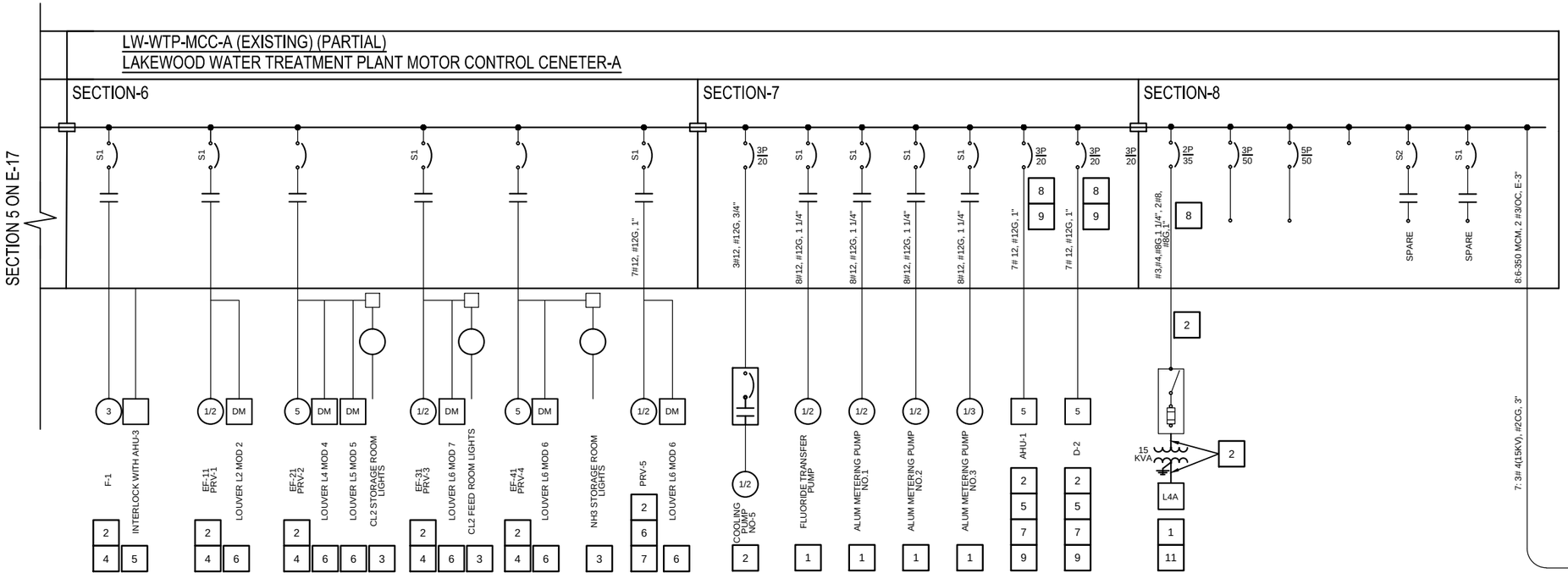
4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

KEY NOTES: XXX

1. EXISTING EQUIPMENT, DEVICES, AND MATERIALS TO REMAIN.
2. DECOMMISSION, DISCONNECT, AND DEMOLISH EXISTING EQUIPMENT, DEVICES, AND CONNECTION MATERIALS COMPLETE. REUSE OF EXISTING CIRCUITS SHALL BE ALLOWED WHEN THE EXISTING CIRCUITS DERIVE FROM AND TERMINATE IN CORRECT LOCATIONS. OTHERWISE THE EXISTING CONTROL, FEEDERS, CIRCUIT, ETC. SHALL BE REMOVED AND REPLACED.
3. REFEED AND FURNISH NEW INTERLOCK CONTROL FOR EXISTING LIGHTING.
4. REUSE EXISTING MOTOR CONTROL AND FEEDER.
5. CONTROL BY MC.
6. REFEED FROM LB-LP4B, FURNISH CONTROL AND INTERLOCKS PER MC.
7. FURNISH AND INSTALL NEW FEEDER, MOTOR CONTROL, AND CONNECTIONS AS SCHEDULED.
8. REPLACE AND UPGRADE MCC BUCKET TO PROVIDE NEW 300/3P CB DISCONNECT BUCKET CIRCUIT BREAKER AND FEEDER. REFER TO E-19.
9. FURNISH AND INSTALL NEW EQUIPMENT, MATERIALS, DEVICES, WIRING, ETC. (COMPLETE).
10. DECOMMISSION FEEDER BUCKET
11. REFEED AS SHOWN ON E-19



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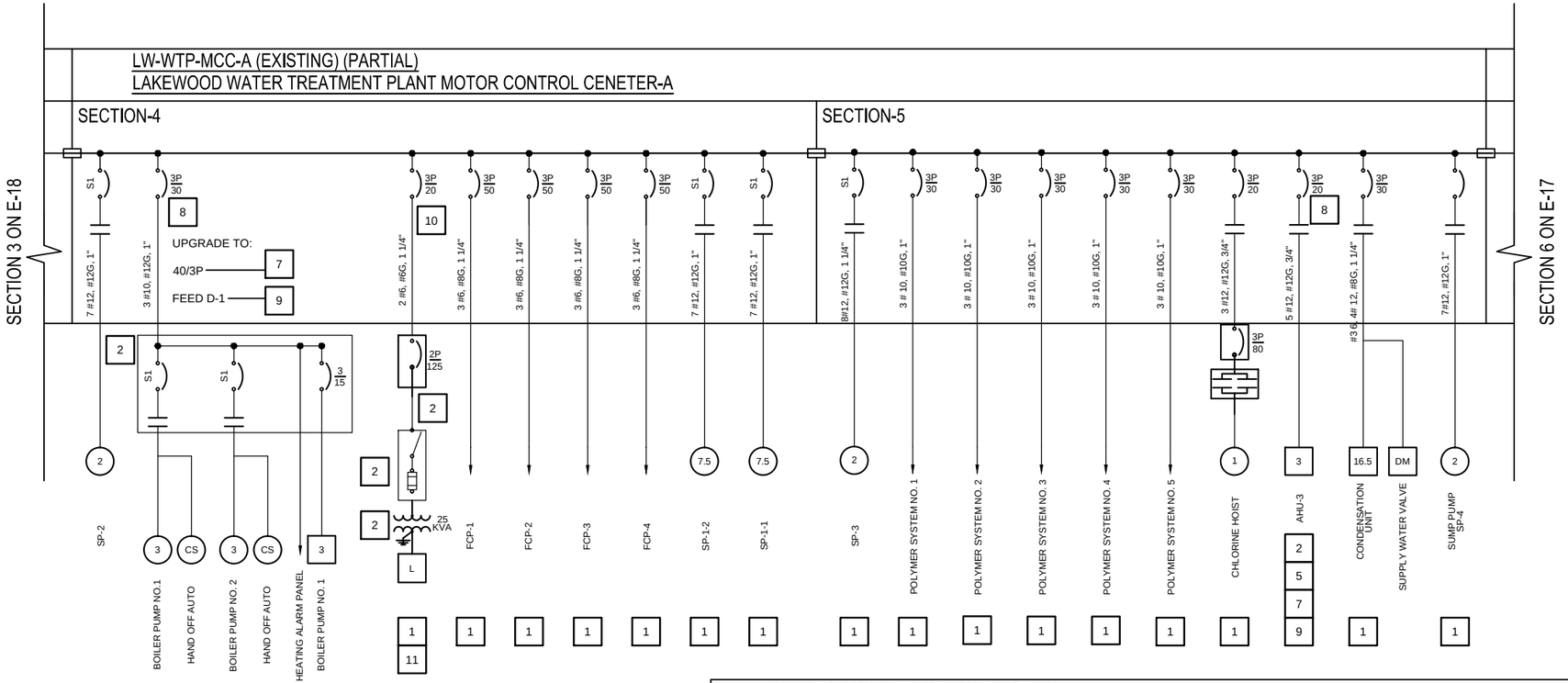
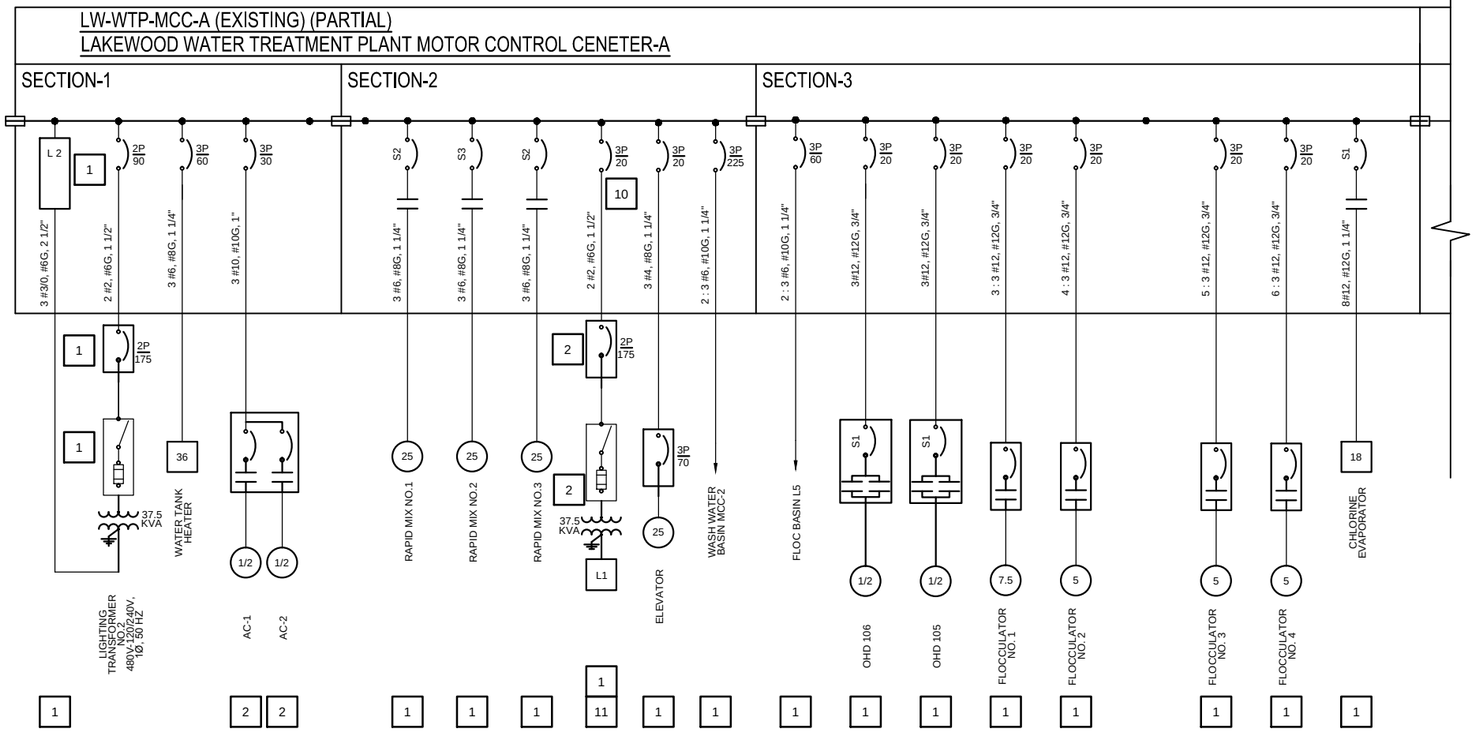
EXISTING ONE-LINE DIAGRAM NO.1

FILE NO. 00616097
SHEET E-17





KEY NOTES: XXX

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3. REFEED AND FURNISH NEW INTERLOCK CONTROL FOR EXISTING LIGHTING.
4. REUSE EXISTING MOTOR CONTROL AND FEEDER.
5. CONTROL BY MC.
6. REFEED FROM LB-LP4B, FURNISH CONTROL AND INTERLOCKS PER MC.
7. FURNISH AND INSTALL NEW FEEDER, MOTOR CONTROL, AND CONNECTIONS AS SCHEDULED.
8. REPLACE AND UPGRADE MCC BUCKET TO PROVIDE NEW 50/3P CIRCUIT BREAKER AND FEEDER. REFER TO E-19.
9. FURNISH AND INSTALL NEW EQUIPMENT, MATERIALS, DEVICES, WIRING, ETC. (COMPLETE).
10. DECOMMISSION FEEDER BUCKET.
11. REFEED AS SHOWN ON E-19.

GENERAL NOTES:

1. REFER TO AND COORDINATE WITH M-DRAWINGS.
2. DEMO ALL INSTRUMENTATION, CONNECTIONS, AND EQUIPMENT AS REQUIRED FOR PROJECT COMPLETION.
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4. EC SHALL SUPPORT DISCONNECTING ALL EQUIPMENT SHOWN AND REQUIRED TO COMPLETE PROJECT.

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

EXISTING ONE-LINE DIAGRAM NO. 2

FILE NO. 00616097

SHEET E-18

WTP-MCC-A (EXISTING PARTIAL)
LAKEWOOD WATER TREATMENT PLANT MOTOR CONTROL CENTER NO. 1
600A HORIZONTAL/300 AMP VERTICAL

EXISTING MCC IS SQUARE D
MODEL 4 MCC

1	2	3	4	5	6	7	8

REMOVE EXSTING SPACE BUCKET
AND FURNISH AND INSTALL NEW
200 AMP DISCONNECT BUCKET
SQUARE D MODEL 4 MCC

NEW
200-3G

50-3G

NEW J-BOX

FURNISH W/ LOCK OUT TABS

WTP-PP1
480V, 3W
3Ø, 200 AMP
21KVA

NEW
XFMR-LP4B
30 KVA
480-208/120
WALL MOUNTED W/ BRACKET

200-4G ((4) #3 & (1) #8G IN 1 1/4" C.)

60-3G ((3) #6 & (1) #8G IN 3/4" C.)

LP4B
208/140V
4W, 3Ø
200 AMP

LP-4A

PRV
7

LGT

LGT

BOILER CONTRACTOR

AKA EF07
CONFIRM SIZE AND RECONNECT

NEW BOILER E-STOP

EXISTING BOILER E-STOP

70-3G

100-3G

XFMR-LP-L1
480-240/120
1Ø, 3W
25KVA

XFMR-LP-L3
480-240/120
1Ø, 3W
37.5KVA

150-3G

150
3P

DS-L

200-3G

200
3P

150-3G

200-3G

LP-L

LP-L3

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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MARCH 7, 2016
Date

44287
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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

ONE-LINE DIAGRAM FOR POWER SUPPLY

FILE NO.
00616097

SHEET
E-19

1 EXISTING TEMPERATURE CONTROL PANEL NO.2 TO BE DEMOLISHED

2 EXISTING CONDENSATE PUMPS TO BE DEMOLISHED

3 ELECTRICAL CONNECTION TO EXISTING ROOFTOP UNIT TO REMAIN

4 EXISITNG ROOFTOP DEHUMIDIFIER TO BE REMOVED

5 HEAT PUMPS AND MISC EQUPIMENT TO BE DEMOLISHED

6 ROOFTOP ELECTRICAL CONNECTIONS TO BE ABANDONED

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS

CITY OF DULUTH
LAKEWOOD, MN

PROCESS RISER DIAGRAM

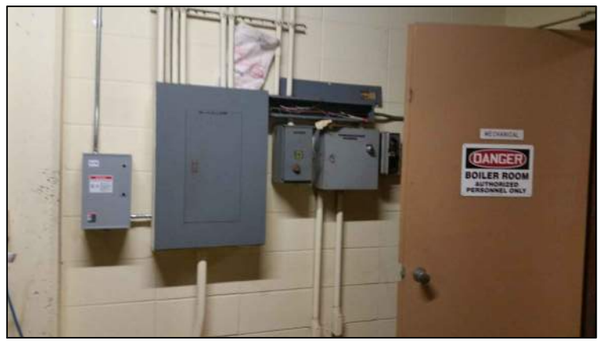
FILE NO. 00616097

SHEET E-20

1 DATA ROOM

2 EXISTING BOILERS AND WATER HEATER TO REMAIN

3 EXISTING HVAC PANELS TO BE REMOVED AND REPALCED



4 EXISTING LP-L4A AND EQUIPMENT

5 EXISTING WTP-MCC-A TO REMAIN

6 EXISTING WTP-MCC-A TO REMAIN

7 EXISTING WTP-MCC-A TO REMAIN

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

ELECTRICAL PHOTOS

FILE NO. 00616097
SHEET E-21

SINGLE PHASE PANEL SCHEDULE — PANEL ID/TAG: LP-L2 (EXISITNG)

TYPE: LIGHTING AND APPLIANCE PANEL (EXISTING TO REMAIN/MODIFY AS REQURIED) — BUS CONSTRUCTION: CU — BUS AMPACITY: NA
VOLTAGE: 240 WYE /120V — GROUND BUS: YES — MAIN CIRCUIT BREAKER: NONE
PHASE/WIRE: 1P-3W — ISOLATED GROUND BUS: YES — SUB-FEED LUGS: NA
MOUNT: SURFACE — INTERRUPTING CAPACITY: 10 KAIC

LOADS SERVED LGT	REC.	MECH.	OTHER	DESCRIPTION	LOAD AMP	BKR SIZE	BKR POLE		A AMP	B AMP		BKR POLE	BKR SIZE	LOAD AMP	DESCRIPTION	LOADS SERVED LGT	REC.	MECH.	OTHER	
						20	1	1	0.0	***	2	1	20							2
						20	1	3	***	0.0	4	1	20							4
						20	1	5	0.0	***	6	1	20							6
						20	1	7	***	0.0	8	1	20							8
						20	1	9	0.0	***	10	1	20							10
						20	1	11	***	0.0	12	1	20							12
						20	1	13	0.0	***	14	1	20							14
						20	1	15	***	0.0	16	1	20							16
						20	1	17	0.0	***	18	1	20							18
						20	1	19	***	0.0	20	1	20							20
						20	1	21	0.0	***	22	1	20							22
						20	1	23	***	0.0	24	1	20							24
						20	1	25	0.0	***	26	1	20							26
						20	1	27	***	0.0	28	1	20							28
						20	1	29	0.0	***	30	1	20							30
						20	1	31	***	0.0	32	1	20							32
						20	1	33	0.0	***	34	1	20							34
						20	1	35	***	0.0	36	1	20							36
						20	1	37	0.0	***	38	1	20							38
						20	1	39	***	0.0	40	1	20							40
						20	1	41	0.0	***	42	1	20							42
0	0	0	0	:LOADS BY TYPE											LOADS BY TYPE:	0	0	0	0	
				TOTAL AMPS / PHASE:					0.0	0.0					TOTAL LOADS BY TYPE:	0	0	0	0	
				KVA / PHASE:					0.0	0.0					TOTAL CONNECTED KVA: 0.0					

GENERAL PANEL CONSTRUCTION NOTES:
1. ALL WORK BY THIS CONTRACTOR TO COMPLY WITH ALL LOCAL, STATE AND NATIONAL ELECTRICAL CODES.
2. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH OTHER TRADES TO AVOID CONFLICTS AND TO VERIFY ALL EQUIPMENT CONNECTION REQUIREMENTS.
3. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM PER CONTRACT DOCUMENTS AND ENSURING THAT THE SYSTEM IS OPERATIONAL UPON JOB COMPLETION.
4. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM FOR ALL OWNER-FURNISHED APPLIANCES IN ACCORDANCE WITH NEC ARTICLE 422 AND 440.22.
5. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL BRANCH CIRCUIT WIRING IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND THESE PROJECT DOCUMENTS
6. PROVIDE ALL POWER WIRING INCLUDING ALL CIRCUITRY CARRYING ELECTRICAL ENERGY FROM PANELBOARD OR OTHER SOURCE THROUGH STARTERS AND DISCONNECTS TO MOTORS, PACKAGED EQUIPMENT, OR PACKAGED CONTROL PANELS. PROVIDE ALL WIRING BETWEEN CONTROL PANELS AND MOTORS. I
7. MOTORS CONNECTED TO EMERGENCY SYSTEMS CIRCUITRY SHALL HAVE CIRCUITRY INSTALLED IN SEPARATE RACEWAY PER NEC ARTICLE 700.
8. PROVIDE SEPARATE GREEN GROUND FOR EACH MOTOR AND EQUIPMENT CONNECTION ROUTED BACK TO INTEGRAL GROUND BUS OF ASSOCIATED PANELBOARD OR MOTOR CONTROL CENTER. GROUND CONDUCTOR SIZES PER NEC ARTICLE 250.122.
9. ALL HEATING, AIR CONDITIONING AND REFRIGERATION EQUIPMENT INSTALLED ON THE EXTERIOR OF THE BUILDING OR ROOF TOP SHALL HAVE A 15 AMP, 125V WEATHER-RESISTANT GFCI RECEPTACLE SURFACE MOUNTED IN WEATHERPROOF ENCLOSURE, MOUNTED ADJACENT TO EQUIPMENT.
10. THIS CONTRACTOR SHALL VERIFY ELECTRICAL REQUIREMENTS INCLUDING VOLTAGE, HORSEPOWER, STARTER TYPE, AND DISCONNECTING MEANS FOR MOTORS AND EQUIPMENT PRIOR TO ORDERING CIRCUIT BREAKERS, DISCONNECT SWITCHES, AND STARTERS
11. REFER TO ONE-LINE AND P&ID'S FOR ADDITIONAL INFORMATION AND DETIAL.
12. REFER TO FEEDER SCHEUDLE FOR ADDITIONAL INFORMATION AND DETIAL.

PANEL NOTES:
* NA

SINGLE PHASE PANEL SCHEDULE — PANEL ID/TAG: LP-L2 (EXISITNG)

TYPE: LIGHTING AND APPLIANCE PANEL (EXISTING TO REMAIN/MODIFY AS REQURIED) — BUS CONSTRUCTION: CU — BUS AMPACITY: NA
VOLTAGE: 240 WYE /120V — GROUND BUS: YES — MAIN CIRCUIT BREAKER: NONE
PHASE/WIRE: 1P-3W — ISOLATED GROUND BUS: YES — SUB-FEED LUGS: NA
MOUNT: SURFACE — INTERRUPTING CAPACITY: 10 KAIC

LOADS SERVED LGT	REC.	MECH.	OTHER	DESCRIPTION	LOAD AMP	BKR SIZE	BKR POLE		A AMP	B AMP		BKR POLE	BKR SIZE	LOAD AMP	DESCRIPTION	LOADS SERVED LGT	REC.	MECH.	OTHER	
						20	1	1	0.0	***	2	1	20							2
						20	1	3	***	0.0	4	1	20							4
						20	1	5	0.0	***	6	1	20							6
						20	1	7	***	0.0	8	1	20							8
						20	1	9	0.0	***	10	1	20							10
						20	1	11	***	0.0	12	1	20							12
						20	1	13	0.0	***	14	1	20							14
						20	1	15	***	0.0	16	1	20							16
						20	1	17	0.0	***	18	1	20							18
						20	1	19	***	0.0	20	1	20							20
						20	1	21	0.0	***	22	1	20							22
						20	1	23	***	0.0	24	1	20							24
						20	1	25	0.0	***	26	1	20							26
						20	1	27	***	0.0	28	1	20							28
						20	1	29	0.0	***	30	1	20							30
						20	1	31	***	0.0	32	1	20							32
						20	1	33	0.0	***	34	1	20							34
						20	1	35	***	0.0	36	1	20							36
						20	1	37	0.0	***	38	1	20							38
						20	1	39	***	0.0	40	1	20							40
						20	1	41	0.0	***	42	1	20							42
0	0	0	0	:LOADS BY TYPE											LOADS BY TYPE:	0	0	0	0	
				TOTAL AMPS / PHASE:					0.0	0.0					TOTAL LOADS BY TYPE:	0	0	0	0	
				KVA / PHASE:					0.0	0.0					TOTAL CONNECTED KVA: 0.0					

GENERAL PANEL CONSTRUCTION NOTES:
1. ALL WORK BY THIS CONTRACTOR TO COMPLY WITH ALL LOCAL, STATE AND NATIONAL ELECTRICAL CODES.
2. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH OTHER TRADES TO AVOID CONFLICTS AND TO VERIFY ALL EQUIPMENT CONNECTION REQUIREMENTS.
3. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM PER CONTRACT DOCUMENTS AND ENSURING THAT THE SYSTEM IS OPERATIONAL UPON JOB COMPLETION.
4. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM FOR ALL OWNER-FURNISHED APPLIANCES IN ACCORDANCE WITH NEC ARTICLE 422 AND 440.22.
5. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL BRANCH CIRCUIT WIRING IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND THESE PROJECT DOCUMENTS
6. PROVIDE ALL POWER WIRING INCLUDING ALL CIRCUITRY CARRYING ELECTRICAL ENERGY FROM PANELBOARD OR OTHER SOURCE THROUGH STARTERS AND DISCONNECTS TO MOTORS, PACKAGED EQUIPMENT, OR PACKAGED CONTROL PANELS. PROVIDE ALL WIRING BETWEEN CONTROL PANELS AND MOTORS. I
7. MOTORS CONNECTED TO EMERGENCY SYSTEMS CIRCUITRY SHALL HAVE CIRCUITRY INSTALLED IN SEPARATE RACEWAY PER NEC ARTICLE 700.
8. PROVIDE SEPARATE GREEN GROUND FOR EACH MOTOR AND EQUIPMENT CONNECTION ROUTED BACK TO INTEGRAL GROUND BUS OF ASSOCIATED PANELBOARD OR MOTOR CONTROL CENTER. GROUND CONDUCTOR SIZES PER NEC ARTICLE 250.122.
9. ALL HEATING, AIR CONDITIONING AND REFRIGERATION EQUIPMENT INSTALLED ON THE EXTERIOR OF THE BUILDING OR ROOF TOP SHALL HAVE A 15 AMP, 125V WEATHER-RESISTANT GFCI RECEPTACLE SURFACE MOUNTED IN WEATHERPROOF ENCLOSURE, MOUNTED ADJACENT TO EQUIPMENT.
10. THIS CONTRACTOR SHALL VERIFY ELECTRICAL REQUIREMENTS INCLUDING VOLTAGE, HORSEPOWER, STARTER TYPE, AND DISCONNECTING MEANS FOR MOTORS AND EQUIPMENT PRIOR TO ORDERING CIRCUIT BREAKERS, DISCONNECT SWITCHES, AND STARTERS
11. REFER TO ONE-LINE AND P&ID'S FOR ADDITIONAL INFORMATION AND DETIAL.
12. REFER TO FEEDER SCHEUDLE FOR ADDITIONAL INFORMATION AND DETIAL.

PANEL NOTES:
* NA

SINGLE PHASE PANEL SCHEDULE — PANEL ID/TAG: LP-L4A (EXISTING)

TYPE: LIGHTING AND APPLIANCE PANEL (EXISTING TO REMAIN/MODIFY AS REQURIED) — BUS CONSTRUCTION: CU — BUS AMPACITY: NA
VOLTAGE: 240 WYE /120V — GROUND BUS: YES — MAIN CIRCUIT BREAKER: NONE
PHASE/WIRE: 1P-3W — ISOLATED GROUND BUS: YES — SUB-FEED LUGS: YES
MOUNT: SURFACE — INTERRUPTING CAPACITY: 10 KAIC

LOADS SERVED LGT	REC.	MECH.	OTHER	DESCRIPTION	LOAD AMP	BKR SIZE	BKR POLE		A AMP	B AMP		BKR POLE	BKR SIZE	LOAD AMP	DESCRIPTION	LOADS SERVED LGT	REC.	MECH.	OTHER	
				#4 ZONE HEATERS		20	1	1	0.0	***	2	1	20		LOWER GALLERY REC					2
				#3 ZONE HEATERS		20	1	3	***	0.0	4	1	20		LOWER GALLERY LIGHTS					4
				LIGHTS FILTER NO.5		20	1	5	0.0	***	6	1	20		LOWER GALLERY UNIT HEATERS					6
				2ND FLOOR GALLERY LIGHTS		20	1	7	***	0.0	8	1	20		STAIRS LIGHTS					8
				LIGHTS 2ND FLOOR GALLERY		20	1	9	0.0	***	10	1	20		2ND FLOOR GALLERY REC					10
				SPARE		20	1	11	***	0.0	12	1	20		FILTER NO 6 LIGHTS					12
				SPARE		20	1	13	0.0	***	14	1	20		#2 ZONE HEATERS					14
				SPARE		20	2	15	***	0.0	16	1	20		#1 ZONE HEATERS					16
						I	2	17	0.0	***	18	2	20		SPARE					18
				SPACE				19	***	0.0	20	2	20		ENTRY GATE					20
				SPACE				21	0.0	***	22	2	1							22
				SPACE				23	***	0.0	24				SPACE					24
				SPACE				25	0.0	***	26				SPACE					26
				SPACE				27	***	0.0	28				SPACE					28
				SPACE				29	0.0	***	30				SPACE					30
				SPACE				31	***	0.0	32				SPACE					32
				SPACE				33	0.0	***	34				SPACE					34
				SPACE				35	***	0.0	36				SPACE					36
				SPACE				37	0.0	***	38				SPACE					38
				SPACE				39	***	0.0	40				SPACE					40
				SPACE				41	0.0	***	42				SPACE					42
0	0	0	0	:LOADS BY TYPE												LOADS BY TYPE:	0	0	0	0
				TOTAL AMPS / PHASE:					0.0	0.0						TOTAL LOADS BY TYPE:	0	0	0	0
				KVA / PHASE:					0.0	0.0						TOTAL CONNECTED KVA: 0.0				

GENERAL PANEL CONSTRUCTION NOTES:
1. ALL WORK BY THIS CONTRACTOR TO COMPLY WITH ALL LOCAL, STATE AND NATIONAL ELECTRICAL CODES.
2. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH OTHER TRADES TO AVOID CONFLICTS AND TO VERIFY ALL EQUIPMENT CONNECTION REQUIREMENTS.
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4. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM FOR ALL OWNER-FURNISHED APPLIANCES IN ACCORDANCE WITH NEC ARTICLE 422 AND 440.22.
5. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL BRANCH CIRCUIT WIRING IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND THESE PROJECT DOCUMENTS
6. PROVIDE ALL POWER WIRING INCLUDING ALL CIRCUITRY CARRYING ELECTRICAL ENERGY FROM PANELBOARD OR OTHER SOURCE THROUGH STARTERS AND DISCONNECTS TO MOTORS, PACKAGED EQUIPMENT, OR PACKAGED CONTROL PANELS. PROVIDE ALL WIRING BETWEEN CONTROL PANELS AND MOTORS. I
7. MOTORS CONNECTED TO EMERGENCY SYSTEMS CIRCUITRY SHALL HAVE CIRCUITRY INSTALLED IN SEPARATE RACEWAY PER NEC ARTICLE 700.
8. PROVIDE SEPARATE GREEN GROUND FOR EACH MOTOR AND EQUIPMENT CONNECTION ROUTED BACK TO INTEGRAL GROUND BUS OF ASSOCIATED PANELBOARD OR MOTOR CONTROL CENTER. GROUND CONDUCTOR SIZES PER NEC ARTICLE 250.122.
9. ALL HEATING, AIR CONDITIONING AND REFRIGERATION EQUIPMENT INSTALLED ON THE EXTERIOR OF THE BUILDING OR ROOF TOP SHALL HAVE A 15 AMP, 125V WEATHER-RESISTANT GFCI RECEPTACLE SURFACE MOUNTED IN WEATHERPROOF ENCLOSURE, MOUNTED ADJACENT TO EQUIPMENT.
10. THIS CONTRACTOR SHALL VERIFY ELECTRICAL REQUIREMENTS INCLUDING VOLTAGE, HORSEPOWER, STARTER TYPE, AND DISCONNECTING MEANS FOR MOTORS AND EQUIPMENT PRIOR TO ORDERING CIRCUIT BREAKERS, DISCONNECT SWITCHES, AND STARTERS
11. REFER TO ONE-LINE AND P&ID'S FOR ADDITIONAL INFORMATION AND DETIAL.
12. REFER TO FEEDER SCHEUDLE FOR ADDITIONAL INFORMATION AND DETIAL.

PANEL NOTES:
* NA

SINGLE PHASE PANEL SCHEDULE — PANEL ID/TAG: LP-L4B (PROPOSED)

TYPE: LIGHTING AND APPLIANCE PANEL — BUS CONSTRUCTION: CU — BUS AMPACITY: 125 AMP
VOLTAGE: 208 WYE /120V — GROUND BUS: YES — MAIN CIRCUIT BREAKER: 100
PHASE/WIRE: 3P-4W — ISOLATED GROUND BUS: YES — SUB-FEED LUGS: NO
MOUNT: SURFACE — INTERRUPTING CAPACITY: 10 KAIC

LOADS SERVED LGT	REC.	MECH.	OTHER	DESCRIPTION	LOAD AMP	BKR SIZE	BKR POLE		A AMP	B AMP		BKR POLE	BKR SIZE	LOAD AMP	DESCRIPTION	LOADS SERVED LGT	REC.	MECH.	OTHER	
			0.0	LP-L4A		60	2	1	0.0		2									2
			0.0			I	2	3		0.0	4									4
				HVAC-TCP-1	13.3	20	1	5	13.3		6									6
								7		0.0	8									8
								9	0.0		10									10
								11		0.0	12									12
								13	0.0		14									14
								15		0.0	16									16
								17	0.0		18									18
				SPACE				19		0.0	20									20
				SPACE				21	0.0		22									22
				SPACE				23		0.0	24				SPACE					24
				SPACE				25	0.0		26				SPACE					26
				SPACE				27		0.0	28				SPACE					28
				SPACE				29	0.0		30				SPACE					30
				SPACE				31		0.0	32				SPACE					32
				SPACE				33	0.0		34				SPACE					34
				SPACE				35		0.0	36				SPACE					36
				SPACE				37	0.0		38				SPACE					38
				SPACE				39		0.0	40				SPACE					40
				SPACE				41	0.0		42				SPACE					42
0	0	0	0	:LOADS BY TYPE												LOADS BY TYPE:	0	0	0	0
				TOTAL AMPS / PHASE:					13.3	0.0						TOTAL LOADS BY TYPE:	0	0	0	0
				KVA / PHASE:					1.6	0.0						TOTAL CONNECTED KVA: 1.6				

GENERAL PANEL CONSTRUCTION NOTES:
1. ALL WORK BY THIS CONTRACTOR TO COMPLY WITH ALL LOCAL, STATE AND NATIONAL ELECTRICAL CODES.
2. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH OTHER TRADES TO AVOID CONFLICTS AND TO VERIFY ALL EQUIPMENT CONNECTION REQUIREMENTS.
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4. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM FOR ALL OWNER-FURNISHED APPLIANCES IN ACCORDANCE WITH NEC ARTICLE 422 AND 440.22.
5. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL BRANCH CIRCUIT WIRING IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND THESE PROJECT DOCUMENTS
6. PROVIDE ALL POWER WIRING INCLUDING ALL CIRCUITRY CARRYING ELECTRICAL ENERGY FROM PANELBOARD OR OTHER SOURCE THROUGH STARTERS AND DISCONNECTS TO MOTORS, PACKAGED EQUIPMENT, OR PACKAGED CONTROL PANELS. PROVIDE ALL WIRING BETWEEN CONTROL PANELS AND MOTORS. I
7. MOTORS CONNECTED TO EMERGENCY SYSTEMS CIRCUITRY SHALL HAVE CIRCUITRY INSTALLED IN SEPARATE RACEWAY PER NEC ARTICLE 700.
8. PROVIDE SEPARATE GREEN GROUND FOR EACH MOTOR AND EQUIPMENT CONNECTION ROUTED BACK TO INTEGRAL GROUND BUS OF ASSOCIATED PANELBOARD OR MOTOR CONTROL CENTER. GROUND CONDUCTOR SIZES PER NEC ARTICLE 250.122.
9. ALL HEATING, AIR CONDITIONING AND REFRIGERATION EQUIPMENT INSTALLED ON THE EXTERIOR OF THE BUILDING OR ROOF TOP SHALL HAVE A 15 AMP, 125V WEATHER-RESISTANT GFCI RECEPTACLE SURFACE MOUNTED IN WEATHERPROOF ENCLOSURE, MOUNTED ADJACENT TO EQUIPMENT.
10. THIS CONTRACTOR SHALL VERIFY ELECTRICAL REQUIREMENTS INCLUDING VOLTAGE, HORSEPOWER, STARTER TYPE, AND DISCONNECTING MEANS FOR MOTORS AND EQUIPMENT PRIOR TO ORDERING CIRCUIT BREAKERS, DISCONNECT SWITCHES, AND STARTERS
11. REFER TO ONE-LINE AND P&ID'S FOR ADDITIONAL INFORMATION AND DETIAL.
12. REFER TO FEEDER SCHEUDLE FOR ADDITIONAL INFORMATION AND DETIAL.

PANEL NOTES:
* NA

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. : .	CHECKED BY: SRC	.	.	.	.
.	.	.	.	.	.

PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 ELECTRICAL SCHEDULES.dwg

I HEREBY CERTIFY THAT THIS PLAN, REPORT, OR SPECIFICATION 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.

SCOTT R. CHILSON — MARCH 7, 2016 (Date) — 44287 (License No.)

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Web Address: www.msa-ps.com

LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

ELECTRICAL SCHEDULES NO.1

FILE NO. 00616097
SHEET E-22

SINGLE PHASE PANEL SCHEDULE — PANEL ID/TAG: LP-L3 LAB (EXISITNG)

TYPE: LIGHTING AND APPLIANCE PANEL (EXISTING TO REMAIN/MODIFY AS REQURIED)
VOLTAGE: 240 WYE /120V
PHASE/WIRE: 1P-3W
MOUNT: SURFACE

BUS CONSTRUCTION: CU
GROUND BUS: YES
ISOLATED GROUND BUS: YES

BUS AMPACITY: NA
MAIN CIRCUIT BREAKER: NONE
SUB-FEED LUGS: NA
INTERRUPTING CAPACITY: 10 KAIC

LOADS SERVED LGT	REC.	MECH.	OTHER	DESCRIPTION	LOAD AMP	BKR SIZE	BKR POLE		A AMP	B AMP		BKR POLE	BKR SIZE	LOAD AMP	DESCRIPTION	LOADS SERVED LGT	REC.	MECH.	OTHER	
				SPARE		20	2	1	0.0	***	2	2	20		206 REC					2
						1	2	3	***	0.0	4	2	1							4
				REC AND FUME HOOD 106		20	1	5	0.0	***	6	1	20		206 REC					6
				REC NE ROOM		20	1	7	***	0.0	8	1	20		206 REC					8
				206 REC		20	1	9	0.0	***	10	2	20		206 REC					10
				SPARE		20	2	11	***	0.0	12	2	1							12
						1	2	13	0.0	***	14	1	20		206 REC					14
				208 REC		30	2	15	***	0.0	16	1	20		206 REC					16
						1	2	17	0.0	***	18	2	20		208 AND 209 REC					18
				220V REC ON WEST WALL		30	2	19	***	0.0	20	2	1							20
						1	2	21	0.0	***	22	2	20		209 REC					22
				AUTOCLAVE 208		20		23	***	0.0	24	2	1							24
				208 AND 209 REC		20		25	0.0	***	26	2	20		NAPCO INCUBATOR					26
				209 AND 213 REC		20		27	***	0.0	28	2	1							28
				209 REC		20		29	0.0	***	30	1	20		REFERIGERATOR 209					30
				213 REC		20		31	***	0.0	32	1	20		REFERIGERATOR 209					32
				213 REC		20		33	0.0	***	34				SPARE					34
				220V REC ON WEST WALL		20	2	35	***	0.0	36				SPACE					36
						1	2	37	0.0	***	38				SPACE					38
				SPACE				39	***	0.0	40				SPACE					40
				SPACE				41	0.0	***	42				SPACE					42
0	0	0	0	:LOADS BY TYPE											LOADS BY TYPE:	0	0	0	0	
				TOTAL AMPS / PHASE:					0.0	0.0					TOTAL LOADS BY TYPE:	0	0	0	0	
				KVA / PHASE:					0.0	0.0					TOTAL CONNECTED KVA: 0.0					

GENERAL PANEL CONSTRUCTION NOTES:
1. ALL WORK BY THIS CONTRACTOR TO COMPLY WITH ALL LOCAL, STATE AND NATIONAL ELECTRICAL CODES.
2. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH OTHER TRADES TO AVOID CONFLICTS AND TO VERIFY ALL EQUIPMENT CONNECTION REQUIREMENTS.
3. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM PER CONTRACT DOCUMENTS AND ENSURING THAT THE SYSTEM IS OPERATIONAL UPON JOB COMPLETION.
4. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM FOR ALL OWNER-FURNISHED APPLIANCES IN ACCORDANCE WITH NEC ARTICLE 422 AND 440.22.
5. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL BRANCH CIRCUIT WIRING IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND THESE PROJECT DOCUMENTS
6. PROVIDE ALL POWER WIRING INCLUDING ALL CIRCUITRY CARRYING ELECTRICAL ENERGY FROM PANELBOARD OR OTHER SOURCE THROUGH STARTERS AND DISCONNECTS TO MOTORS, PACKAGED EQUIPMENT, OR PACKAGED CONTROL PANELS. PROVIDE ALL WIRING BETWEEN CONTROL PANELS AND MOTORS. I
7. MOTORS CONNECTED TO EMERGENCY SYSTEMS CIRCUITRY SHALL HAVE CIRCUITRY INSTALLED IN SEPARATE RACEWAY PER NEC ARTICLE 700.
8. PROVIDE SEPARATE GREEN GROUND FOR EACH MOTOR AND EQUIPMENT CONNECTION ROUTED BACK TO INTEGRAL GROUND BUS OF ASSOCIATED PANELBOARD OR MOTOR CONTROL CENTER. GROUND CONDUCTOR SIZES PER NEC ARTICLE 250.122.
9. ALL HEATING, AIR CONDITIONING AND REFRIGERATION EQUIPMENT INSTALLED ON THE EXTERIOR OF THE BUILDING OR ROOF TOP SHALL HAVE A 15 AMP, 125V WEATHER-RESISTANT GFCI RECEPTACLE SURFACE MOUNTED IN WEATHERPROOF ENCLOSURE, MOUNTED ADJACENT TO EQUIPMENT.
10. THIS CONTRACTOR SHALL VERIFY ELECTRICAL REQUIREMENTS INCLUDING VOLTAGE, HORSEPOWER, STARTER TYPE, AND DISCONNECTING MEANS FOR MOTORS AND EQUIPMENT PRIOR TO ORDERING CIRCUIT BREAKERS, DISCONNECT SWITCHES, AND STARTERS
11. REFER TO ONE-LINE AND P&ID'S FOR ADDITIONAL INFORMATION AND DETIAL.
12. REFER TO FEEDER SCHEUDLE FOR ADDITIONAL INFORMATION AND DETIAL.

PANEL NOTES:
* NA

THREE PHASE PANEL SCHEDULE — PANEL ID/TAG: DC (EXISTING)

TYPE: PANELBOARD (EXISTING TO REMAIN/MODIFY AS REQURIED)
VOLTAGE: 480 WYE /277V
PHASE/WIRE: 3P-4W
MOUNT: SURFACE

BUS CONSTRUCTION: CU
GROUND BUS: YES
ISOLATED GROUND BUS: YES

BUS AMPACITY: NA
MAIN CIRCUIT BREAKER: 200A
SUB-FEED LUGS: NA
INTERRUPTING CAPACITY: NA

LOADS SERVED LGT	REC.	MECH.	OTHER	DESCRIPTION	LOAD AMP	BKR SIZE	BKR POLE		A AMP	B AMP	C AMP		BKR POLE	BKR SIZE	LOAD AMP	DESCRIPTION	LOADS SERVED LGT	REC.	MECH.	OTHER	
								1	0.0	***	***	2									2
				SPACE				3	***	0.0	***	4	3	200		MAIN					4
								5	***	***	0.0	6									6
								7	0.0	***	***	8									8
				FILTER #1 EFFLUENT VALVE		30	3	9	***	0.0	***	10	3	30		FILTER #2 EFFLUENT VALVE					10
								11	***	***	0.0	12									12
								13	0.0	***	***	14									14
				FILTER #2 EFFLUENT VALVE		30	3	15	***	0.0	***	16	3	30		FILTER #4 EFFLUENT VALVE					16
								17	***	***	0.0	18									18
								19	0.0	***	***	20									20
				SPARE		30	3	21	***	0.0	***	22	3	30		SPARE					22
								23	***	***	0.0	24									24
								25	0.0	***	***	26									26
				SPARE		30	3	27	***	0.0	***	28	3	30		SPARE					28
								29	***	***	0.0	30									30
								31	0.0	***	***	32									32
				SPARE		30	3	33	***	0.0	***	34	3	30		WASHWATER SUPPLY VALVE					34
								35	***	***	0.0	36									36
								37	0.0	***	***	38									38
				SPARE		30	3	39	***	0.0	***	40	3	30		BATTERY CHARGER					40
								41	***	***	0.0	42									42
0	0	0	0	:LOADS BY TYPE												LOADS BY TYPE:	0	0	0	0	
				TOTAL AMPS / PHASE:					0.0	0.0	0.0					TOTAL LOADS BY TYPE:	0	0	0	0	
				KVA / PHASE:					0.0	0.0	0.0					TOTAL CONNECTED KVA: 0.0					

GENERAL PANEL CONSTRUCTION NOTES:
1. ALL WORK BY THIS CONTRACTOR TO COMPLY WITH ALL LOCAL, STATE AND NATIONAL ELECTRICAL CODES.
2. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH OTHER TRADES TO AVOID CONFLICTS AND TO VERIFY ALL EQUIPMENT CONNECTION REQUIREMENTS.
3. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM PER CONTRACT DOCUMENTS AND ENSURING THAT THE SYSTEM IS OPERATIONAL UPON JOB COMPLETION.
4. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM FOR ALL OWNER-FURNISHED APPLIANCES IN ACCORDANCE WITH NEC ARTICLE 422 AND 440.22.
5. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL BRANCH CIRCUIT WIRING IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND THESE PROJECT DOCUMENTS
6. PROVIDE ALL POWER WIRING INCLUDING ALL CIRCUITRY CARRYING ELECTRICAL ENERGY FROM PANELBOARD OR OTHER SOURCE THROUGH STARTERS AND DISCONNECTS TO MOTORS, PACKAGED EQUIPMENT, OR PACKAGED CONTROL PANELS. PROVIDE ALL WIRING BETWEEN CONTROL PANELS AND MOTORS. I
7. MOTORS CONNECTED TO EMERGENCY SYSTEMS CIRCUITRY SHALL HAVE CIRCUITRY INSTALLED IN SEPARATE RACEWAY PER NEC ARTICLE 700.
8. PROVIDE SEPARATE GREEN GROUND FOR EACH MOTOR AND EQUIPMENT CONNECTION ROUTED BACK TO INTEGRAL GROUND BUS OF ASSOCIATED PANELBOARD OR MOTOR CONTROL CENTER. GROUND CONDUCTOR SIZES PER NEC ARTICLE 250.122.
9. ALL HEATING, AIR CONDITIONING AND REFRIGERATION EQUIPMENT INSTALLED ON THE EXTERIOR OF THE BUILDING OR ROOF TOP SHALL HAVE A 15 AMP, 125V WEATHER-RESISTANT GFCI RECEPTACLE SURFACE MOUNTED IN WEATHERPROOF ENCLOSURE, MOUNTED ADJACENT TO EQUIPMENT.
10. THIS CONTRACTOR SHALL VERIFY ELECTRICAL REQUIREMENTS INCLUDING VOLTAGE, HORSEPOWER, STARTER TYPE, AND DISCONNECTING MEANS FOR MOTORS AND EQUIPMENT PRIOR TO ORDERING CIRCUIT BREAKERS, DISCONNECT SWITCHES, AND STARTERS
11. REFER TO ONE-LINE AND P&ID'S FOR ADDITIONAL INFORMATION AND DETIAL.
12. REFER TO FEEDER SCHEUDLE FOR ADDITIONAL INFORMATION AND DETIAL.

PANEL NOTES:
* NA

CONDUIT & BOX SCHEDULE

Area Classification	Voltage	Type	Installation	Use Conduit		Use Box	Supports	Hardware	Location
Exterior/ Non-Hazardous	ALL	ALL	Exposed	GRS	REFER TO SPEC	CB	GS	GS	AS REQUIRED
Exterior/ Non-Hazardous	ALL	ALL	Underground	PVC	REFER TO SPEC	PVC	SS	SS	AS REQUIRED
Interior/ Dry / Non-Hazardous	ALL	ALL	Exposed	EMT	REFER TO SPEC	GS	GS	GS	AS REQUIRED
Interior/ Dry / Non-Hazardous	ALL	ALL	Concealed	EMT	REFER TO SPEC	GS	GS	GS	AS REQUIRED
Interior/ Wet / Non-Hazardous	ALL	ALL	Exposed	PGRS/PVC	REFER TO SPEC	PGRS CAST/PVC	SS	SS	AS REQUIRED
Interior/ Wet / Non-Hazardous	ALL	ALL	Concealed	PGRS/PVC	REFER TO SPEC	PGRS CAST/PVC	SS	SS	AS REQUIRED
Interior/ Dry / Corrosive	ALL	ALL	Exposed	PGRS/PVC	REFER TO SPEC	PGRS CAST/PVC	SS	SS	AS REQUIRED
Interior/ Dry / Corrosive	ALL	ALL	Concealed	PGRS/PVC	REFER TO SPEC	PGRS CAST/PVC	SS	SS	AS REQUIRED
Interior/ Wet / Corrosive	ALL	ALL	Exposed	PGRS/PVC	REFER TO SPEC	PGRS CAST/PVC	SS	SS	AS REQUIRED
Interior/ Wet / Corrosive	ALL	ALL	Concealed	PGRS/PVC	REFER TO SPEC	PGRS CAST/PVC	SS	SS	AS REQUIRED

CONDUIT & BOX SCHEDULE

NOTES:
1. All conduit and raceways shall be concealed when possible.
2. No substitutions shall be allowed unless written permission to the contrary has been obtained from engineer.
3. Transition to exposed conduit shall comply with specified requirements for exposed conduit, regardless of whether transition is rigid or flexible. Embedded transitions shall be rigid material.
4. All junction boxes not located in associated area shall be enamel coated galvanized steel or brushed aluminum.
5. CONTRACTOR shall furnish and install wire gutters as required.
6. CONTRACTOR shall only use flex conduit in equipment connections. Use on fixtures and I&C devices shall not be permitted.
7. CONTRACTOR shall only use flex conduit in equipment connections. Use on fixtures and I&C devices shall not be permitted.
8. AFD motor feeders shall be installed in PGRS conduit or Insulated AFD Motor cables installed in PVC.
9. Exposed conduit located in finished areas of the facility shall be painted.

ABBREVIATIONS:

Conduit		Supports & Hardware	
PVC:	Schedule 40 Rigid PVC		
GRS:	Galvanized Rigid Steel	GS	Galvanized Steel
PGRS:	PVC-Coated GRS	SS	Stainless Steel
EMT:	Electrical Metallic Tubing	PVC40	SCH 40 PVC
HDPE:	High Density Polyethylene	PVC80	SCH 80 PVC
		ZPS	Zinc Plated Steel
Boxes		PCS	PVC Coated Steel
SB:	Steel Box	S	Steel
CB:	Cast Box	AL	Aluminum
PCB:	PVC-Coated Cast Box		

THREE PHASE PANEL SCHEDULE — PANEL ID/TAG: PP (PROPOSED)

TYPE: PANELBOARD (EXISTING TO REMAIN/MODIFY AS REQURIED)
VOLTAGE: 480 WYE /277V
PHASE/WIRE: 3P-4W
MOUNT: SURFACE

BUS CONSTRUCTION: CU
GROUND BUS: YES
ISOLATED GROUND BUS: YES

BUS AMPACITY: NA
MAIN CIRCUIT BREAKER: 200A
SUB-FEED LUGS: NA
INTERRUPTING CAPACITY: NA

LOADS SERVED LGT	REC.	MECH.	OTHER	DESCRIPTION	LOAD AMP	BKR SIZE	BKR POLE		A AMP	B AMP	C AMP		BKR POLE	BKR SIZE	LOAD AMP	DESCRIPTION	LOADS SERVED LGT	REC.	MECH.	OTHER	
								1	0.0	***	***	2									2
				SPACE				3	***	0.0	***	4	3	200		MAIN					4
								5	***	***	0.0	6									6
								7	0.0	***	***	8									8
				FILTER #1 EFFLUENT VALVE		30	3	9	***	0.0	***	10	3	30		FILTER #2 EFFLUENT VALVE					10
								11	***	***	0.0	12									12
								13	0.0	***	***	14									14
				FILTER #2 EFFLUENT VALVE		30	3	15	***	0.0	***	16	3	30		FILTER #4 EFFLUENT VALVE					16
								17	***	***	0.0	18									18
								19	0.0	***	***	20									20
				SPARE		30	3	21	***	0.0	***	22	3	30		SPARE					22
								23	***	***	0.0	24									24
								25	0.0	***	***	26									26
				SPARE		30	3	27	***	0.0	***	28	3	30		SPARE					28
								29	***	***	0.0	30									30
								31	0.0	***	***	32									32
				SPARE		30	3	33	***	0.0	***	34	3	30		WASHWATER SUPPLY VALVE					34
								35	***	***	0.0	36									36
								37	0.0	***	***	38									38
				SPARE		30	3	39	***	0.0	***	40	3	30		BATTERY CHARGER					40
								41	***	***	0.0	42									42
0	0	0	0	:LOADS BY TYPE												LOADS BY TYPE:	0	0	0	0	
				TOTAL AMPS / PHASE:					0.0	0.0	0.0					TOTAL LOADS BY TYPE:	0	0	0	0	
				KVA / PHASE:					0.0	0.0	0.0					TOTAL CONNECTED KVA: 0.0					

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11. REFER TO ONE-LINE AND P&ID'S FOR ADDITIONAL INFORMATION AND DETIAL.
12. REFER TO FEEDER SCHEUDLE FOR ADDITIONAL INFORMATION AND DETIAL.

PANEL NOTES:
* NA

PROJECT NO.:	00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE:	MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. :	.	CHECKED BY: SRC	.	.	.	.
.	.	.	.	.	.	.

PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 ELECTRICAL SCHEDULES NO. 2.dwg

I HEREBY CERTIFY THAT THIS PLAN, REPORT, OR SPECIFICATION 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.

SCOTT R. CHILSON — MARCH 7, 2016 (Date) — 44287 (License No.)

MSA
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332 W. Superior Street Duluth, MN 55802
218-722-3915 1-800-777-7380 Fax: 218-722-4548
Web Address: www.msa-ps.com

LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

ELECTRICAL SHECUDLES NO. 2

FILE NO. 00616097
SHEET E-23

LUMINAIRE SCHEDULE

ABBREVIATIONS

DW	=	DRY WALL	P	=	PENDANT	S	=	SURFACE
ES	=	EXPOSED STRUCTURE	PL	=	PLASTER	W	=	WALL MOUNTED
LG	=	LAY-IN GRID	R	=	RECESSED	V	=	VARIES

DES.	LAMP DATA		DESCRIPTION	LUMINAIRE		VOLT	BALLAST/ DRIVER CODE	MOUNT	CATELOG SERIAL #	CEILING TYPE	LUMINAIRIE DEPTH	OPTIONS/ ACCESSORIES CODE #	ACCEPTABLE MANUFACTURERS	SEE NOTE #
	NO.	TYPE		MANUFACTURE	CATELOG SERIES									
V1	1	LED	ROUGH SERVICE FIXTURE	PHILLIPS	LED	MVOLT	GZ10	V	FLUXSTREAM EX 4' 3/800Lm 4000K (LF-4-EZ-38-40-U-LAG-FH360-UNV)	V	~3"	FH360-UNV	OR EQUAL	10-17-A
V2	2	LED	ROUGH SERVICE FIXTURE	LITHONIA	VAP LED	MVOLT	GZ10	V	VAP-4000L-FST-WD-MVOLT-GZ10-40K-80CRI-SF-BSL722-CS89-QMB-MSI10NWL-VAPQMB	V	~4"	VAPQMB	OR EQUAL	10-17-A
EXIT	3	LED	EXIT WITH DUAL EM LAMPS	LITHONIA	LHQM LED	MVOLT	NA	V	LHQM-LED-WHITE-R-HO-SD	V	~9"		OR EQUAL	16-A
EM1	2	LED	EMERGENCY LIGHITNG UNIT	LITHONIA	EU2-LED-M12	MVOLT	NA	V	EU2-LED-M12-784231874493-120/277-1.8	V	~4"			

OPTIONS/ACCESSORIES CODE LISTING:

1 SEMI-SPECULAR REFELECTOR
2 LOW IRIDESCENT REFLECTOR
3 FLAT ALUMINUM DOOR FRAME
4 REGRESSED ALUMINUM DOOR FRAME
5 FLAT STEEL DOOR FRAME
6 SINGLE GASKET DOOR FRAME
7 DOUBLE GASKET DOOR FRAME
8 TRIPLE-GASKET DOOR FRAME, LENS, & BODY
9 ANTI-MICROBIAL PROTECTION PAINTED FINISH
10 DAMP LOCATION CONSTRUCTION
11 WET LOCATION CONSTRUCTION
12 STAINLESS STEEL TRIM & DOOR FRAME
13 WHITE MILLIGOVE BAFFLE
14 BLACK MILLIGROVE BAFFLE
15 FURNISH WITH SLOPE ADAPTER - VERIFY SLOPE
16 FURNISH WITH AUXILIARY EMERGENCY BATTERY PACK
17 FURNISH WITH WIRE GUARD
18 FURNISH CHAIN MOUNTING ACCESSORIES
19 FURNISH WITH RIGID PENDANT STEMS
20 FURNISH WITH SWIVEL CANOPY
21 FURNISH WITH PHOTO CELL
22 FURNISH TRIM SUITABLE FOR USE WITH NARROW TEE CEILING GRID
23 CUSTOM PAINTED FINISH - COLOR AS SELECTED BY ARCHITECT

BALLAST CODE LISTING: (SEE SPECIFICATION SECTIONS FOR ADDITIONAL INFORMATION)

A LED DRIVER, FIXED (NON-DIMMED). LED DRIVER MAY BE DIMMABLE, BUT DIMMING IS NOT REQUIRED FOR THIS FIXTURE.
B LED DRIVER, STEP-DIM.
C LED DRIVER, DIMMABLE TO 5%.
D LED DRIVER, DIMMABLE TO 1%.
E T8 PROGRAMMED START, NORMAL BALLAST FACTOR 0.87, <10% THD, SYLVANIA QUICKTRONIC HIGH EFFICIENCY SERIES, OR EQUAL BY ADVANCE OR UNIVERSAL.
F T8 PROGRAMMED START, LOW BALLAST FACTOR 0.77, <10% THD, SYLVANIA QUICKTRONIC HIGH EFFICIENCY SERIES, OR EQUAL BY ADVANCE OR UNIVERSAL.
G T8 PROGRAMMED START, LOW BALLAST FACTOR 0.71, <10% THD, SYLVANIA QUICKTRONIC HIGH EFFICIENCY SERIES, OR EQUAL BY ADVANCE OR UNIVERSAL.
H T8 PROGRAMMED START, HIGH BALLAST FACTOR 1.2, <10% THD, SYLVANIA QUICKTRONIC HIGH EFFICIENCY SERIES, OR EQUAL BY ADVANCE OR UNIVERSAL.
I T8 PROGRAMMED START, STEP-DIM, BALLAST FACTOR 0 .87/0.37, <10% THD, SYLVANIA QUICKTRONIC PROFESSIONAL SERIES, OR EQUAL BY ADVANCE OR UNIVERSAL.
J T8 INSTANT START, NORMAL BALLAST FACTOR 0.87, <10% THD, SYLVANIA QUICKTRONIC HIGH EFFICIENCY SERIES, OR EQUAL BY ADVANCE OR UNIVERSAL.
K T5HO PROGRAMMED START, 1.0 BALLAST FACTOR, <10% THD, SYLVANIA QUICKTRONIC PROFESSIONAL SERIES, OR EQUAL BY ADVANCE OR UNIVERSAL.
L T5HO PROGRAMMED START, 1.0 BALLAST FACTOR, <10% THD, SYLVANIA QUICKTRONIC PROFESSIONAL SERIES, OR EQUAL BY ADVANCE OR UNIVERSAL.
M T5 PROGRAMMED START, 1.0 BALLAST FACTOR, <10% THD, SYLVANIA QUICKTRONIC PROFESSIONAL SERIES, OR EQUAL BY ADVANCE OR UNIVERSAL.
N H.I.D. LOW FREQUENCY ELECTRONIC UNIVERSAL VOLTAGE, ADVANCE e-VISION, OR EQUAL BY SYLVANIA OR UNIVERSAL.
O CERAMIC METAL HALIDE (T-6) BALLASTS SHALL BE ADVANCE E-VISION SERIES OR APPROVED EQUAL.
P PULSE START BALLAST AS MANUFACTURED BY SYLVANIA, UNIVERSAL, OR ADVANCE.
Q PULSE START BALLAST AS MANUFACTURED BY SYLVANIA, UNIVERSAL, OR ADVANCE.

GENERAL LUMINAIRE SCHEDULE NOTES:

O SEE SPECIFICATION SECTION FOR ADDITONAL INFORMATION REGARDING LUMINAIRE AND INSTALLATION REQUIREMENTS. PROVIDE OPTIONS AND ACCESSORIES REFERENCED BY THE COLUM TITLED"OPTIONS/ACCESSORIES". MANUFACTURES LISTED AS ACCEPTABLE SHALL MEET ALL REQUIREMENTS AND FEATURES INDICATED. ACCEPTABLE MANUFACTUREERS MUST MEET THE PHOTOMETRIC PERFORMANCE OF THE LISTED UNIT.

O MANUFACTURE NAMES AND CATELOG NUMBERS ARE USED FOR QUALITY AND PERFOMANCE ONLY. LUMINARES AND OTHER ELECTRICAL DEVICES MANUFACTUREED BY OTHERS SHALL BE EQUALLY ACCEPTABLE PROVIDED THEY MEET OR EXCEED IN PERFORMANCE AND QUALITY AS SPECIFIED.

O ALL FLUORESCENT LAMP/BALLAST LAMP/BALLASTS WIRED TO THE DIMMING SYSTEM SHALL BE BURNED-IN FOR A MINIMUM OF 100 HOURS PRIOR TO DIMMING SYSTEM SET-UP/PROGRAMMING

O EACH FLUORESCENT LUMINAIRE SHALL BE SUPPLIED WITH QUICK DISCONNECTING MEANS FOR ALL BALLASTS AS REQURED BY NEX 410.73. PROVIDE THOMAS AND BETTS LD2 OR LD3 OR EQUAL.

O ALL SELECTION ARE BEST ATTEMPT TO IDENTIFY THE CORRECT ITEM. THE SUPPLIER SHALL COORDINATE AND CONFIRM ALL SELECTION AND APPLCIAITONS BASED ON THE INTENT OF THE CONTRACT.

LUMINAIRE SCHEDULE NOTES:

1

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. : .	CHECKED BY: SRC	.	.	.	.
.	.	.	.	.	.

PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 ELECTRICAL SCHEDULES NO. 3.dwg

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SCOTT R. CHILSON — MARCH 7, 2016 (Date) — 44287 (License No.)

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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

ELECTRICAL SCHEDULES NO.3

FILE NO. 00616097
SHEET E-24

MOTOR AND WIRING COMPARISON SCHEDULE

TAG NUMBER	EQUIPEMENT/DEVICE/MOTOR DESCRIPTION	PROPOSED				EXISTING				NOTES
		LOAD		POWER				POWER		
		(HP)	(AMPS)	(VOLTS)	(PHASE)	(HP)	(AMPS)	(VOLTS)	(PHASE)	
SMP-1	SAMPLER PUMP NO.1	~1	16	120	1	~1	L4	120	1	1,2
SMP-2	SAMPLER PUMP NO.2	~1	16	120	1	~1	L4	120	1	1,2
EF-1	EXHAUST FAN NO.1	1.5	3	480	3	0.5	MCC-A	480	3	1,2
EF-2	EXHAUST FAN NO.2	3	4.8	480	3	5	MCC-A	480	3	1,2
EF-3	EXHAUST FAN NO.3	0.75	1.6	480	3	0.5	MCC-A	480	3	1,2
EF-4	EXHAUST FAN NO.4	0.75	1.6	480	3	0.75	MCC-A	480	3	1,2
EF-5	EXHAUST FAN NO.5	0.5	9.8	120	1	0.5	MCC-A	480	3	1,2
EF-6	EXHAUST FAN NO.6	0.5	9.8	120	1	TBD	L4	120	1	1,2
EF-7	EXHAUST FAN NO.7	0.02	4.4	120	1	TBD	L4	120	1	1,2
EF-8	EXHAUST FAN NO.8	0.25	5.8	120	1	TBD	L4	120	1	1,2
EF-9	EXHAUST FAN NO.9	0.02	4.4	120	1	TBD	L4	120	1	1,2
AHU-1	AIR HANDLING UNIT NO.1	7.5	11	480	3	5	MCC-A	480	3	1,2
AHU-2	AIR HANDLING UNIT NO.2	3	4.8	480	3	5	MCC-A	480	3	1
AHU-3	AIR HANDLING UNIT NO.3	3	4.8	480	3	3	MCC-A	480	3	1,2
D-1	DESICCANT DEHUMIDIFIER NO.1	COMBINED	30	480	3	NA	NA	NA	NA	1,3
	DESICCANT DEHUMIDIFIER NO.1 (SUPPLY FAN)	15	21	480	3	NA	NA	NA	NA	1,3
	DESICCANT DEHUMIDIFIER NO.1 (EXHAUST FAN)	3	4.8	480	3	NA	NA	NA	NA	1,3
	DESICCANT DEHUMIDIFIER NO.1 (REGENERATION FAN)	3	4.8	480	3	NA	NA	NA	NA	1,3
D-2	DESICCANT DEHUMIDIFIER NO.2	COMBINED	20	480	3	NA	NA	NA	NA	1,3
	DESICCANT DEHUMIDIFIER NO.1 (SUPPLY FAN)	10	14	480	3	NA	NA	NA	NA	1,3
	DESICCANT DEHUMIDIFIER NO.1 (EXHAUST FAN)	NA	NA	480	3	NA	NA	NA	NA	1,3
	DESICCANT DEHUMIDIFIER NO.1 (REGENERATION FAN)	3	4.8	480	3	NA	NA	NA	NA	1,3
MD-1	MOTORIZED DAMPER NO.1	0.1	2.6	120	1	TBD	MCC-A	480	TBD	1,2
MD-2	MOTORIZED DAMPER NO.2	0.1	2.6	120	1	TBD	MCC-A	480	TBD	1,2
MD-3	MOTORIZED DAMPER NO.3	0.1	2.6	120	1	TBD	TBD	TBD	TBD	1,2
MD-4	MOTORIZED DAMPER NO.4	0.1	2.6	120	1	TBD	MCC-A	480	TBD	1,2
MD-5	MOTORIZED DAMPER NO.5	0.1	2.6	120	1	TBD	MCC-A	480	TBD	1,2
MD-6	MOTORIZED DAMPER NO.6	0.1	2.6	120	1	TBD	MCC-A	480	TBD	1,2
MD-7	MOTORIZED DAMPER NO.7	0.1	2.6	120	1	TBD	MCC-A	480	TBD	1,2
MD-8	MOTORIZED DAMPER NO.8	0.1	2.6	120	1	TBD	TBD	TBD	TBD	1,2
MD-9	MOTORIZED DAMPER NO.9	0.1	2.6	120	1	TBD	TBD	TBD	TBD	1,2
MD-10	MOTORIZED DAMPER NO.10	0.1	2.6	120	1	TBD	TBD	TBD	TBD	1,2
MD-11	MOTORIZED DAMPER NO.11	0.1	2.6	120	1	TBD	TBD	TBD	TBD	1,2
MD-12	MOTORIZED DAMPER NO.12	0.1	2.6	120	1	TBD	TBD	TBD	TBD	1,2
MD-13	MOTORIZED DAMPER NO.13	0.1	2.6	120	1	TBD	TBD	TBD	TBD	1,2
MD-14	MOTORIZED DAMPER NO.14	0.1	2.6	120	1	TBD	TBD	TBD	TBD	1,2
MD-15	MOTORIZED DAMPER NO.15	0.1	2.6	120	1	TBD	TBD	TBD	TBD	1,2
MD-16	MOTORIZED DAMPER NO.16	0.1	2.6	120	1	TBD	TBD	TBD	TBD	1,2
P-1	HEATING SYSTEM PUMP NO.1	3	4.8	480	3	3	MCC-A	480	3	1,2
P-VFD-1	HEATING SYSTEM PUMP NO.1 VFD CONTROL PANEL	3+	~15	480	3	3	MCC-A	480	3	1,2
P-2	HEATING SYSTEM PUMP NO.2	3	4.8	480	3	3	MCC-A	480	3	1,2
P-VFD-2	HEATING SYSTEM PUMP NO.2 VFD CONTROL PANEL	3+	~15	480	3	3	MCC-A	480	3	1,2
UH-1	UNIT HEATER NO.1	1/20	0.8	120	1	TBD	LP-L4A	120	1	1,2
UH-2	UNIT HEATER NO.2	1/20	0.8	120	1	TBD	LP-L4A	120	1	1,2
UH-3	UNIT HEATER NO.3	1/20	0.8	120	1	TBD	LP-L4A	120	1	1,2
UH-4	UNIT HEATER NO.4	1/20	0.8	120	1	TBD	LP-L4A	120	1	1,2
UH-5	UNIT HEATER NO.5	1/20	2	120	1	TBD	LP-L4A	120	1	1,2
UH-6	UNIT HEATER NO.6	1/20	0.8	120	1	TBD	LP-L4A	120	1	1,2
UH-7	UNIT HEATER NO.7	1/20	0.8	120	1	TBD	LP-L4A	120	1	1,2
UH-8	UNIT HEATER NO.8	1/20	0.8	120	1	TBD	LP-L4A	120	1	1,2
UH-9	UNIT HEATER NO.9	TBD	0.26	120	1	TBD	LP-L4A	120	1	1,2
UH-10	UNIT HEATER NO.10	TBD	0.26	120	1	TBD	TBD	TBD	TBD	1,2
UH-11	UNIT HEATER NO.11	1/20	0.8	120	1	TBD	TBD	TBD	TBD	1,2
UH-12	UNIT HEATER NO.12	1/20	0.8	120	1	TBD	TBD	TBD	TBD	1,2
UH-13	UNIT HEATER NO.13	1/20	0.8	120	1	TBD	MCC-A	480	3	1,2
UH-14	UNIT HEATER NO.14	1/20	0.8	120	1	TBD	MCC-A	480	3	1,2
UH-15	UNIT HEATER NO.15	TBD	0.26	120	1	TBD	LP-L4A	120	1	1,2
UH-16	UNIT HEATER NO.16	TBD	0.26	120	1	TBD	LP-L4A	120	1	1,2
UH-17	UNIT HEATER NO.17	TBD	0.16	120	1	TBD	LP-L4A	120	1	1,2
UH-18	UNIT HEATER NO.18	1/20	0.8	120	1	TBD	TBD	TBD	TBD	1,2
UH-19	UNIT HEATER NO.19	1/20	0.8	120	1	TBD	TBD	TBD	TBD	1,2
UH-20	UNIT HEATER NO.20	1/20	0.8	120	1	TBD	TBD	TBD	TBD	1,2
UH-21	UNIT HEATER NO.21	1/20	0.8	120	1	TBD	TBD	TBD	TBD	1,2
UH-22	UNIT HEATER NO.22	1/20	0.8	120	1	TBD	TBD	TBD	TBD	1,2
UH-23	UNIT HEATER NO.23	1/20	0.8	120	1	TBD	TBD	TBD	TBD	1,2
UH-24	UNIT HEATER NO.24	1/20	0.8	120	1	TBD	TBD	TBD	TBD	1,2
UH-25	UNIT HEATER NO.25	1/20	0.8	120	1	TBD	TBD	TBD	TBD	1,2
UH-26	UNIT HEATER NO.26	TBD	0.26	120	1	TBD	TBD	TBD	TBD	1,2
LW-XFMR-L4B	L4B TRANSFORMER	30 Kva	36	480	3	5 kVA	21	240	1	1,4
LP-L4B	LIGHTING AND APPLIANCE PANEL L4B	NA	NA	208/120	3	TBD	TBD	TBD	TBD	1,3
LP-L4A	LIGHTING AND APPLIANCE PANEL L4A	NA	NA	208/120	1	TBD	TBD	240/120	1	1,3
HVAC-TCP-1	HVAC TEMPERATURE CONTROL PANEL	NA	13.3	120	1	TBD	L4	120		1,3

NOTE(S):

(INFORMATION PROVIDED IS THE BEST INFORMAITON AVAILABE. THE CONTRACTOR SHALL PROVIDE PRECONSTRUCTION INSPECTION TO VERIFY ALL CONNECTION ARE CONSISTANT AND RELATIVELY SIMILAR FOR THE PROPOSED APPLICATION.)

(THE CONTRACTOR SHALL NOTE THAT SOME DEVICES ARE FEED AC, BUT HAVE LOCAL DC XFMRS.)

1. CONTRACTOR SHALL FIELD VERFIY ALL EXSITNG CONNECTION AND WIRING. ANY DESCRANCIES FROM THE INFROMATION PROVIDED SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO CONSTRUCITON.
2. WHEN PROPOSED EQUIPMENT POWER REQUIREMENTS ARE DIFFERENT THAN THE EXISITNG, THEN: DEMOLISH EXISITNG AND FURNISH AND INSTALL NEW RACEWAY AND POWER CIRCUIT FROM NEAREST POWER DISTRIBUITON PANEL.
3. FURNISH AND INSTALL NEW RACEWAY AND POWER CIRCUIT FROM NEAREST POWER DISTRIBUTION PANEL
4. FURNISH NEW CB BUCKET AND FEEDER IN EXISING RACEWAY FROM WTP-MCC-A

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B. : .	CHECKED BY: SRC	.	.	.	.
.	.	.	.	.	.

PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 ELECTRICAL SCHEDULES NO. 4.dwg

I HEREBY CERTIFY THAT THIS PLAN, REPORT, OR SPECIFICATION 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.

SCOTT R. CHILSON — MARCH 7, 2016 (Date) — 44287 (License No.)

MSA PROFESSIONAL SERVICES
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LAKEWOOD WTP HVAC SYSTEM IMPROVEMENTS
CITY OF DULUTH
LAKEWOOD, MN

ELECTRICAL SHCEUDLES NO.4

FILE NO. 00616097
SHEET E-25

FIELD DEVICE AND WIRING SCHEDULE

TAG NUMBER	EQUIPEMENT/DEVICE/MOTOR DESCRIPTION	STATUS EXISTING / PROPOSED / REPLACMENT / RELOCATE	EQUIPMENT/DEVICE DISGNATOR (DEVICE / MOTOR / PANEL / DISCONNECT / OTHER)	LOCATION	LOAD			POWER		BREAKER		WIRING	MOTOR CONTROLLER			LOCAL EQUIPMENT DISCONNECT				FIRST SIGNAL/CONTROL CONDUIT			SECOND SIGNAL/CONTROL CONDUIT			POWER CONDUIT			NOTES
					(KVA)	(HP)	(AMPS)	(VOLTS)	(PHASE)	(SIZE)	(POLE)	(AMP-#G)	TYPE	SIZE	BY	(TYPE)	(SIZE)	(FUSED)	(BY)	DESTINATION	TYPE	WIRING	DESTINATION	TYPE	WIRING	DESTINATION	TYPE	WIRING	
SMP-1	SAMPLER PUMP NO.1	RELOCATE	MOTOR	106	NA	~1	16	120	1	EXISTING	NA	10-4G	EXISTING	EXISTING	EC	NFMP	30	NA	EC	EXISITNG	EXISITNG	EXISITNG	EXISITNG	EXISITNG	EXISITNG	LP-L4B	PWR	35-4G	1,5,7
SMP-2	SAMPLER PUMP NO.2	RELOCATE	MOTOR	106	NA	~1	16	120	1	EXISTING	NA	10-4G	EXISTING	EXISTING	EC	NFMP	30	NA	EC	EXISITNG	EXISITNG	EXISITNG	EXISITNG	EXISITNG	EXISITNG	LP-L4B	PWR	35-4G	1,5,7
EF-1	EXHAUST FAN NO.1	REPLACEMENT	MOTOR	Roof	NA	1.5	3	480	3	EXISTING	3	20-3G	FVNR	NEMA 1	EC	NFMP	30	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	WTP-MCC-A	PWR	15-3G	1,3,4,7,8
EF-2	EXHAUST FAN NO.2	REPLACEMENT	MOTOR	Roof	NA	3	4.8	480	3	EXISTING	3	20-3G	FVNR	NEMA 1	EC	NFMP	30	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	WTP-MCC-A	PWR	15-3G	1,3,4,7,8
EF-3	EXHAUST FAN NO.3	REPLACEMENT	MOTOR	Roof	NA	0.75	1.6	480	3	EXISTING	3	20-3G	FVNR	NEMA 1	EC	NFMP	30	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	WTP-MCC-A	PWR	15-3G	1,3,4,7,8
EF-4	EXHAUST FAN NO.4	REPLACEMENT	MOTOR	Roof	NA	0.75	1.6	480	3	EXISTING	3	20-3G	FVNR	NEMA 1	EC	NFMP	30	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	WTP-MCC-A	PWR	15-3G	1,3,4,7,8
EF-5	EXHAUST FAN NO.5	REPLACEMENT	MOTOR	Roof	NA	0.5	9.8	120	1	EXISTING	1	20-2G	FVNR	NEMA 1	EC	NFMP	30	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	WTP-MCC-A	PWR	15-3G	1,3,4,7,8
EF-6	EXHAUST FAN NO.6	REPLACEMENT	MOTOR	Roof	NA	0.5	9.8	120	1	EXISTING	1	20-2G	FVNR	NEMA 1	EC	NFMP	30	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	PWR	15-2G	1,3,4,7,8
EF-7	EXHAUST FAN NO.7	REPLACEMENT	MOTOR	Roof	NA	0.02	4.4	120	1	EXISTING	1	20-2G	FVNR	NEMA 1	EC	NFMP	30	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	PWR	15-2G	1,3,4,7,8
EF-8	EXHAUST FAN NO.8	REPLACEMENT	MOTOR	Roof	NA	0.25	5.8	120	1	EXISTING	1	20-2G	FVNR	NEMA 1	EC	NFMP	30	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	PWR	15-2G	1,3,4,7,8
EF-9	EXHAUST FAN NO.9	REPLACEMENT	MOTOR	Roof	NA	0.02	4.4	120	1	EXISTING	1	20-2G	FVNR	NEMA 1	EC	NFMP	30	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	PWR	15-2G	1,3,4,7,8
ENV-1	ENERGY RECOVERY UNIT	PROPOSED	MOTOR	107	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,6
AHU-1	AIR HANDLING UNIT NO.1	REPLACEMENT	MOTOR	107	NA	7.5	11	480	3	MCP	3	VFD CABLE	VFD	TBD	EC	NFMP	30	NA	EC	AHU-VFD-1	DICRETE SIGNAL	D4	TBD BY MC	TBD BY MC	TBD BY MC	AHU-VFD-1	480 VAC	VFD CABLE	1,3,9
AHU-VFD-1	AIR HANDLING UNIT NO.1 VFD MOTOR CONTROLLER	REPLACEMENT	MOTOR	107	NA	7.5	11	480	3	30	3	30-4G	VFD	TBD	EC	MCB	20	20	EC	HVAC-TCP-1	DISCRETE SIGNAL	D6	HVAC-TCP-1	ANALOG SIGNAL	A1	WTP-MCC-A	480VAC	30-4G	1,2,5,8,9
AHU-2	AIR HANDLING UNIT NO.2	DEMOLISH	MOTOR	107	NA	3	4.8	480	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1
AHU-3	AIR HANDLING UNIT NO.3	REPLACEMENT	MOTOR	217	NA	3	4.8	480	3	MCP	3	20-3G	FVNR	TBD	EC	NFMP	30	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	AHU-MC-3	480 VAC	20-3G	1,3,9
AHU-MC-3	AIR HANDLING UNIT NO.1 VFD MOTOR CONTROLLER	REPLACEMENT	MOTOR	107	NA	3	4.8	480	3	30	3	30-4G	FVNR	TBD	EC	MCB	20	20	EC	HVAC-TCP-1	DISCRETE SIGNAL	D6	TBD BY MC	TBD BY MC	TBD BY MC	WTP-MCC-A	480VAC	20-4G	1,2,5,8,9
AD	AIR DRYER	DEMOLISH	MOTOR	107	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,6
D-1	DESICCANT DEHUMIDIFIER NO.1	PROPOSED	PANEL	OUTSIDE	~30	COMBINED	30	480	3	40	3	40-4G	PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	PP	480/277VAC	40-3G	1,2,5,8,9
	DESICCANT DEHUMIDIFIER NO.1 (SUPPLY FAN)	PROPOSED	MOTOR	OUTSIDE	NA	15	21	480	3				PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC				1,2,5,8,9
	DESICCANT DEHUMIDIFIER NO.1 (EXHAUST FAN)	PROPOSED	MOTOR	OUTSIDE	NA	3	4.8	480	3				PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC				1,2,5,8,9
	DESICCANT DEHUMIDIFIER NO.1 (REGENERATION FAN)	PROPOSED	MOTOR	OUTSIDE	NA	3	4.8	480	3				PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC				1,2,5,8,9
D-2	DESICCANT DEHUMIDIFIER NO.2	PROPOSED	PANEL	107	~21	COMBINED	20	480	3	30	3	30-4G	PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	PP	480/277VAC	30-3G	1,2,5,8,9
	DESICCANT DEHUMIDIFIER NO.1 (SUPPLY FAN)	PROPOSED	MOTOR	107	NA	10	14	480	3				PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC				1,2,5,8,9
	DESICCANT DEHUMIDIFIER NO.1 (EXHAUST FAN)	PROPOSED	MOTOR	107	NA	NA	NA	480	3				PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC				1,2,5,8,9
	DESICCANT DEHUMIDIFIER NO.1 (REGENERATION FAN)	PROPOSED	MOTOR	107	NA	3	4.8	480	3				PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	PER MFR	MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC				1,2,5,8,9
AFMS-1	AIR FLOW MEASURING STATION	PROPOSED	DEVICE	107	1	NA	6.7	120	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,6
VAV-1	VAV CONTROL UNIT NO.1	PROPOSED	DEVICE	107	0.25	NA	2.6	120	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	1,6
VAV-3	VAV CONTROL UNIT NO.1	PROPOSED	DEVICE	107	0.25	NA	2.6	120	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	1,6
VAV-4	VAV CONTROL UNIT NO.1	PROPOSED	DEVICE	107	0.25	NA	2.6	120	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	1,6
VAV-5	VAV CONTROL UNIT NO.1	PROPOSED	DEVICE	107	0.25	NA	2.6	120	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	1,6
VAV-6	VAV CONTROL UNIT NO.1	PROPOSED	DEVICE	217	0.25	NA	2.6	120	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	1,6
MD-1	MOTORIZED DAMPER NO.1	PROPOSED	MOTOR	217	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-2	MOTORIZED DAMPER NO.2	PROPOSED	MOTOR	107	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-3	MOTORIZED DAMPER NO.3	PROPOSED	MOTOR	218	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-4	MOTORIZED DAMPER NO.4	PROPOSED	MOTOR	116	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-5	MOTORIZED DAMPER NO.5	PROPOSED	MOTOR	116	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-6	MOTORIZED DAMPER NO.6	PROPOSED	MOTOR	115	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-7	MOTORIZED DAMPER NO.7	PROPOSED	MOTOR	115	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-8	MOTORIZED DAMPER NO.8	PROPOSED	MOTOR	202	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-9	MOTORIZED DAMPER NO.9	PROPOSED	MOTOR	107	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-10	MOTORIZED DAMPER NO.10	PROPOSED	MOTOR	217	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-11	MOTORIZED DAMPER NO.11	PROPOSED	MOTOR	ROOF	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-12	MOTORIZED DAMPER NO.12	PROPOSED	MOTOR	ROOF	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-13	MOTORIZED DAMPER NO.13	PROPOSED	MOTOR	ROOF	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-14	MOTORIZED DAMPER NO.14	PROPOSED	MOTOR	ROOF	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-15	MOTORIZED DAMPER NO.15	PROPOSED	MOTOR	ROOF	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
MD-16	MOTORIZED DAMPER NO.16	PROPOSED	MOTOR	ROOF	0.25	0.1	2.6	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
P-1	HEATING SYSTEM PUMP NO.1	PROPOSED	MOTOR	107	NA	3	4.8	480	3	MCP	3	VFD CABLE	VFD	3HP	EC	NFMP	NA	8	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	P-VFD-1	SHEILDED MTR CABLE	20-3G	1,3,5,7
P-VFD-1	HEATING SYSTEM PUMP NO.1 VFD CONTROL PANEL	PROPOSED	PANEL	107	NA	3+	~15	480	3	30	3	20-4G	VFD	3HP	EC	MCP	30	NA	EC	HVAC-TCP-1	DISCRETE SIGNAL	D6	HVAC-TCP-1	ANALOG SIGNAL	A1	DC	208/120 VAC	30-4G	1,3,5,7
P-2	HEATING SYSTEM PUMP NO.2	PROPOSED	MOTOR	107	NA	3	4.8	480	3	MCP	3	VFD CABLE	VFD	3HP	EC	NFMP	NA	8	EC	P-VFD-2	DISCRETE SIGNAL	D2				P-VFD-2	SHEILDED MTR CABLE	20-3G	1,3,5,7
P-VFD-2	HEATING SYSTEM PUMP NO.2 VFD CONTROL PANEL	PROPOSED	PANEL	107	NA	3+	~15	480	3	30	3	20-4G	VFD	3HP	EC	MCP	30	NA	EC	HVAC-TCP-1	DISCRETE SIGNAL	D6	HVAC-TCP-1	ANALOG SIGNAL	A1	DC	208/120 VAC	30-4G	1,3,5,7
UH-1	UNIT HEATER NO.1	PROPOSED	MOTOR	116	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-2	UNIT HEATER NO.2	PROPOSED	MOTOR	116	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-3	UNIT HEATER NO.3	PROPOSED	MOTOR	116	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-4	UNIT HEATER NO.4	PROPOSED	MOTOR	117	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-5	UNIT HEATER NO.5	PROPOSED	MOTOR	117	NA	1/20	2	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-6	UNIT HEATER NO.6	PROPOSED	MOTOR	218	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-7	UNIT HEATER NO.7	PROPOSED	MOTOR	218	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-8	UNIT HEATER NO.8	PROPOSED	MOTOR	218	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-9	UNIT HEATER NO.9	PROPOSED	MOTOR	100	31.25	NA	0.26	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-10	UNIT HEATER NO.10	PROPOSED	MOTOR	100	31.25	NA	0.26	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-11	UNIT HEATER NO.11	PROPOSED	MOTOR	E. ENTRY	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-12	UNIT HEATER NO.12	PROPOSED	MOTOR	112	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-13	UNIT HEATER NO.13	PROPOSED	MOTOR	115	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-14	UNIT HEATER NO.14	PROPOSED	MOTOR	113	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-15	UNIT HEATER NO.15	PROPOSED	MOTOR	212	31.25	NA	0.26	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-16	UNIT HEATER NO.16	PROPOSED	MOTOR	212	31.25	NA	0.26	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-17	UNIT HEATER NO.17	PROPOSED	MOTOR	217	20	NA	0.16	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-18	UNIT HEATER NO.18	PROPOSED	MOTOR	N. FILTER	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-19	UNIT HEATER NO.19	PROPOSED	MOTOR	N. FILTER	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-20	UNIT HEATER NO.20	PROPOSED	MOTOR	N. FILTER	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-21	UNIT HEATER NO.21	PROPOSED	MOTOR	N. FILTER	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-22	UNIT HEATER NO.22	PROPOSED	MOTOR	S. FILTER	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-23	UNIT HEATER NO.23	PROPOSED	MOTOR	S. FILTER	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-24	UNIT HEATER NO.24	PROPOSED	MOTOR	S. FILTER	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-25	UNIT HEATER NO.25	PROPOSED	MOTOR	S. FILTER	NA	1/20	0.8	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
UH-26	UNIT HEATER NO.26	PROPOSED	MOTOR	116	31.25	NA	0.26	120	1	20	1	20-2G	TBD	TBD	MC	NFMP	20	NA	EC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	TBD BY MC	LP-L4B	120VAC	20-2G	1,3,5,8
LW-XFMR-L4B	L4B TRANSFORMER	PROPOSED	XFMR	106	30	NA	NA	480	3	50	3	50-4G	NA	NA	NA	CB	50	NA	EC							LW-WTP-MCC-A	480 VAC	50-3G	10
LP-L4B	LIGHTING AND APPLIANCE PANEL L4B	PROPOSED	PANEL	116	NA	NA	NA	208/120	3	100	3	100-4G	NA	NA	NA	MAIN CB	100	NA	EC							LW-XFMR-L4B	208/120 VAC	100-4G	10
LP-L4A	LIGHTING AND APPLIANCE PANEL L4A	EXISITNG	PANEL	116	NA	NA	NA	208/120	1	60	2	60-3G	NA	NA	NA	CB	60	NA	EC							LP-L4B	208/120 VAC	100-3G	11
HVAC-TCP-1	HVAC TEMPERATURE CONTROL PANEL	PROPOSED	PANEL	107	2	NA	13.3	120	1	20	1	20-3G	NA	NA	NA	CB	20	NA	EC							LP-L4B	208/120 VAC	100-3G	10

ELECTRICAL WIRING SCHEDULE GENERAL NOTES:

1. ALL WORK BY THIS CONTRACTOR TO COMPLY WITH ALL LOCAL, STATE AND NATIONAL ELECTRICAL CODES.
2. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH OTHER TRADES TO AVOID CONFLICTS AND TO VERIFY ALL EQUIPMENT CONNECTION REQUIREMENTS.
3. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM PER CONTRACT DOCUMENTS AND ENSURING THAT THE SYSTEM IS OPERATIONAL UPON JOB COMPLETION.
4. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A COMPLETE ELECTRICAL SYSTEM FOR ALL OWNER-FURNISHED APPLIANCES IN ACCORDANCE WITH NEC ARTICLE 422 AND 440.22.
5. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL BRANCH CIRCUIT WIRING IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE AND THESE PROJECT DOCUMENTS
6. PROVIDE ALL POWER WIRING INCLUDING ALL CIRCUITRY CARRYING ELECTRICAL ENERGY FROM PANELBOARD OR OTHER SOURCE THROUGH STARTERS AND DISCONNECTS TO MOTORS, PACKAGED EQUIPMENT, OR PACKAGED CONTROL PANELS. PROVIDE ALL WIRING BETWEEN CONTROL PANELS AND MOTORS. I
7. MOTORS CONNECTED TO EMERGENCY SYSTEMS CIRCUITRY SHALL HAVE CIRCUITRY INSTALLED IN SEPARATE RACEWAY PER NEC ARTICLE 700.
8. PROVIDE SEPARATE GREEN GROUND FOR EACH MOTOR AND EQUIPMENT CONNECTION ROUTED BACK TO INTEGRAL GROUND BUS OF ASSOCIATED PANELBOARD OR MOTOR CONTROL CENTER. GROUND CONDUCTOR SIZES PER NEC ARTICLE 250.122.
9. ALL HEATING, AIR CONDITIONING AND REFRIGERATION EQUIPMENT INSTALLED ON THE EXTERIOR OF THE BUILDING OR ROOF TOP SHALL HAVE A 15 AMP, 125V WEATHER-RESISTANT GFCI RECEPTACLE SURFACE MOUNTED IN WEATHERPROOF ENCLOSURE, MOUNTED ADJACENT TO EQUIPMENT.
10. THIS CONTRACTOR SHALL VERIFY ELECTRICAL REQUIREMENTS INCLUDING VOLTAGE, HORSEPOWER, STARTER TYPE, AND DISCONNECTING MEANS FOR MOTORS AND EQUIPMENT PRIOR TO ORDERING CIRCUIT BREAKERS, DISCONNECT SWITCHES, AND STARTERS
11. REFER TO ONE-LINE AND P&ID'S FOR ADDITIONAL INFORMATION AND DETIAL.
12. REFER TO FEEDER SCHEUDLE FOR ADDITIONAL INFORMATION AND DETIAL.
13. ALL SIZES PROVIDED SHALL BE CONSIDERED A MINIMUM. ACTUAL SIZES SHALL BE CONFIRMED TO MATCH ACTUAL APPLICATION AND ACTUAL EQUIPMENT.

ELECTRICAL WIRING SCHEDULE LEGEND:

MOTOR CONTROLLERS:
FVNR = FULL VOLTAGE NON-REVERSING STARTER (ACROSS THE LINE ELECTRONIC MAG STARTER)
FVR = FULL VOLTAGE REVERSING STARTER (ACROSS THE LINE ELECTRONIC MAG STARTER)
2SP = 2-SPEED FULL VOLTAGE STARTER
SSRV = SOLID STATE REDUCED VOLTAGE (REDUCED VOLTAGE SMART MOTOR CONTROLLER - SOFT START)
VFD = VARIABLE FREQUENCY DIRVE

DISCONNECT:
F = FUSED
NF = NON-FUSED
NFMP = NON-FUSED MOTOR PLUG AND RECEPTCLE
CB = CIRCUIT BREAKER

BY:
GC = GENERAL CONTRACTOR
EC = ELECTRICAL CONTRACTOR
MC = MECHANICAL CONTRACTOR

WIRING LEGEND:
Ax = ANALOG SIGNAL = 2C#16 SHEILDED, TWISTED PAIR) (x = # OF TWISTED PAIRS)
Dx = DISCRETE SIGNAL = #14 THHN WIRE (x = # OF WIRES)
Mx = MANUFACTURE CABLE (x = # OF CABLES)
Ex = CAT5e (x = # OF CAT5e CABLES)
Px = POWER CIRCUIT (x = NUMBER OF CONDUCTOR + G / REFER TO ONE-LINE DIAGRAM)

NOTE(S):

1. DEMOLISH EXISTING
2. CONNECT NEW EQUIPMENT
3. CONNECT NEW EQUIPMENT WITH NEW DISCONNECT RATED PLUG/REC SET (TYPICAL)
4. REUSE EXISITNG MOTOR FEEDERS
5. REPLACE EXISTING MOTOR CIRCUIT, RACEWAY, ETC...AND CONNECT EQUIPMENT
6. NO POWER CONNECTION EXPECTED (BY MC)
7. RELOCATE EXISTING MOTOR CONTROLLER, REFEED TO PROPOSED LOCATION
8. CONTROL WIRING BY MC
9. NEW MOTOR CIRCUIT, RACEWAY, ETC...AND CONNECT EQUIPMENT
10. NEW FEEDER CIRCUIT, RACEWAY, ETC...AND CONNECT EQUIPMENT
11. NEW FEEDER CIRCUIT, RACEWAY, ETC...AND CONNECT EXISTING EQUIPMENT

PROJECT NO.: 00616097	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE: MARCH 2016	DRAWN BY: INIT	.	.	.	.
F.B.: .	CHECKED BY: SRC	.	.	.	.
.	.	.	.	.	.

PLOT DATE: 3/7/16, P:\610s\616\00616097\CADD\Construction Documents\Electrical Dwgs\616097 ELECTRICAL SCHEDULES NO. 5.dwg

I HEREBY CERTIFY THAT THIS PLAN, REPORT, OR SPECIFICATION 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.

SCOTT R. CHILSON — MARCH 7, 2016 (Date) — 44287 (License No.)

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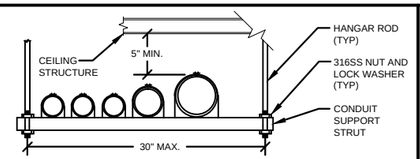
ELECTRICAL SCHEDULES NO. 5

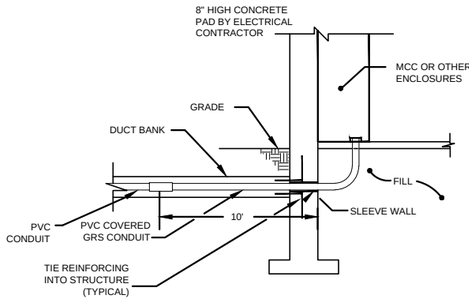
FILE NO. 00616097
SHEET E-26



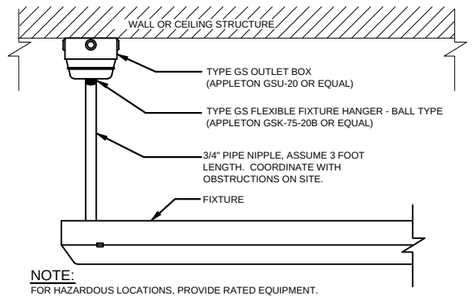
NOTES:

1. LENGTH OF CONDUIT SUPPORT STRUT VARIES WITH NUMBER OF CONDUITS TO BE SUPPORTED AND SPACING BETWEEN CONDUITS.
2. SIZE CONDUIT SUPPORT STRUT TO SUPPORT LOAD WITHOUT DEFLECTION. MINIMUM SIZE OF CONDUIT SUPPORT STRUT SHALL BE 1-1/2"x1-1/2".
3. HANGAR ROD SHALL BE CONSTRUCTED OF HOT-DIPPED GALVANIZED STEEL, SIZE ROD TO SUPPORT LOAD, MINIMUM SIZE SHALL BE 3/8".
4. MANUFACTURER'S WRITTEN RECOMMENDATIONS SHALL DICTATE ALLOWABLE SPAN, NUMBER/SIZE OF HANGER RODS, AND ALLOWABLE LOADING.
5. USE CONCRETE INSERTS FOR SUPPORT OF HANGAR RODS FROM CONCRETE CEILING, USE SWIVEL BEAM CLAMPS FOR STEEL BEAM APPLICATIONS.

1 CONDUIT RACKING SYSTEM
E-27

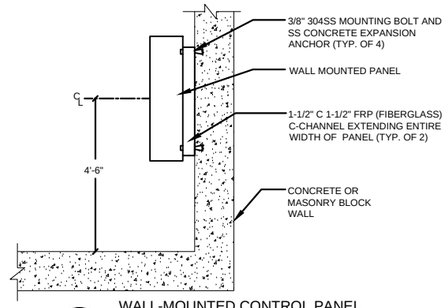


2 CONDUIT ENTRANCE
E-27

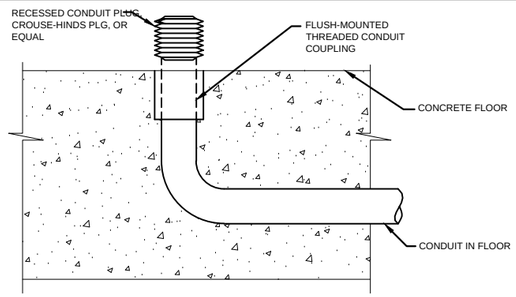


NOTE:
FOR HAZARDOUS LOCATIONS, PROVIDE RATED EQUIPMENT.

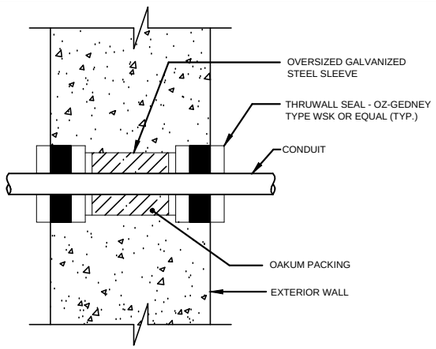
3 LUMINARY FIXTURE PENDANT MOUNTING
E-27



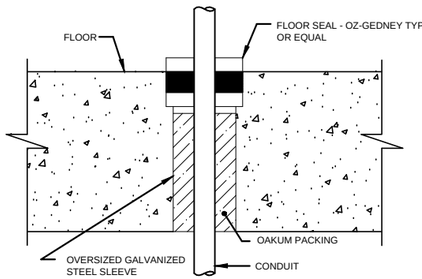
4 WALL-MOUNTED CONTROL PANEL INSTALLATION (EXTERIOR WALL)
E-27



5 IN-FLOOR CONDUIT FUTURE EQUIPMENT
E-27

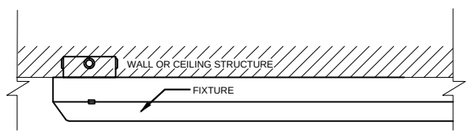


WALL PENETRATION



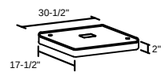
FLOOR PENETRATION

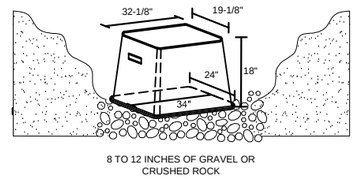
7 CONDUIT WALL PENETRATION
E-27



NOTE:
FOR HAZARDOUS LOCATIONS, PROVIDE RATED EQUIPMENT.

6 LIMINARY FIXTURE FLUSH MOUNTING
E-27



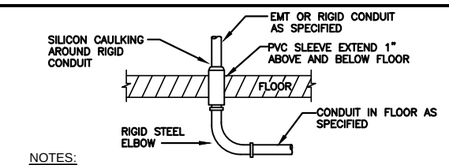


8 TO 12 INCHES OF GRAVEL OR CRUSHED ROCK

NOTES:

1. USE QUAZITE TYPE PT PREFABRICATED PULL-BOX MINIMUM DIMENSIONS AS SHOWN. SIZE BOX LARGER AS REQUIRED TO ACCOMMODATE TOTAL NUMBER OF SPLICES AT EACH PULL-BOX LOCATION.
2. USE QUAZITE PREFABRICATED COVER WITH STAINLESS STEEL BOLTS FOR TYPE PT PULL-BOX SHOWN. COVER MINIMUM DIMENSIONS AS SHOWN. SIZE LARGER AS REQUIRED FOR LARGER BOX.

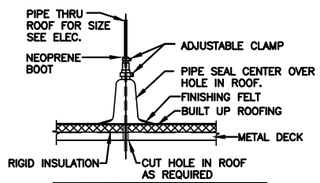
9 PULL BOX ASSEMBLY
E-27



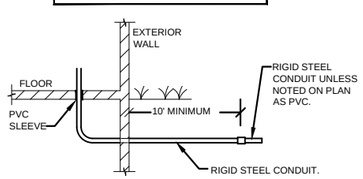
NOTES:

1. E.C. MAY USE PVC COATED RIGID STEEL CONDUIT IN LIEU OF RIGID CONDUIT AND PVC SLEEVE.
2. PVC SLEEVE TO BE AS SNUG AS POSSIBLE ON RIGID CONDUIT.

CONDUIT UNDER FLOOR PENETRATION

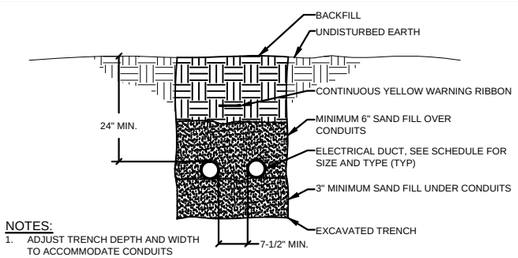


ROOF PENETRATION



EXTERIOR CONDUIT INTO NEW SPACE

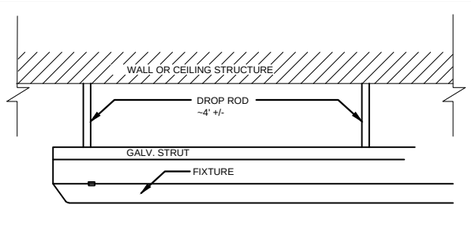
10 CONDUIT ROUTING DETAIL
E-27



NOTES:

1. ADJUST TRENCH DEPTH AND WIDTH TO ACCOMMODATE CONDUITS SCHEDULED.
2. COORDINATE ROUTING TO AVOID CONFLICTS WITH MECHANICAL PIPING.

11 DIRECT BURIED UNDERGROUND CONDUIT
E-27



NOTE:
FOR HAZARDOUS LOCATIONS, PROVIDE RATED EQUIPMENT.

12 LIMINARY FIXTURE STRUT MOUNTING
E-27

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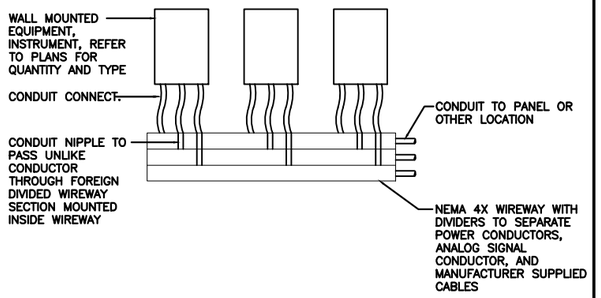
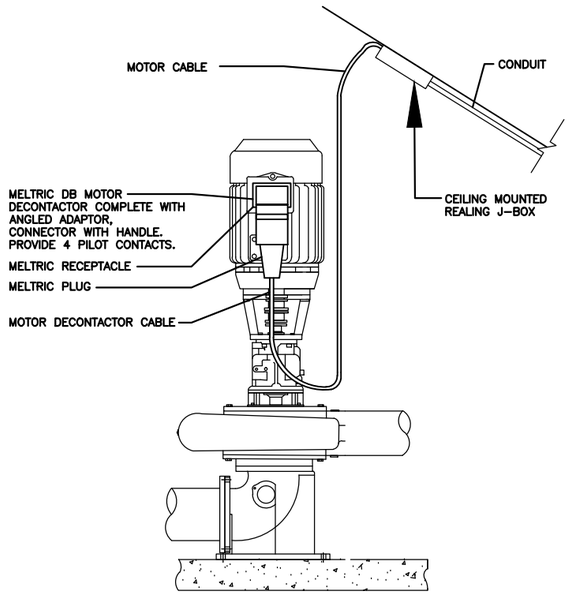
ELECTRICAL DETAILS

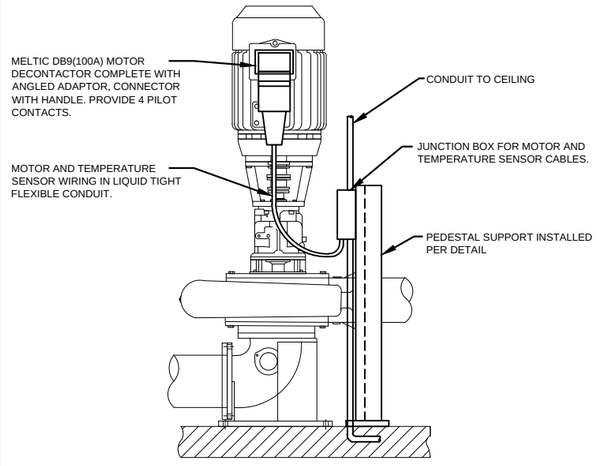
FILE NO. 00616097
SHEET E-27



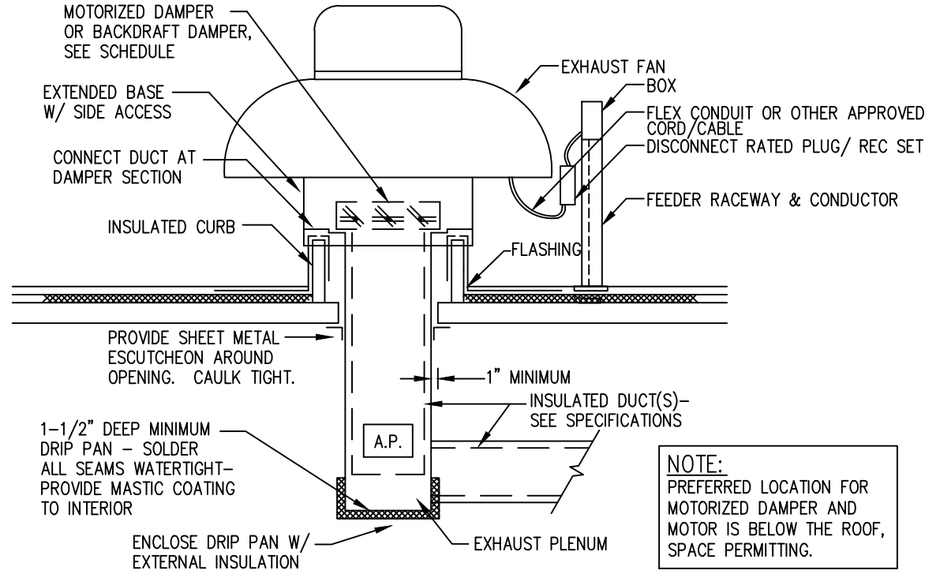
1 E-28 WIREWAY INSTALLATION DETAIL



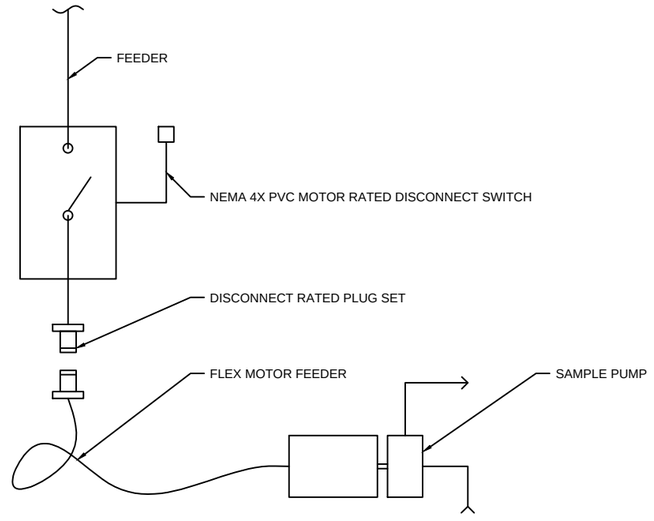
2 E-28 EQUIPMENT CONNECTION W/ EXPOSED CONDUIT



3 E-28 EQUIPMENT CONNECTION W/ EXPOSED CONDUIT



4 E-28 ROOF MOUNTED EXHAUST FAN



5 E-28 SAMPLE PUMP CONNECTION DETAIL

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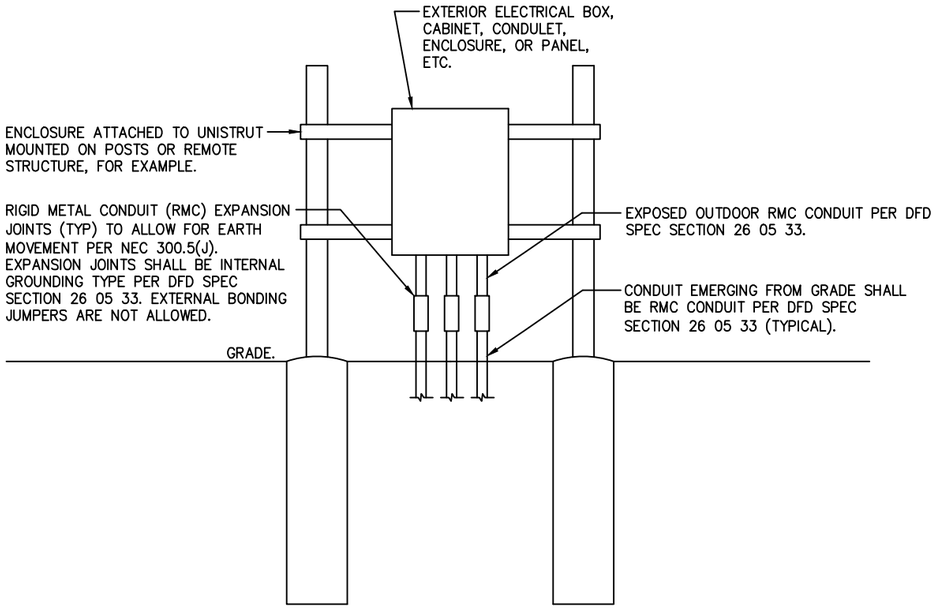
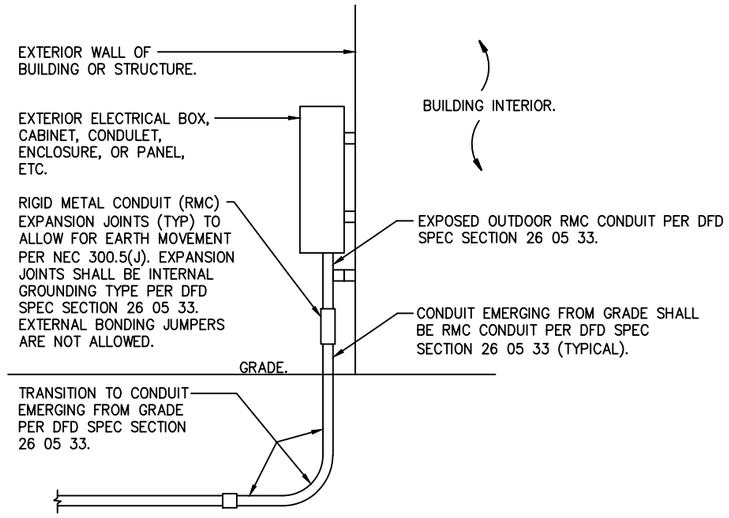


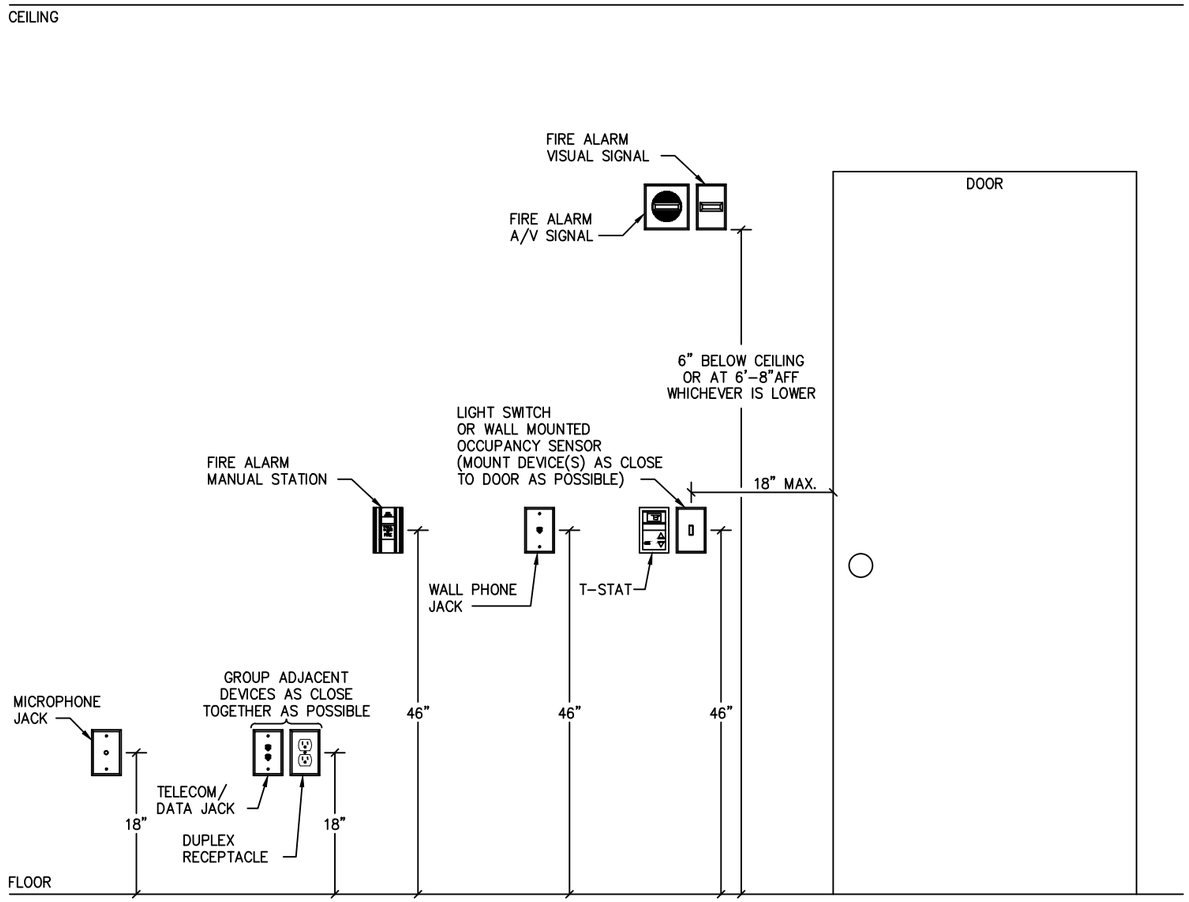
REMOTE STRUCTURE EXAMPLE



WALL-MOUNTED ENCLOSURE EXAMPLE

1 E-29 CONDUIT EMERGING FROM GRADE W/ EXPANSION JOINT DETAIL

NOT TO SCALE



2 E-29 TYPICAL MOUNTING HEIGHT DETAIL

NOT TO SCALE

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