STRUCTURAL ABBREVIATIONS

#	NUMBER
&	AND
@	AT
A/E	ARCHITECT / ENGINEER
AB	ANCHOR BOLT
ACI	AMERICAN CONCRETE INSTITUTE
ADDL	ADDITIONAL
ADJ	ADJACENT
AFF	ABOVE FINISEHD FLOOR
AGG	AGGREGATE
AH, AHU	AIR HANDLING UNIT
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ALT	ALTERNATE
APA	AMERICAN PLYWOOD ASSOCIATION
APPROX	APPROXIMATELY
ARCH	ARCHITECTURAL
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AT/FP	ANTI-TERRORISM/ FORCE PROTECTION
AWS	AMERICAN WELDING SOCIETY
BET	BETWEEN
BLDG	BUILDING
BLW	BELOW
BM	BEAM
BN	BOUNDARY NAIL
BOF	BOTTOM OF FOOTING
BOS	BOTTOM OF STEEL
BOT	BOTTOM
BRG	BEARING
BTWN	BETWEEN
C	CHANNEL
CD	CONSTRUCTION DOCUMENTS
CE	CARBON EQUIVALENT
CENT	CENTERED
CFMF	COLD-FORMED METAL FRAMING
CFS	COLD-FORMED STEEL
CIP	CAST IN PLACE
CJ	CONTROL JOINT/CEILING JOIST
CJP	COMPLETE JOINT PENETRATION
CL	CENTERLINE
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CO	CONTRACTING OFFICER
COL	COLUMN
CONC	CONCRETE
COND	CONDITION
CONN	CONNECT, CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
COORD	COORDINATE
COR	CORNER, CONTRACTING OFFICER'S REPRESENTATIVE
CTR	CENTER
CU FT	CUBIC FEET
D	DEEP, DEPTH
DAS	DEFORMED ANCHOR STUD
DBL	DOUBLE
DEG	DEGREE
DEMO	DEMOLISH, DEMOLITION
DEP	DEPRESSED
DIA, Ø	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIR	DIRECTION
DL	DEAD LOAD
DO	DITTO
DT	DRAG TRUSS
DTL	DETAIL
DWG(S)	DRAWINGS
DWL	DOWEL
EA	EACH
EF	EACH FACE
ELEC	ELECTRICAL
ELEV	ELEVATION
EN	EDGE NAIL
EOR	ENGINEER OF RECORD
EQ, =	EQUAL, EQUALS
EQN	EQUATION
EQUIP	EQUIPMENT
ES	EACH SIDE
EW	EACH WAY
EXIST, (E)	EXISTING
EXP	EXPANSION
EXT	EXTERNAL, EXTERIOR
FF	FAR FACE, FINISH FACE
FFE	FINISH FLOOR ELEVATION
FG	FINISH GRADE
FJ	FLOOR JOIST
FN	FIELD NAIL
FND	FOUNDATION
FOC	FACE OF CONCRETE
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FRMG	FRAMING
FS	FAR SIDE
FT, '	FOOT
FTG	FOOTING
Fy	YIELD STRESS
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GLB	GLUED LAMINATED BEAM
GT	GIRDER TRUSS
GUSS	GUSSET
GYP BD	GYPSUM BOARD
HAS	HEADED ANCHOR STUD
HD	HOLD DOWN
HDR	HEADER
HGR	HANGER
HK	HOOK
HORIZ	HORIZONTAL
HP	HIGH POINT
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT
HVAC	HEATNG/ VENTILATING/ AIR CONDITIONING
I	MOMENT OF INERTIA
IBC	INTERNATIONAL BUILDING CODE
ICF	INSULATED CONCRETE FORM
ID	INSIDE DIAMETER
IN, "	INCH
INCL	INCLUDE
INFO	INFORMATION
INS	INSULATED, INSULATION
INT	INTERIOR
JST	JOIST
JT	JOINT
K, KIPS	THOUSAND POUNDS
KLF	KIPS PER LINEAR FOOT
KSF	KIPS PER SQUARE FOOT
L	LENGTH, ANGLE
LB	POUND
LF	LINEAR FOOT
LG	LONG, LIGHT GUAGE
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLR	ROOF LIVE LOAD
LLV	LONG LEG VERTICAL
LOC	LOCATE, LOCATION
LONG	LONGITUDINAL
LTE	TENSION EMBEDMENT
LTS	LAP TENSION SPLICE
LW	LIGHT WEIGHT
MAS	MASONRY
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MB	MACHINE BOLT
MBR	MEMBER
MECH	MECHANICAL
MED	MEDIUM
MEZZ	MEZZANINE
MF	MOMENT FRAM
MFG	MANUFACTURING
MID	MIDDLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MLS	MASONRY LAP SPLICE
MO	MASONRY OPENING
MOD	MODIFY, MODIFIED
MPH	MILES PER HOUR
MRF	MANUFACTURER
N	NORTH
NA	NOT APPLICABLE
NIC	NOT IN CONTRACT
NS	NEAR SIDE
NTS	NOT TO SCALE
NW	NORMAL WEIGHT
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OPPOSITE HAND, OVERHEAD
OPP	OPPOSITE
OSB	ORIENTED STRAND BOARD
OWSJ	OPEN WEB STEEL JOIST
P/C	PIN CONNECTED
PAF	POWDER ACCUATED FASTENER
PAR	PARALLEL
PCC	PRECAST CONCRETE
PCF	POUNDS PER CUBIC FOOT
PERIM	PERIMETER
PL	PLATE
PLUMB	PLUMBING
PLYWD	PLYWOOD
PNL	PANEL
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TREATED, POINT, PRETENSIONED
REINF	REINFORCING, REINFORCED
REQ	REQUIRED
RET	RETURN, RETAINING
REV	REVISION, REVISED
RF	ROOF
RFT	RAFTERS
RS	ROUGH SAWN
RT	ROOF TRUSS
S	SECTION MODULUS
SC	SLIP CRITICAL
SCHED	SCHEDULE
SDC	SEISMIC DESIGN CATEGORY
SDI	STEEL DECK INSTITUTE
SECT	SECTION
SEIS	SEISMIC
SEOR	STRUCTURAL ENGINEER OF RECORD
SEP	SEPARATION
SF	SQUARE FEET
SHT	SHEET
SIM	SIMILAR
SJI	STEEL JOIST INSTITUTE
SL	SNOW LOAD
SMS	SHEET METAL SCREW
SPEC(S)	SPECIFICATION(S)
SPRT	SUPPORT
SQ	SQUARE
SS	STAINLESS STEEL
ST	SNUG TIGHT
STD	STANDARD
STIF/STIFF	STIFFENER
STL	STEEL
STRUCT	STRUCTURAL, STRUCTURE
SUSP	SUSPENDED
SYM	SYMMETRICAL
T&B	TOP AND BOTTOM
TGB	TOP OF GRADE BEAM
THK	THICK, THICKNESS
TL	TOTAL LOAD
TN	TOE NAIL
TOB	TOP OF BEAM
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOS	TOP OF STEEL
TOW	TOP OF WALL
TYP	TYPICAL
UFC	UNITED FACILITES CRITERIA
UON	UNLESS OTHERWISE NOTED
V	SHEAR
VB	VAPOR BARRIER
VERT	VERTICAL
VIF	VIF
W	WIDTH, WEST, WIDE FLANGE
W/	WITH
W/C	WATER CONTENT
W/O	WITHOUT
WL	WIND LOAD
WPT	WORKING POINT
WWF	WELDED WIRE FABRIC
WWM	WELDED WIRE MESH
x, *	BY, TIMES

CODE AND DESIGN CRITERIA

1. BUILDING CODES:
   a. INTERNATIONAL BUILDING CODE (IBC) – 2021
   b. AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) 7, MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES – 2016
   c. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), STEEL CONSTRUCTION MANUAL – 15th EDITION
   d. AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE – 2019
2. DESIGN CRITERIA
   a. RISK CATEGORY: II
3. DESIGN LOADS
   a. MEZZANINE
      1. SUPERIMPOSED DEAD LOAD: 5 PSF
      2. LIVE LOAD: 200 PSF
   b. ROOF
      1. SUPERIMPOSED DEAD LOAD: 5 PSF
      2. ADD-ALT SUPERIMPOSED DEAD LOAD (PV PANELS): 5 PSF
      3. LIVE LOAD: 20 PSF
4. WIND DESIGN DATA
   a. BASIC WIND SPEED: 109 MPH (ULTIMATE) 84 MPH (ALLOWABLE)
   b. EXPOSURE: C
   c. SURFACE ROUGHNESS: C
   d. INTERNAL PRESSURE COEFFICIENT (GCpi): ± 0.18
   e. DESIGN WIND PRESSURES FOR COMPONENTS AND CLADDING DESIGNED BY THE CONTRACTOR:
      1. LISTED PRESSURES ARE INCLUDED FOR REFERENCE ONLY BASED ON A TRIBUTARY AREA OF 10 SF. FINAL CALCULATIONS SHALL BE COMPLETED BY THE CONTRACTOR.
      2. EDGE ZONE a = 4.8'
      3. WALL PRESSURES
         1. INTERIOR ZONE (4) = -31 PSF, +28 PSF
         2. CORNER ZONE (5) = -38 PSF, +28 PSF
      4. ROOF PRESSURES
         1. POSITIVE ALL ZONES = 16 PSF
         2. INTERIOR ZONE 1 = -52 PSF
         3. EDGE ZONE 2 = -76 PSF
         4. CORNER ZONE 3 = -91 PSF
5. SEISMIC DESIGN DATA
   a. ANALYSIS PROCEDURE: INDEX FORCE
   b. SEISMIC IMPORTANCE FACTOR (Ie): 1
   c. Ss: 0.049g
   d. S1: 0.017g
   e. SITE CLASS: D
   f. Sds: 0.052g
   q. Sd1: 0.027g
   h. SEISMIC DESIGN CATEGORY: A
      1. BASE SHEAR = 0.01*WEIGHT
      2. MEZZANINE LOADS INTO EACH METAL= BUILDING BRACED BAY 0.34 KIPS
6. SNOW DESIGN DATA
   a. GROUND SNOW LOAD: 60 PSF
   b. SNOW IMPORTANCE FACTOR (Is): 1.0
   c. SNOW EXPOSURE FACTOR (Ce) = 1.0
   d. THERMAL FACTOR (Ct) = 1.0
   e. SLOPED ROOF FACTOR (Cs) = 0.79
   f. FLAT ROOF SNOW LOAD = 42 PSF
   q. MIN UNIFORM ROOF SNOW LOAD = 33 PSF
   h. SNOW DRIFT LOAD, SEE SHEET S07
7. RAIN DESIGN DATA
   a. DESIGN RAIN INTENSITY = 3.25 INCHES PER HOUR

GENERAL NOTES

1. THE PROJECT SPECIFICATIONS ARE A PART OF THE CONTRACT DOCUMENTS.
2. THE CONTRACTOR SHALL EXAMINE THE STRUCTURAL DRAWINGS, ARCHITECTURAL DRAWINGS, AND EXISTING CONDITIONS/DIMENSIONS. THE CONTRACTOR SHALL NOTIFY THE COR OF ANY DISCREPANCIES BEFORE PROCEEDING WITH ANY WORK.
3. THE DRAWINGS AND SPECIFICATIONS REPRESENT THE COMPLETED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES AND MEANS NECESSARY TO PROTECT PERSONS AND STRUCTURES DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, SHORING, ETC. OBSERVATION BY THE ARCHITECT, ENGINEER OR COR DOES NOT INCLUDE REVIEW OF THESE MEASURES.
4. NOTES AND DETAILS ON THE STRUCTURAL DRAWINGS TAKE PRECEDENCE OVER GENERAL NOTES. TYPICAL DETAILS SHALL BE USED WHENEVER APPLICABLE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
5. ALL WORK NOT DETAILED OR NOTED SHALL BE CONSTRUCTED IN ACCORDANCE WITH OTHER SIMILAR WORK SHOWN ON THE DRAWINGS AND TYPICAL DETAILS.
6. DRAWINGS SHALL NOT BE SCALED FOR CONSTRUCTION PURPOSES.
7. NO PIPES OR DUCTS SHALL BE PLACED IN OR PENETRATE STRUCTURAL MEMBERS UNLESS SPECIFICALLY DESIGNED AND DETAILED.
8. STRUCTURAL DRAWINGS TO BE USED IN CONJUNCTION WITH ARCHITECTURAL, MECHANICAL, PLUMBING, ELECTRICAL, AND CIVIL DRAWINGS HEREIN.
9. REFER TO ARCHITECTURAL DRAWINGS FOR THE FOLLOWING:
   a. SIZE AND LOCATION OF DOOR AND WINDOW OPENINGS, EXCEPT AS NOTED.
   b. SIZE AND LOCATION OF INTERIOR AND EXTERIOR NONBEARING PARTITIONS.
   c. SIZE AND LOCATION OF CURBS, FLOOR DRAINS, SLOPES, DEPRESSED AREAS, CHANGES IN LEVEL, RAMPS, CHAMFERS, GROOVES, INSERTS, ETC.
   d. SIZE AND LOCATION OF FLOOR AND ROOF OPENINGS, IF NOT DIMENSIONED ON THESE DRAWINGS.
   e. FLOOR AND ROOF FINISHES.
   f. STAIR FRAMING AND DETAILS, EXCEPT AS NOTED.
   g. DIMENSIONS NOT SHOWN ON STRUCT DWGS.
10. REFER TO MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR THE FOLLOWING:
    a. PIPE RUNS, SLEEVES, HANGERS, EQUIPMENT, SLAB OPENINGS, NOT SHOWN OR NOTED ON STRUCTURAL DRAWINGS
    b. ELECTRICAL CONDUIT, BOXES, OUTLETS.
    c. CONCRETE INSERTS FOR ELECTRICAL, MECHANICAL, AND PLUMBING FIXTURES.
    d. SIZE AND LOCATION OF MACHINE AND EQUIPMENT BASES. CONTRACTOR'S ENGINEER SHALL DESIGN SEISMIC ANCHORAGE FOR MECHANICAL AND ELECTRICAL EQUIPMENT PER SPEC.
11. ASTM REFERENCES ARE FOR LATEST REVISIONS AND ISSUE, UON.
12. CONTRACTOR SHALL INVESTIGATE THE SITE DURING CLEARING AND EXCAVATION FOR UNSUITABLE CONDITIONS, UNCONSOLIDATED AND UNDOCUMENTED FILLS, BURIED STRUCTURES, UTILITIES, ETC., SHALL IMMEDIATELY NOTIFY THE COR OF ANY SITE CONDITIONS NOT REFLECTED ON THE DRAWINGS OR DIFFERENT FROM MAXIMUM OR MINIMUM DIMENSIONS INDICATED, INCLUDING CONFLICT IN GRADES, ADVERSE SOIL CONDITIONS, GROUND WATER PRESENT, DEEPENED FOOTINGS, UNCOVERED AND UNEXPECTED UTILITY LINES, ETC.
13. CONSTRUCTION MATERIALS SHALL BE SPREAD OUT IF PLACED ON STRUCTURAL FRAME SUCH THAT THE LOADING DOES NOT EXCEED THE DESIGN LIVE LOADS. PROVIDE SHORING AND BRACING WHERE DESIGN STRENGTH HAS NOT BEEN ATTAINED OR STRUCTURE IS NOT COMPLETE.
14. THE CONTRACTOR SHALL DETERMINE THE LOCATION OF UTILITY SERVICES IN AREAS TO BE EXCAVATED BEFORE BEGINNING EXCAVATION. EXERCISE CAUTION IN EXCAVATING AND TRENCHING.
15. THE STRUCTURAL ENGINEER SHALL NOT HAVE CONTROL OR CHARGE OF, AND SHALL NOT BE RESPONSIBLE FOR, CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES, FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, FOR THE ACT OF OMISSIONS OF THE CONTRACTOR, SUB-CONTRACTORS OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
16. CONTRACTOR'S CONSTRUCTION AND ERECTION SEQUENCE SHALL CONSIDER THE EFFECTS OF THERMAL MOVEMENTS OF STRUCTURAL ELEMENTS DURING THE CONSTRUCTION PERIOD.
17. VERIFY ALL OPENING DIMENSIONS THROUGH FLOOR, ROOF, AND WALLS WITH MECHANICAL AND ELECTRICAL CONTRACTORS.
18. STRUCTURAL ELEMENTS ARE CENTERED ON GRID LINES AND GRID LINE INTERSECTIONS, UNLESS DIMENSIONED OTHERWISE.
19. NOTIFY GOVERNMENT OF ANY CONDITIONS NOT CONSTRUCTED PER THE CONTRACT DOCUMENTS PRIOR TO PROCEEDING WITH CORRECTIVE WORK. SUBMIT PROPOSED REPAIR TO THE GOVERNMENT FOR ACCEPTANCE.
20. NOTHING SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE CONSTRUED AS ELIMINATING THE NEED FOR THE CONTRACTOR TO COMPLY WITH ALL OSHA REQUIREMENTS. WHERE THE STRUCTURAL DRAWINGS APPEAR TO CONFLICT WITH OSHA REQUIREMENTS, THE STRUCTURAL DRAWINGS REPRESENT FINAL CONDITIONS ONLY.
21. SEE ARCHITECTURAL PLANS FOR INTERIOR PARTITIONS. PARTITION FRAMING SHALL BE CONNECTED TO THE PRIMARY STRUCTURE IN SUCH A WAY SO AS TO ALLOW FOR VERTICAL LIVE LOAD DEFLECTIONS OF 3/4" AT FLOOR FRAMING OR 1" AT ROOF FRAMING. DO NOT MAKE RIGID VERTICAL AND HORIZONTAL CONNECTIONS TO THE PRIMARY STRUCTURE IN THE PLANE OF THE PARTITION.

VERIFY SCALE

THIS BAR IS ONE INCH ON ORIGINAL DRAWING

0" 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

REV.	DATE	DESCRIPTION	BY

Professional Engineer
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota

Signature: Edward Sabia

Typed or Printed Name: Edward Charles Sabia

Date: 1/12/24 License Number: 61484

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK ERSKINE, MN

GENERAL STRUCTURAL NOTES, DESIGN LOADS & ABBREVIATIONS

PROJECT NUMBER: 22-RF-027

S1	DESIGNED: ES	DRAWN: EM	DATE: 01.12.2024
	CADD:RDL 152S4	DRAWING NO: 3R-MN-1176-152	SHEET 31 OF 64

CHECKED: TDF

SUBMITTAL NOTES

1. SEE THE PROJECT SPECIFICATIONS FOR DETAILED REQUIREMENTS.
2. SUBMITTALS SHALL NOT CONTAIN SUBSTITUTION REQUESTS WITHOUT PRIOR AUTHORIZATION. SUBSTITUTION REQUESTS ARE FOR CONTRACTOR'S CONVENIENCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CHANGES NECESSARY IF THEY CHOOSE TO SUBSTITUTE AND SHALL COORDINATE ALL DETAILS. COST OF ADDITIONAL FIELD AND OFFICE WORK NECESSITATED BY REQUESTS BY THE CONTRACTOR FOR A SUBSTITUTION REQUEST OR DUE TO ERRORS OR OMISSIONS IN CONSTRUCTION SHALL BE BORNE BY THE CONTRACTOR.
3. DELEGATED DESIGN SUBMITTALS:
   a. THE CONTRACTOR SHALL EMPLOY OR RETAIN A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED TO DESIGN AND DETAIL DELEGATED DESIGN ITEMS TO MEET THE PERFORMANCE AND DESIGN CRITERIA ESTABLISHED AS PART OF THE BASE BUILDING STRUCTURE. DELEGATED DESIGN ITEMS INCLUDE:
      1. RAILINGS AND HANDRAILS
      2. METAL STAIRS
      3. PREFABRICATED BUILDINGS
      4. VEHICLE LIFT
   b. CONNECTION OF DEFERRED SUBMITTAL ITEMS TO PRIMARY STRUCTURE BY DEFERRED SUBMITTAL SUPPLIER. DEFERRED SUBMITTAL SUPPLIER TO PROVIDE CONNECTIONS AND FRAMING ARRANGEMENT TO AVOID LOADING WHICH EXCEEDS THE CAPACITY OF THE ELEMENT BEING ATTACHED TO.
   c. ALL DEFERRED SUBMITTALS TO BE ATTACHED TO PRIMARY STRUCTURE WITH A PINNED CONNECTION. MOMENT CONNECTIONS TO PRIMARY STRUCTURE NOT PERMITTED UNLESS NOTED ON DRAWINGS OR APPROVED BY THE GOVERNMENT IN WRITING PRIOR TO SUBMITTAL OF DRAWINGS OR CALCULATIONS.
   d. LOADING AND LOCATION FOR ATTACHMENT OF DEFERRED SUBMITTAL ITEMS ARE NOTED ON DRAWINGS AND ARE NOT TO BE RE-LOCATED OR INCREASED WITHOUT WRITTEN APPROVAL.
   e. WALLS, GRADE BEAMS AND THE UNDERSIDE OF CONCRETE ON METAL DECK SHALL BE CONSIDERED CRACKED FOR THE PURPOSE OF DESIGNING ANCHORS FOR ATTACHMENT OF DEFERRED SUBMITTAL ITEMS.
   f. POWDER ACTUATED FASTENERS (PAF) INTO CONCRETE SHALL NOT BE USED TO RESIST TENSION LOADS.

FOUNDATION NOTES

1. FOUNDATION DESIGN IS BASED ON THE GEOTECHNICAL EVALUATION REPORT PREPARED BY CHOSEN VALLEY TESTING, DATED SEPTEMBER 24. 2023 (PROJECT # 22442.23.MNS)
   a. FOOTINGS:
      1. ALLOWABLE BEARING PRESSURE = 2500 PSF
      2. ULTIMATE COEFFICIENT OF FRICTION TO RESIST LATERAL LOADS = 0.5
      3. FROST DEPTH TO BOTTOM OF FOUNDATION = 5'-0"
      4. PASSIVE PRESSURE COEFFICIENT, K_P = 3.54
2. SOIL BEARING PREPARATIONS FOR FOOTINGS SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACING THE CONCRETE AND REINFORCING. THE CONTRACTOR SHALL NOTIFY THE GEOTECHNICAL ENGINEER WHEN THE EXCAVATIONS ARE READY FOR INSPECTION. THE GEOTECHNICAL ENGINEER SHALL SUBMIT A LETTER OF COMPLIANCE TO THE OWNER. ALL INSPECTION COSTS TO BE PAID FOR BY CONTRACTOR
3. ALL EARTHWORK, FOOTING DEPTHS, AND EXCAVATIONS FOR FOUNDATIONS SHALL BE INSPECTED BY THE SOILS ENGINEER TO VERIFY ASSUMED ALLOWABLE SOIL BEARING PRESSURE AND TO MAKE ANY ADDITIONAL RECOMMENDATIONS. ALL INSPECTIONS COSTS TO BE PAID FOR BY CONTRACTOR
4. CONTRACTOR SHALL PROVIDE FOR PROPER DEWATERING OF EXCAVATIONS FROM SURFACE WATER, GROUND WATER, SEEPAGE, ETC.
5. ALL EXCAVATIONS SHALL BE PROPERLY BACKFILLED.
6. FOOTING BACKFILL AND UTILITY TRENCH BACKFILL WITHIN THE BUILDING PERIMETER SHALL BE MECHANICALLY COMPACTED IN LAYERS, TO THE APPROVAL OF THE GEOTECHNICAL ENGINEER. FLOODING WILL NOT BE PERMITTED.
7. SEE PLAN FOR TOP OF FOOTING ELEVATIONS. CONTRACTOR SHALL VERIFY AND LOWER FOOTINGS AS REQUIRED TO BEAR ON PROPER BEARING STRATUM.
8. EXISTING SILTY SOILS ARE EASILY WEAKENED WHEN WET OR SUBJECT TO HEAVY TRAFFIC, THE WEAKENED SOIL MAY NEED TO BE REPLACED OR PARTIALLY REPLACED WITH CLEAN SAND OR GRAVEL IF THAT OCCURS. THE NEED FOR THIS REPLACEMENT WILL NEED TO BE EVAULATED DURING CONSTRUCTION. SEE GEOTECHINCAL REPORT FOR ADDITIONAL INFORMATION.
9. CONTRACTOR TO REMOVE MINIMUM 6" OF TOPSOIL, INCLUDING ANY DEEP ROOT ZONES, OLD FOUNDATIONS, UTILITIES OR OTHER DELETRIOUS MATERIALS THAT MAY BE DISCOVERED DURING CONSTRUCTION. SOIL UNDER BUILDING(S) AND PAVED AREAS SHALL BE REPLACED WITH ENGINEERED FILL. SEE GEOTECHNICAL REPORT FOR ADDITIONAL REQUIREMENTS
10. EXCAVATIONS SHALL EXTEND 1'-0" MINIMUM HORIZONTALLY BEYOND THE EDGE OF FOUNDATION FOR EACH 1'-0" OF FILL REQUIRED BELOW FOOTING GRADE. OVERSIZING CAN BE REDUCED BY UP TO 50% IF PRECISE STAKING IS PRESENT DURING GRADING AND THE EXCAVATION LIMITS CAN BYE PRECISELY CONFIRMED RELATIVE TO THE FOUNDATIONS.

REINFORCING STEEL NOTES

1. ALL REINFORCING STEEL SHALL BE DETAILED AND PLACED IN ACCORDANCE WITH THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318) AND THE "MANUAL OF STANDARD PRACTICE FOR REINFORCED CONCRETE CONSTRUCTION" CRSI AND WCRSI AS MODIFIED BY THE PROJECT DRAWINGS AND SPECIFICATIONS.
2. DEFORMED REINFORCING BARS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615 GRADE 60.
3. WELDING OF REINFORCING SHALL BE WITH LOW HYDROGEN ELECTRODES IN CONFORMANCE WITH "RECOMMENDED PRACTICES FOR WELDING REINFORCING STEEL, ETC." AMERICAN WELDING SOCIETY (AWS) AWS D1.4 WELDING OF REINFORCING STEEL IS LIMITED TO A706 REBAR.
4. NO REINFORCING BAR BENDS SHALL BE MADE UNLESS A706 REBAR.
5. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A1064 GR. 65.
6. MINIMUM LAP OF WELDED WIRE FABRIC SHALL BE 6" OR TWO MESH PANELS, WHICHEVER IS GREATER.
7. SPLICES SHALL BE MADE WHERE INDICATED ON THE STRUCTURAL DRAWINGS. IF NOT INDICATED, SPLICE BEAM BOTTOM BARS OVER SUPPORTS AND TOP BARS AT MIDSPAN. MAKE BAR CONTINUOUS AROUND CORNERS UON. ALL SPLICES TO BE CONTACT TENSION SPLICE (CLASS B) UON.
8. DOWELS BETWEEN FOOTINGS AND WALLS OR COLUMNS SHALL BE THE SAME GRADE, SIZE, SPACING, AND NUMBER AS THE SPECIFIED VERTICAL REINFORCING, UON.
9. WHERE A 90°, 135°, OR 180° HOOK IS GRAPHICALLY INDICATED, PROVIDE CORRESPONDING ACI STANDARD HOOKS UON.

CONCRETE NOTES

1. ALL PHASES OF WORK PERTAINING TO THE CONCRETE CONSTRUCTION SHALL CONFORM TO THE "BUILDING CODE FOR REINFORCED CONCRETE" ACI 318, AND THE "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS", ACI 301, LATEST EDITIONS, WITH MODIFICATIONS AS NOTED ON THE DESIGN DRAWINGS OR SPECIFICATIONS.
2. CONCRETE MIXES SHALL BE SUBMITTED FOR REVIEW, DESIGNED BY A QUALIFIED TESTING LABORATORY AND SHALL BEAR THE SEAL OF AN ENGINEER LICENSED IN THE UNITED STATES. SEE CONCRETE MIX TABLE FOR MIX REQUIREMENTS.

CONCRETE MIX TABLE

USE	f'c (KSI)	CONCRETE WEIGHT	MAX. W/C RATIO	MAX. AGG. (IN)	AIR CONTENT (%)	EXPOSURE CLASS	OTHER NOTES
FOOTINGS	3	NWT	–	1	–	F0, S0, W0, C0	–
STEM WALLS, GRADE BEAMS	4	NWT	0.55	3/4	5	F1, S0, W0, C0	–
INTERIOR SLAB ON GRADE	3.5	NWT	–	3/4	–	F0, S0, W0, C0	–
CONCRETE EXPOSED TO WEATHER OR DEICERS	4.5	NWT	0.4	3/4	6	F3, S0, W0, C2	–
SLABS ON DECK OR INTERIOR TOPPING SLABS	3.5	NWT	0.5	3/4	–	F0, S0, W0, C0	–

MIX TABLE NOTES:
1. CEMENT TYPE TO BE TYPE ASTM C150 I/II OR ASTM C595 TYPE IL UNLESS OTHERWISE NOTED.
2. CONTRACTOR TO PROVIDE SLUMP AS NEEDED FOR WORKABILITY AND CONSISTENCY TO BE PLACED INTO FORMS AND AROUND REINFORCEMENT WITHOUT SEGREGATION OR EXCESS BLEEDING. USE ADMIXTURES AS REQUIRED TO OBTAIN DESIRED RESULTS.
3. NORMAL WEIGHT (NWT) CONCRETE SHALL HAVE A DRY DENSITY OF 145 ± 5 PCF.
4. AIR CONTENT SHALL BE ± 1 1/2% FROM REQUIRED VALUES. DO NOT PROVIDE AIR ENTRAINING ADMIXTURES TO ANY INTERIOR SLABS UNLESS CONTRACTOR CAN DEMONSTRATE TO ARCHITECT THAT SLABS WITH ENTRAINED AIR WILL HAVE ACCEPTABLE FINISH.
5. EXPOSURE CLASS DEFINITION PER ACI301/318. CONTRACTOR TO PROVIDE MIXES THAT MEET THESE REQUIREMENTS. FOR CORROSION PROTECTION OF REINFORCING (C0, C1, C2) PROVIDE MAXIMUM CHLORIDE ION CONTENT IN CONCRETE (%/WT) OF C0 = 1.0, C1 = 0.3, C2 = 0.15).
6. FOR SLABS ON GRADE, REQUIRED MINIMUM FLEXURAL STRENGTH = $6.7\sqrt{f'c}$.

3. AGGREGATE FOR HARD ROCK CONCRETE SHALL CONFORM TO ALL REQUIREMENTS AND TESTS OF ASTM C33 AND PROJECT SPECIFICATIONS. EXCEPTIONS MAY BE USED ONLY WITH PERMISSION OF THE STRUCTURAL ENGINEER THROUGH THE COR.
4. CONCRETE MIXING OPERATIONS, ETC. SHALL CONFORM TO ASTM C94.
5. PLACEMENT OF CONCRETE SHALL CONFORM TO ACI 305 "HOT WEATHER CONCRETING" AND ACI 306 " COLD WEATHER CONCRETING" WHEN APPLICABLE
6. CLEAR COVERAGE OF CONCRETE OVER REINFORCING BARS TO BE AS FOLLOWS:

CONCRETE PLACEMENT CONDITION:	CONCRETE COVER
CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	3"
CONCRETE EXPOSED TO EARTH OR WEATHER, #6 THROUGH #18 BAR	2"
CONCRETE EXPOSED TO EARTH OR WEATHER, #5 BAR AND SMALLER	1 1/2"
CONCRETE NOT EXPOSED: SLABS, WALLS, AND JOISTS, #14 AND #18 BAR	1 1/2"
CONCRETE NOT EXPOSED: SLABS, WALLS, AND JOISTS, #11 BAR AND SMALLER	3/4"
CONCRETE NOT EXPOSED: BEAMS, COLUMNS (PRIMARY REINF., TIES, STIRRUPS, SPIRALS)	1 1/2"
SLABS ON GRADE (FROM TOP)	1 1/2"

7. ALL REINFORCING BARS, ANCHOR BOLTS, AND OTHER CONCRETE INSERTS SHALL BE WELL SECURED IN POSITION PRIOR TO PLACING CONCRETE
8. MECHANICAL PIPES AND ELECTRICAL CONDUITS WHICH PASS THROUGH SLAB ON GRADE AND WALLS DO NOT REQUIRE SLEEVES, UNLESS OTHERWISE INDICATED IN THE PROJECT SPECIFICATIONS, MECHANICAL OR ELECTRICAL DRAWINGS. IF SLEEVES ARE REQUIRED, INSTALL SLEEVES BEFORE PLACING CONCRETE. DO NOT CUT ANY REINFORCING WHICH MAY INTERFERE WITH SLEEVE PLACEMENT. CORING OPENINGS IN CONCRETE IS NOT PERMITTED. NOTIFY THE STRUCTURAL ENGINEER IN ADVANCE OF CONDITIONS NOT SHOWN ON THE STRUCTURAL DRAWINGS.
9. PROJECTING CORNERS OF BEAMS, WALLS, COLUMNS, ETC., SHALL BE FORMED WITH A 3/4" CHAMFER, UNLESS OTHERWISE NOTED ON ARCHITECTURAL DRAWINGS.
10. ALL CONCRETE NOT SPECIFICALLY SHOWN WITH REINFORCEMENT SHALL BE REINFORCED IN THE SAME MANNER AS SIMILAR CONDITIONS OR WITH REINFORCEMENT MEETING THE MINIMUM REQUIREMENTS OF ACI-318.
11. CONCRETE SLAB SHALL BE WET MAT, MOIST CURED FOR A MINIMUM OF 7 DAYS. CONTRACTOR MAY SUBMIT ALTERNATE CURING PROCEDURES TO THE GOVERNMENT FOR REVIEW.
12. VERIFY ALKALINITY OF CONCRETE SURFACE, SLAB VAPOR TRANSMISSION, AND SLAB FLATNESS/LEVELNESS ARE COMPATIBLE WITH FLOORING SYSTEM AND ADHESIVES PRIOR TO INSTALLING FLOORING.
13. CURING COMPOUNDS USED ON CONCRETE THAT IS TO RECEIVE A RESILIENT FINISH SHALL BE APPROVED BY THE FINISH APPLICATOR BEFORE USE.
14. TAKE PRECAUTIONS TO MINIMIZE SLAB CURLING. GRIND SLAB OR USE LEVELING COMPOUND IF FLOOR FLATNESS AND LEVELNESS VALUES ARE NOT ACCEPTABLE TO THE GOVERNMENT.
15. CONCRETE CONSTRUCTION JOINT SURFACE SHALL BE CLEANED AND ALL LAITANCE AND LOOSE MATERIAL REMOVED PRIOR TO SECOND CONCRETE PLACEMENT.
16. SUBMIT DRAWINGS SHOWING CONSTRUCTION AND CONTROL JOINT LOCATIONS ALONG WITH THE SEQUENCE OF POURS. CONSTRUCTION JOINT LOCATIONS AND CASTING SEQUENCE SHALL BE ARRANGED TO MINIMIZE THE EFFECTS OF ELASTIC AND LONG-TERM SHORTENING/SHRINKAGE.

POST-INSTALLED ANCHOR NOTES

1. POST-INSTALLED ANCHORS BASIS OF DESIGN:

POST-INSTALLED ANCHORS

TYPE	USE	ANCHOR
ADHESIVE ANCHOR:		
	CONCRETE:	HILTI HIT-RE 500 V3
	MASONRY:	HILTI HY-270
MECHANICAL ANCHORS:		
	SCREW ANCHOR:	HILTI KWIK HUS-EZ
	EXPANSION ANCHOR:	HILTI KWIK BOLT TZ2

2. CONTRACTOR SHALL PROVIDED ENGINEERING BACKUP FOR ANY ANCHOR SUBSTITUTION REQUEST OR COMPENSATE CALIBRE TO PERFORM ENGINEERING VALIDATION THAT SUBSTITUTED ANCHOR IS ACCEPTABLE.
3. CONTRACTOR SHALL ARRANGE AN ANCHOR MANUFACTURER'S REPRESENTATIVE TO PROVIDE ONSITE INSTALLATION TRAINING FOR ALL OF THEIR ANCHORING PRODUCTS SPECIFIED. SUBMIT DOCUMENTED CONFIRMATION THAT ALL OF THE CONTRACTOR'S PERSONNEL WHO INSTALL ANCHORS HAVE PASSED THE TRAINING COURSE PRIOR TO THE COMMENCEMENT OF INSTALLING ANCHORS.
4. PROOF TENSION TEST FIRST 3 ADHESIVE ANCHORS AND 1% OF TOTAL ANCHORS PER ASTM E488. TEST 10% TOTAL OF OVERHEAD ADHESIVE ANCHORS. ALL TESTING COSTS TO BE PAID FOR BY CONTRACTOR
5. TORQUE TEST 100% OF EXPANSION, SLEEVE, AND SCREW ANCHORS TO 100% OF INSTALLATION TORQUE SHOWN IN PRODUCT ICC REPORT. ALL TESTING COSTS TO BE PAID FOR BY CONTRACTOR
6. INSTALL ANCHORS IN ACCORDANCE WITH CONTRACT DOCUMENTS AND THE CURRENT MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS.
7. LOCATE, THROUGH NON-DESTRUCTIVE MEANS, AND AVOID ALL EXISTING REINFORCING PRIOR TO INSTALLATION OF ANCHORS. IF EXISTING LAYOUT CONFLICTS WITH PROPOSED ANCHORS, CONTACT EOR FOR REVISED LAYOUT.
8. ANCHORS INSTALLED IN MASONRY SHALL BE INTO FULLY GROUTED CELLS FOR LOCATION OF ANCHOR AND ONE CELL ABOVE, BELOW, AND ADJACENT TO ANCHOR, UON.

STRUCTURAL STEEL NOTES

1. STRUCTURAL STEEL SHALL BE DESIGNED, DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE AISC "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS" AND "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (LATEST EDITION AND SUPPLEMENTS).

STEEL SHAPES	ASTM REQUIREMENTS
WIDE FLANGE SHAPES	A992
CHANNELS, ANGLES, PLATES, AND BARS	A36, UON
PIPE	A53 GRADE B
HSS	ASTM A500 GRADE C
HAS	A108
DAS	A1064
BOLTS	F3125-TYPE A325
ANCHOR RODS	F1554 GR 55

2. CONNECTING OR SPLICING OF STRUCTURAL STEEL NOT SHOWN ON THE DRAWINGS IS PROHIBITED WITHOUT PRIOR WRITTEN APPROVAL OF THE SEOR.
3. THE STRUCTURAL STEEL FABRICATOR SHALL FURNISH SHOP DRAWINGS OF ALL STRUCTURAL STEEL FOR REVIEW BEFORE FABRICATION. SHOP DRAWINGS SHALL SHOW THE ERECTION PROCEDURES AND DETAILS.
4. SEE SPECIFICATIONS FOR FINISH / PAINTING REQUIREMENTS FOR STRUCTURAL STEEL SURFACES. VERIFY WITH ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
5. WELDED JOINTS SHALL CONFORM TO THE PRE-QUALIFIED JOINT DETAILS AS INDICATED IN THE STRUCTURAL WELDING CODE (AWS D1.1) BY THE AMERICAN WELDING SOCIETY.
6. ALL WELDING SHALL BE BY WELDERS HOLDING CURRENT VALID CERTIFICATES AND HAVING CURRENT EXPERIENCE IN TYPE OF WELD CALLED FOR. WELDING RODS TO BE LOW HYDROGEN TYPE, E70.
7. ALL GROOVE WELDS TO BE FULL PENETRATION, UON.
8. ALL FILLET WELDS TO BE 5/16", CONTINUOUS, UON.
9. WELD LENGTHS CALLED FOR ON PLANS ARE THE NET EFFECTIVE LENGTH REQUIRED. WELD SIZE SHALL BE AISC MINIMUM PER AISC SECTION J2.1b AND J2.2b, UNLESS A LARGER SIZE IS NOTED.
10. WELDS SHOWN AS FIELD WELDS MUST BE MADE IN THE FIELD UNLESS A SUBSTITUTION REQUEST IS MADE. ALL OTHER WELDS MAY BE MADE IN SHOP OR FIELD AT CONTRACTOR'S OPTION.
11. EXCEPT AS SUBSEQUENTLY NOTED, HIGH STRENGTH BOLTS NEED NOT BE TIGHTENED BEYOND THE SNUG-TIGHT CONDITION, AS DEFINED IN SECTION 8.(c) OF THE SPECIFICATIONS FOR STRUCTURAL JOINTS USING TYPE A325 OR A490 BOLTS. FOR CONNECTIONS SUBJECT TO DIRECT TENSION, CONNECTIONS FOR BRACED FRAMES, AND OTHER CONNECTIONS SHOWN OR NOTED ON THE PLANS AS SLIP CRITICAL (SC) OR FULLY TENSIONED, BOLTS SHALL BE TIGHTENED BY ONE OF THE METHODS DESCRIBED IN SECTION 8.(d) AND TO THE MINIMUM TENSION SPECIFIED IN SECTION 8.(d), TABLE 4.
12. ALL CONNECTION AND MEMBER FORCES SHOWN ARE ULTIMATE, UON.
13. DETAILS INDICATED ON DRAWINGS DO NOT SHOW ERECTION AIDS. PROVIDE ERECTION AIDS AS REQUIRED AND REMOVE THEM AFTER WORK IS COMPLETE.
14. WHERE NO CAMBER IS INDICATED, FABRICATE BEAMS SO THAT ROLLING CAMBER IS UPWARD AFTER ERECTION.
15. PROVIDE HOLES IN ALL STEEL ELEMENTS AS REQUIRED TO PREVENT ANY ACCUMULATION OF WATER. ALL PENETRATIONS ADDED SHALL BE 1-1/8"Ø MAX AND GROUND SMOOTH.

VERIFY SCALE

THIS BAR IS ONE INCH ON ORIGINAL DRAWING

0" —— 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

Professional Engineer
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota
Signature: Edward Sabia
Typed or Printed Name: Edward Charles Sabia
Date: 1/12/24 License Number: 61484

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP
POLK ERSKINE, MN

GENERAL STRUCTURAL NOTES

PROJECT NUMBER: 22-RF-027

DESIGNED: ES	DRAWN: EM	DATE: 01.12.2024	CHECKED: TDF
CADD:RDL153S4	DRAWING NO: 3R-MN-1176-153		SHEET 32 OF 64

S2

STEEL JOIST NOTES

1. JOISTS SHALL BE DESIGNED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE STEEL JOIST INSTITUTE (SJI) STANDARD SPECIFICATIONS, 43RD EDITION (2010).
2. SIZE, TYPE, AND SPACING OF JOIST BRIDGING PER CURRENT SJI REQUIREMENTS. USE 'X' BRIDGING AT DISCONTINUOUS ENDS OF BRIDGING, UON ON PLANS OR DETAILS.
3. REFER TO PLANS, DETAILS, AND SPECIAL JOIST LOADING DIAGRAMS FOR ADDITIONAL JOIST DESIGN REQUIREMENTS INCLUDING UNBALANCED, CONCENTRATED, AXIAL, AND UPLIFT LOADS.
4. CONTRACTOR/JOIST MANUFACTURER TO COORDINATE EXACT WEIGHT, WEIGHT DISTRIBUTION, SIZE, AND LOCATION OF ROOF MECHANICAL UNITS/DUCTS AND VERIFY SIZE OF OPEN-WEB STEEL JOIST SHOWN ON THE DRAWINGS.

STEEL DECK NOTES

1. THE STEEL DECK SHALL BE THE TYPE AND GAUGE AS CALLED FOR ON DRAWINGS. DECK AND ALL ACCESSORIES SHALL BE FORMED FROM STEEL SHEETS CONFORMING TO ASTM STANDARDS AS SHOWN BELOW. GALVANIZED DECK SHALL BE COATED IN ACCORDANCE WITH ASTM A924 WITH A MINIMUM G60 COATING AS DEFINED IN ASTM A653.
   a. GALVANIZED DECK: ASTM A653, GRADE 50 (MIN)
   b. PAINTED DECK: ASTM A1008, GRADE 50 (MIN)
2. STEEL DECK UNITS WITH CONCRETE FILL SHALL BE CONTINUOUS OVER TWO OR MORE SPANS. IF STEEL DECK UNITS WITH CONCRETE FILL SPAN LESS THAN 2 SPANS, THE DECK UNITS SHALL BE SHORED, UON.
3. MINIMUM BEARING OF STEEL DECK ON SUPPORTS SHALL BE 4" AT INTERIOR SUPPORTS AND 2" AT EXTERIOR SUPPORTS UON.
4. SHEETS SHALL BE ATTACHED TO ALL SUPPORTING STEEL MEMBERS AS INDICATED ON DRAWINGS AND IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
5. SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL, ETC., FOR SIZES AND LOCATIONS OF ALL DECK OPENINGS. SEE TYPICAL DETAILS FOR FRAMING REQUIREMENTS AT DECK OPENINGS. OPENINGS LARGER THAN 12" SHALL NOT BE PLACED IN DECK UNLESS SPECIFICALLY SHOWN ON THE STRUCTURAL DRAWINGS, NOTIFY THE STRUCTURAL ENGINEER THROUGH THE COR OF ANY DISCREPANCIES.

PRE-ENGINEERED METAL BUILDING NOTES

1. THE PRE-ENGINEERED METAL BUILDING IS A DELEGATED DESIGN SERVICE.
2. THE PRE-ENGINEERED METAL BUILDING DESIGNER IS RESPONSIBLE FOR THE GRAVITY AND LATERAL DESIGN OF THE BUILDING FRAME, GIRTS, ROOF FRAMING, METAL DECKING, WALL CLADDING, BASEPLATES, ETC. REFERENCE THE PRE-ENGINEERED METAL BUILDING DESIGN CRITERIA AND THE DEFERRED SUBMITTAL NOTES FOR ADDITIONAL INFORMATION AND DESIGN REQUIREMENTS.
3. THE PRE-ENGINEERED STRUCTURE SHALL BE DESIGNED IN ACCORDANCE WITH THE LATEST ADDITION OF THE MBMA METAL BUILDING SYSTEM MANUAL AND THE CODES AND DESIGN CRITERIA LISTED ON THE STRUCTURAL DRAWINGS AND IN THE SPECIFICATIONS.
4. COLUMN, FOUNDATION AND FRAME LOCATIONS ARE TO REMAIN AS SHOWN ON THE STRUCTURAL DRAWINGS.
5. SEE S5 FOR REQUIRED LATERAL LOADS TRANSFERRED TO PEMB SYSTEM

QUALITY ASSURANCE PLAN AND STATEMENT OF SPECIAL INSPECTION NOTES

1. SPECIAL INSPECTIONS FOR THIS PROJECT ARE REQUIRED PER THE 2021 INTERNATIONAL BUILDING CODE CHAPTER 17, SECTION 1704 AND 1705. SEE PROJECT SPECIFICATIONS AND STATEMENT OF SPECIAL INSPECTIONS BELOW FOR SPECIFIED REQUIREMENTS.
2. THE CONTRACTOR SHALL ENGAGE A QUALIFIED INSPECTION AND TESTING AGENCY TO PERFORM SPECIAL INSPECTION SERVICES FOR ALL STRUCTURAL MEMBERS AND ASSEMBLIES. SPECIAL INSPECTORS' INSPECTIONS ARE IN ADDITION TO ANY INSPECTION PERFORMED BY THE AUTHORITY HAVING JURISDICTION.
3. THE SPECIAL INSPECTOR OR INSPECTION AGENCY RETAINED FOR CONDUCTING INSPECTIONS SHALL BE EMPLOYED BY THE CONTRACTOR, AS APPROVED BY THE AUTHORITY HAVING JURISDICTION.
4. SPECIAL INSPECTION IS REQUIRED FOR THE FOLLOWING:
   a. STEEL CONSTRUCTION (IBC 1705.2, AISC 360-16)
      1. WELDING
      2. HIGH STRENGTH BOLTS
      3. STEEL JOIST AND JOIST GIRDERS
   b. STEEL DECK (ANSI-SDI-QAQC-2017)
   c. CONCRETE CONSTRUCTION (IBC 1705.3, ACI 318)
   d. SOILS (IBC 1705.6)
5. SEE INSPECTION TABLES AND REFERENCED DOCUMENTS FOR MORE IN-DEPTH INSPECTION REQUIREMENTS.
   a. 'O' = OBSERVE, INSPECTOR SHALL OBSERVE THESE ITEMS ON A RANDOM BASIS
   b. 'P' = PERFORM, INSPECTOR SHALL PERFORM TASKS FOR EACH MEMBER
6. FOR SHOP FABRICATED MEMBERS AND ASSEMBLIES, INSPECTIONS SHALL OCCUR UNLESS THE FABRICATOR IS REGISTERED AND APPROVED BY THE AUTHORITY HAVING JURISDICTION TO PERFORM SUCH WORK WITHOUT SPECIAL INSPECTION OR HAS A CURRENT ICC-ES EVALUATION REPORT.
   a. AT COMPLETION OF FABRICATION BY AN APPROVED FABRICATOR, THE FABRICATOR SHALL SUBMIT A CERTIFICATE OF COMPLIANCE THAT THE WORK WAS COMPLETED IN COMPLIANCE WITH CONTRACT DOCUMENTS.
7. THE SPECIAL INSPECTOR FOR EACH MATERIAL SHALL SUBMIT SPECIAL INSPECTOR QUALIFICATIONS TO THE AUTHORITY HAVING JURISDICTION PRIOR TO START OF WORK
8. A FINAL REPORT OF SPECIAL INSPECTIONS, DOCUMENTING COMPLETION OF ALL REQUIRED SPECIAL INSPECTIONS, INCLUDING TESTING AND CORRECTION OF ANY DISCREPANCIES NOTED IN THE INSPECTIONS, SHALL BE SUBMITTED TO THE AUTHORITY HAVING JURISDICTION STATING THAT THE WORK WAS COMPLETED IN SUBSTANTIAL CONFORMANCE TO THE APPROVED PLANS, SPECIFICATIONS, AND THE APPLICABLE PROVISIONS OF THE CODE. ANY WORK NOT IN COMPLIANCE SHALL BE DESCRIBED IN THE REPORT.
9. THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING AND COORDINATING THE WORK WITH THE INSPECTOR (WITH UPDATES AS NEEDED) TO FACILITATE PROPER INSPECTION PER THE CODE. CONTRACTOR SHALL KEEP WORK EXPOSED AND ACCESSIBLE UNTIL REQUIRED SPECIAL INSPECTIONS ARE COMPLETE. ANY COSTS TO RE-EXPOSE AREAS NOT INSPECTED SHALL BE BORNE BY THE CONTRACTOR.
10. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. INSPECTOR SHALL SUBMIT TIMELY REPORTS OF NON-CONFORMANCE TO SEOR.
11. STRUCTURAL OBSERVATION BY THE GOVERNMENT DOES NOT CONSTITUTE SPECIAL INSPECTIONS.

POST-INSTALLED ANCHOR / REINFORCING STEEL SPECIAL INSPECTIONS (ICC-ES REPORT)

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
EXPANSION ANCHORS, SLEEVE ANCHORS, SCREW ANCHORS INSTALLATION	X	–
TORQUE TESTING OF EXPANSION ANCHORS, SLEEVE ANCHORS, SCREW ANCHORS	100%	–
ADHESIVE ANCHORS, REINFORCING STEEL INTO HARDENED CONCRETE INSTALLATION	X	–
TENSION TEST OF ADHESIVE ANCHORS	–	FIRST 3 AND 1% OF REMANING

POST-INSTALLED ANCHORS / REINFORCING STEEL SPECIAL INSPECTIONS
REFERENCE INDIVIDUAL ANCHOR – ICC-ES REPORT

TASKS	PERIODIC	CONTINUOUS
PRIOR TO START OF WORK REVIEW CONTRACTOR'S INSTALLATION PROCEDURE	–	X
PRIOR TO INSTALLATION OF ANCHOR VERIFY TYPE, DIAMETER, LENGTH, FINISH AND BASE MATERIAL. VERIFY SOLID GROUTED AREA AROUND ANCHORS IN GROUTED MASONRY. VERIFY MAXIMUM IMPACT WRENCH TORQUE RATING FOR SCREW ANCHORS	X	–
DURING INSTALLATION OF ANCHOR VERIFY HOLE DIMENSIONS, HOLE CLEANING, ANCHOR EMBEDMENT, EDGE DISTANCES AND SPACING	–	X
AFTER INSTALLATION OF ATTACHED ASSEMBLY VERIFY NUMBER, EDGE DISTANCES AND ANCHOR FLUSH WITH AND PERPENDICULAR TO THE RECEIVING SURFACE	–	X
AFTER INSTALLED TORQUE TEST	–	X
ADHESIVE ANCHORS, REINFORCING STEEL ANCHORED INTO HARDENED CONCRETE		
PRIOR TO START OF WORK REVIEW CONTRACTOR'S INSTALLATION PROCEDURE	–	X
PRIOR TO INSTALLATION OF ANCHOR VERIFY TYPE, DIAMETER, LENGTH, FINISH AND BASE MATERIAL. VERIFY SOLID GROUTED AREA AROUND ANCHORS IN GROUTED MASONRY. VERIFY MAXIMUM IMPACT WRENCH TORQUE RATING FOR SCREW ANCHORS	X	–
DURING INSTALLATION OF ANCHOR VERIFY HOLE DIMENSIONS, HOLE CLEANING, ANCHOR EMBEDMENT, EDGE DISTANCES AND SPACING	–	X
AFTER INSTALLATION OF ATTACHED ASSEMBLY VERIFY NUMBER, EDGE DISTANCES AND ANCHOR FLUSH WITH AND PERPENDICULAR TO THE RECEIVING SURFACE	–	X
CURE TIME	–	X
AFTER INSTALLED TENSION TEST PER ASTM E488	X	–

REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS – REFERENCE 2021 IBC 1705.6

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN CAPACITY	–	X
VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL	–	X
PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS	–	X
DURING FILL PLACEMENT USE OF PROPER MATERIALS AND PROCEDURES IN ACCORDANCE WITH THE PROVISIONS OF THE APPROVED GEOTECHNICAL REPORT. VERIFY DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL	X	–
PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY	–	X

VERIFY SCALE

THIS BAR IS ONE INCH ON ORIGINAL DRAWING

0" —— 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

Professional Engineer
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota

Signature: Edward Sabia

Typed or Printed Name: Edward Charles Sabia

Date: 1/12/24 License Number: 61484

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK ERSKINE, MN

GENERAL STRUCTURAL NOTES AND QA NOTES & TABLES

PROJECT NUMBER: 22-RF-027

S3

DESIGNED: ES	DRAWN: EM	DATE: 01.12.2024	CHECKED: TDF
CADD:RDL 154S4	DRAWING NO: 3R-MN-1176-154		SHEET 33 OF 64

DECK QUALITY ASSURANCE TABLES (SDI TABLE 1.1 THRU 1.8)	
INSPECTION OR EXECUTION TASKS PRIOR TO DECK PLACEMENT	
TYPE	QA
VERIFY COMPLIANCE OF MATERIALS (DECK AND ALL DECK ACCESSORIES) WITH CONSTRUCTION DOCUMENTS, INCLUDING PROFILES, MATERIAL PROPERTIES AND BASE METAL THICKNESS	PERFORM
DOCUMENT ACCEPTANCE OR REJECTION OF DECK AND DECK ACCESSORIES	PERFORM
INSPECTION OR EXECUTION TASKS AFTER DECK PLACEMENT	
TYPE	QA
VERIFY COMPLIANCE OF DECK AND ALL DECK ACCESSORIES INSTALLATION WITH CONSTRUCTION DOCUMENTS	PERFORM
VERIFY DECK MATERIALS ARE REPRESENTED BY THE MILL CERTIFICATIONS THAT COMPLY WITH THE CONSTRUCTION DOCUMENTS	PERFORM
DOCUMENT ACCEPTANCE OR REJECTION OF INSTALLATION OF DECK AND DECK ACCESSORIES	PERFORM
INSPECTION OR EXECUTION TASKS PRIOR TO WELDING	
TYPE	QA
WELDING PROCEDURE SPECIFICATIONS (WPS) AVAILABLE	OBSERVE
MANUFACTURER CERTIFICATIONS FOR WELDING CONSUMABLES AVAILABLE	OBSERVE
MATERIAL IDENTIFICATION (TYPE / GRADE)	OBSERVE
CHECK WELDING EQUIPMENT	OBSERVE
INSPECTION OR EXECUTION TASKS DURING WELDING	
TYPE	QA
USE OF QUALIFIED WELDERS	OBSERVE
CONTROL AND HANDLING OF WELDING CONSUMABLES	OBSERVE
ENVIRONMENTAL CONDITIONS (WIND SPEED, MOISTURE AND TEMPERATURE)	OBSERVE
WPS FOLLOWED	OBSERVE
INSPECTION OR EXECUTION TASKS AFTER WELDING	
	QA
VERIFY SIZE AND LOCATION OF WELDS, INCLUDING SUPPORT, SIDELAP AND PERIMETER WELDS.	PERFORM
WELDS MEET VISUAL ACCEPTANCE CRITERIA	PERFORM
VERIFY REPAIR ACTIVITIES	PERFORM
DOCUMENT ACCEPTANCE OR REJECTION OF WELDS	PERFORM
INSPECTION OR EXECUTION TASKS TO MECHANICAL FASTENING	
TYPE	QA
MANUFACTURER INSTALLATION INSTRUCTIONS AVAILABLE FOR MECHANICAL FASTENERS	OBSERVE
PROPER TOOLS AVAILABLE FOR FASTENER INSTALLATION	OBSERVE
PROPER STORAGE FOR MECHANICAL FASTENERS	OBSERVE
INSPECTION OR EXECUTION TASKS DURING MECHANICAL FASTENING	
TYPE	QA
FASTENERS ARE POSITIONED AS REQUIRED	OBSERVE
FASTENERS ARE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS	OBSERVE
INSPECTION OR EXECUTION TASKS AFTER MECHANICAL FASTENING	
TYPE	QA
CHECK SPACING, TYPE AND INSTALLATION OF SUPPORT FASTENERS	PERFORM
CHECK SPACING, TYPE AND INSTALLATION OF SIDELAP FASTENERS	PERFORM
CHECK SPACING, TYPE AND INSTALLATION OF PERIMETER FASTENERS	PERFORM
VERIFY REPAIR ACTIVITIES	PERFORM
DOCUMENT ACCEPTANCE OR REJECTION OF MECHANICAL FASTENERS	PERFORM

REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION – REFERENCE 2021 IBC 1705.3		
TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
INSPECT REINFORCEMENT, INCLUDING TENDONS AND VERIFY PLACEMENT.	–	X
REINFORCING BAR WELDING: a. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706: b. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16"; AND c. INSPECT ALL OTHER WELDS.	 – X	 X X
INSPECT ANCHORS CAST IN CONCRETE.	–	X
INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS. a. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS. b. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED ABOVE.	 X –	 – X
VERIFY USE OF REQUIRED DESIGN MIX.	–	X
PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR TESTS AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	–
INSPECT CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	–
VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	–	X

REQUIRED SPECIAL INSPECTIONS AND TESTS OF STRUCTURAL STEEL – REFERENCE 2021 IBC 1705.2 INSPECTION TASKS PRIOR TO WELDING – REFERENCE AISC 360-16 SPECIFICATION, TABLE N5.4-1		
INSPECTION TASKS PRIOR TO WELDING	QC	QA
WELDER QUALIFICATION RECORDS AND CONTINUITY RECORDS	PERFORM	OBSERVE
WPS AVAILABLE	PERFORM	OBSERVE
MANUFACTURER CERTIFICATIONS FOR WELDING CONSUMABLES AVAILABLE	PERFORM	PERFORM
MATERIAL IDENTIFICATION (TYPE / GRADE)	OBSERVE	OBSERVE
WELDER IDENTIFICATION SYSTEM	OBSERVE	OBSERVE
FIT-UP OF GROOVE WELDS (INCLUDING JOINT GEOMETRY)	OBSERVE	OBSERVE
FIT-UP OF CJP GROVE WELDS OF HSS T-, Y-, AND K-JOINTS WITHOUT BACKING (INCLUDING JOINT GEOMETRY)	PERFORM	OBSERVE
CONFIGURATION AND FINISH OF ACCESS HOLES	OBSERVE	OBSERVE
FIT-UP OF FILLET WELDS	OBSERVE	OBSERVE
CHECK WELDING EQUIPMENT	OBSERVE	–

REQUIRED SPECIAL INSPECTIONS AND TESTS OF STRUCTURAL STEEL – REFERENCE 2021 IBC 1705.2 INSPECTION TASKS DURING WELDING – REFERENCE AISC 360-16 SPECIFICATION, TABLE N5.4-2		
INSPECTION TASKS DURING WELDING	QC	QA
CONTROL AND HANDLING OF WELDING CONSUMABLES	OBSERVE	OBSERVE
NO WELDING OVER CRACKED TACK WELDS	OBSERVE	OBSERVE
ENVIRONMENTAL CONDITIONS	OBSERVE	OBSERVE
WPS FOLLOWED	OBSERVE	OBSERVE
WELDING TECHNIQUES	OBSERVE	OBSERVE

REQUIRED SPECIAL INSPECTIONS AND TESTS OF STRUCTURAL STEEL – REFERENCE 2021 IBC 1705.2 INSPECTION TASKS AFTER WELDING – REFERENCE AISC 360-16 SPECIFICATION, TABLE N5.4-3		
INSPECTION TASKS AFTER WELDING	QC	QA
WELDS CLEANED	OBSERVE	OBSERVE
SIZE, LENGTH, AND LOCATION OF WELDS	PERFORM	PERFORM
WELDS MEET VISUAL ACCEPTANCE CRITERIA	PERFORM	PERFORM
ARC STRIKES	PERFORM	PERFORM
K-AREA	PERFORM	PERFORM
REPAIR ACTIVES	PERFORM	PERFORM
DOCUMENT ACCEPTANCE OR REJECTION OF WELDED JOINT OR MEMBER	PERFORM	PERFORM
NO PROHIBITED WELDS HAVE BEEN ADDED WITHOUT THE APPROVAL OF EOR	OBSERVE	OBSERVE

REQUIRED SPECIAL INSPECTIONS AND TESTS OF STRUCTURAL STEEL – REFERENCE 2021 IBC 1705.2 INSPECTION TASKS PRIOR TO BOLTING – REFERENCE AISC 360-16 SPECIFICATION, TABLE N5.6-1		
INSPECTION TASKS PRIOR TO BOLTING	QC	QA
MANUFACTURER'S CERTIFICATIONS AVAILABLE FOR FASTENER MATERIALS	OBSERVE	PERFORM
FASTENERS MARKED IN ACCORDANCE WITH ASTM REQUIREMENTS	OBSERVE	PERFORM
CORRECT FASTENERS SELECTED FOR THE JOINT DETAIL	OBSERVE	OBSERVE
CORRECT BOLTING PROCEDURE SELECTED FOR JOINT DETAIL	OBSERVE	OBSERVE
CONNECTION ELEMENTS, INCLUDING THE APPROPRIATE FAYING SURFACE CONDITIONS AND HOLE PREPARATION, IF SPECIFIED, MEET APPLICABLE REQUIREMENTS	OBSERVE	OBSERVE
PRE-INSTALLATION VERIFICATION TESTING	PERFORM	OBSERVE
PROPER STORAGE PROVIDED FOR BOLTS, NUTS, WASHERS, AND OTHER FASTENER COMPONENTS	OBSERVE	OBSERVE

REQUIRED SPECIAL INSPECTIONS AND TESTS OF STRUCTURAL STEEL – REFERENCE 2021 IBC 1705.2 INSPECTION TASKS DURING BOLTING – REFERENCE AISC 360-16 SPECIFICATION, TABLE N5.6-2		
INSPECTION TASKS DURING BOLTING	QC	QA
FASTENER ASSEMBLIES PLACED IN ALL HOLES AND WASHERS AND NUTS ARE POSITIONED AS REQUIRED	OBSERVE	OBSERVE
JOINT BROUGHT TO THE SNUG-TIGHT CONDITION PRIOR TO THE PRE-TENSIONING OPERATION	OBSERVE	OBSERVE
FASTENER COMPONENT NOT TURNED BY THE WRENCH PREVENTED FROM ROTATING	OBSERVE	OBSERVE
FASTENERS ARE PRETENSIONED IN ACCORDANCE WITH THE RCSC SPECIFICATION, PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID POINT TOWARDS THE FREE EDGES	OBSERVE	OBSERVE

REQUIRED SPECIAL INSPECTIONS AND TESTS OF STRUCTURAL STEEL – REFERENCE 2021 IBC 1705.2 INSPECTION TASKS AFTER BOLTING – REFERENCE AISC 360-16 SPECIFICATION, TABLE N5.6-3		
INSPECTION TASKS AFTER BOLTING	QC	QA
DOCUMENT ACCEPTANCE OR REJECTION OF BOLTED CONNECTIONS	PERFORM	PERFORM

VERIFY SCALE

THIS BAR IS ONE INCH ON ORIGINAL DRAWING

0" ——— 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

REV.	DATE	DESCRIPTION	BY

Professional Engineer
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota

Signature: Edward Sabia

Typed or Printed Name: Edward Charles Sabia

Date: 1/12/24 License Number: 61484

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK ERSKINE, MN

QA NOTES & TABLES

PROJECT NUMBER: 22-RF-027

S4

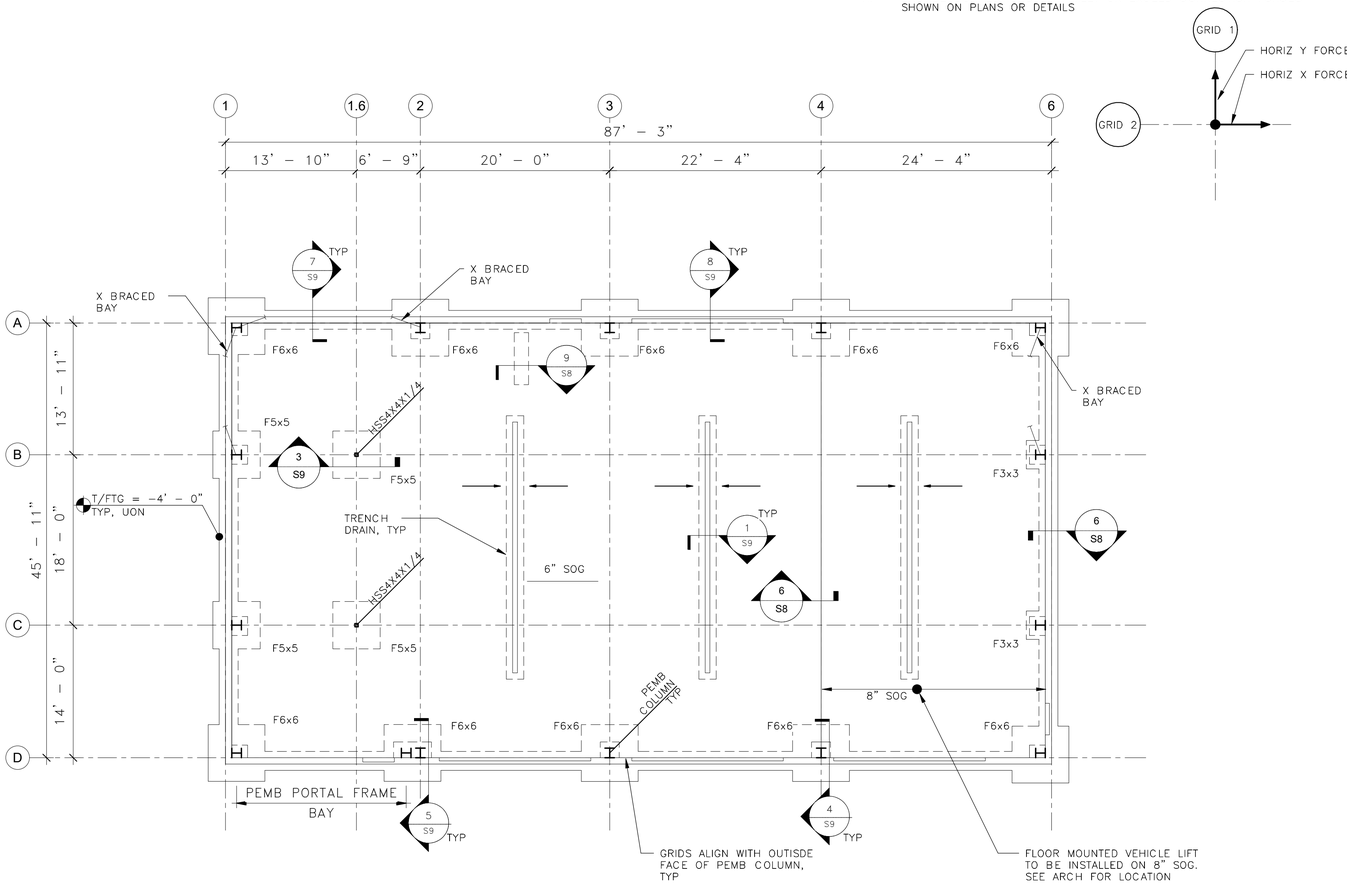
DESIGNED: ES | DRAWN: EM | DATE: 01.12.2024 | CHECKED: TDF

CADD:RDL 155S4 | DRAWING NO: 3R-MN-1176-155 | SHEET 34 OF 64

PRE–ENGINEERED METAL BUILDING DESIGN CRITERIA

1. GENERAL:
   - A. CRITERIA LISTED BELOW ARE MINIMUM PERFORMANCE REQUIREMENTS FOR DEFERRED SUBMITTAL DESIGN OF THE PRE–ENGINEERED METAL BUILDING SYSTEM. FINAL CRITERIA SHALL BE CALCULATED BY THE PRE–ENGINEERED METAL BUILDING DESIGNER.
     - a. GENERAL BUILDING CRITERA: S01
     - b. SNOW LOADS: S01
     - c. WIND EDGE, CORNER, AND OVERHANG ZONES: S01
     - d. ROOF LOADING CRITERIA: S01 & S06
   - B. PEMB ENGINEER TO COORDINATE ADDITIONAL POINT LOAD LOCATIONS NOT SHOWN ON STRUCTURAL DRAWINGS WITH GENERAL CONTRACTOR. ADDITIONAL POINT LOADS TO BE VERIFIED INCLUDE:
     - a. FANS
     - b. MAKE UP AIR UNIT
     - c. DUCTWORK AND MISCELLANEOUS MECHANICAL ITEMS
     - d. LIGHTS
     - e. FIRE PROTECTION
     - f. PLUMBING
     - g. OVERHEAD, SECTIONAL, AND COILING DOORS
2. SERVICEABILITY:
   - A. SEE PRE–ENGINEERED METAL BUILDING DEFLECTIONS AND DRIFT LIMITS TABLE FOR REQUIRED LIMITS
3. CONNECTIONS:
   - A. PROVIDE CONNECTIONS THAT MEET OR EXCEED CONNECTION FORCES SHOWN ON PLANS OR DETAILS

PRE–ENGINEERED METAL BUILDING DEFLECTION AND DRIFT LIMITS	
VERTICAL DEFLECTIONS	
ROOF MEMBERS:	
SNOW LOAD DEFLECTION FOR MEMBERS NOT SUPPORTING CEILING	L/180
SNOW LOAD DEFLECTION FOR SECONDARY MEMBERS AT FORMED METAL ROOF ONLY	L/150
TOTAL LOAD DEFLECTION FOR MEMBERS NOT SUPPORTING CEILING	L/120
TOTAL LOAD DEFLECTION AT FORMED METAL ROOF (W/ NO ADDITIONAL ROOF COVERINGS)	L/60
TOTAL DEAD LOAD DEFLECTION FOR SPANDRELS SUPPORTING CLADDING LOADS	L/480 ≤ 5/8 IN
NOTES: 1. STIFFER ROOF MEMBERS MAY BE REQUIRED TO SATISFY ROOF PONDING REQUIREMENTS. PRE–ENGINEERED METAL BUILDING DESIGNER SHALL MAINTAIN POSITIVE ROOF DRAINAGE. 2. SPANDREL MEMBERS MAY REQUIRES STIFFER DEFLECTION REQUIREMETNS. PRE–ENGINEERED METAL BUILDING DESIGNER SHALL COORDINATE VERTICAL DEFLECTION REQUIREMENTS WHERE STRUCTURAL MEMBERS INTERACT WITH ARCHITECTURAL ELEMENTS AND WHERE CLADDING WEIGHT EXCEEDS 25 PERCENT OF THE TOTAL DEAD LOAD OF THE SPANDREL BEAM.	
HORIZONTAL DEFLECTIONS	
EXTERIOR WALLS/GIRTS (OUT–OF–PLANE):	
EXTERIOR WALLS WITH METAL PANEL SIDING AND NO INTERIOR GYP	L/90
EXTERIOR WALLS WITH FLEXIBLE FINISHES (GYP BOARD, METAL PANEL, ETC)	L/120
NOTES: 1. WIND LOAD – IBC 2021: 0.42*ULTIMATE LEVEL COMPONENT AND CLADDING PRESSURES	
BUILDING DRIFT:	
WIND DRIFT FOR FORMED METAL SIDED BUILDINGS	H/60, 1" MAX IN E–W DIRECTION
SEISMIC LOADS – STORY DRIFTS	H/50, 1" MAX IN E–W DIRECTION
NOTES: 1. FOR BUILDING DRIFT, MODIFY WIND LOAD BY 0.42*MAIN WIND FORCE RESISTING SYSTEM PRESSURES AS CALCULATED BY THE PRE–ENGINEERED METAL BUILDING DESIGNER. 2. FOR BUILDING DRIFT AT EXPANSION JOINTS, MODIFY WIND LOAD BY 0.6*MAIN WIND FORCE RESISTING SYSTEM PRESSURES AS CALCULATED BY THE PRE–ENGINEERED METAL BUILDING DESIGNER.	



METAL BUILDING ANTICIPATED LOADING (ALLOWABLE)				
GRID INTERSECTION (GRID 1 / GRID 2)	MAX VERT COLUMN FORCE (KIPS)	MIN VERT COLUMN FORCE (KIPS)	MAX HORIZ Y (KIPS)	MAX HORIZ X (KIPS)
A/3, A/4, D/3, D/4	41	2	9	±2
A/1, D/1	25	3	2	±2
B/1, C/1	38	1	2	±4
A/2, D/2	36	5	10	±2
A/6, D/6	7	–2	2	±2
B/6, C/6	13	–4	2	±4

1 S5 FIRST FLOOR STRUCTURAL PLAN

0 8 16
SCALE IN FEET
SCALE: 1/8" = 1'-0"

TRUE NORTH NORTH REF

NOTES:
1. SEE GENERAL NOTES, SPECIFICATIONS, AND DETAILS FOR ADDITIONAL INFORMATION.
2. TOP OF SLAB = 0'–0" WHICH IS 1189.60' IN CIVIL ELEVATION. SEE CIVIL AND ARCHITECTURAL DRAWINGS FOR LAYOUT IN SPACE.
3. ALL COLUMNS ARE CENTERED ON GRIDS UNLESS NOTED OTHERWISE.
4. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS OF OPENINGS.
5. FOR SLAB REINFORCEMENT INFORMATION SEE 8/S8
   - A. CONTRACTOR TO SUBMIT SLAB CONTROL JOINT PLACEMENT PLAN FOR REVIEW.
   - B. MAX SLAB PANEL RATIO IS 1:1 ½
6. SEE ARCHITECTURAL DRAWINGS FOR SLAB ON GRADE SLOPES, STEPS, AND DEPRESSIONS NOT SHOWN ON STRUCTURAL.
7. SEE ARCH DRAWINGS FOR VAPOR RETARDER LOCATIONS, IF REQUIRED. INSTALL VAPOR RETARDER DIRECTLY UNDER SLAB PER RECOMMENDATIONS OF PCA AND ACI 302.1R–04. TAKE PRECAUTIONS TO MINIMIZE SLAB CURLING. GRIND SLAB TO ACHIEVE SPECIFIED FLOOR FLATNESS AND LEVELNESS VALUES.
8. SEE 6/S9 FOR TYPICAL SPREAD FOOTING SCHEDULE

VERIFY SCALE
THIS BAR IS ONE INCH ON ORIGINAL DRAWING
0" 1"
ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

Professional Engineer
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Signature: Edward Sabia
Typed or Printed Name: Edward Charles Sabia
Date: 1/12/24 License Number: 61484

REV.	DATE	DESCRIPTION	BY

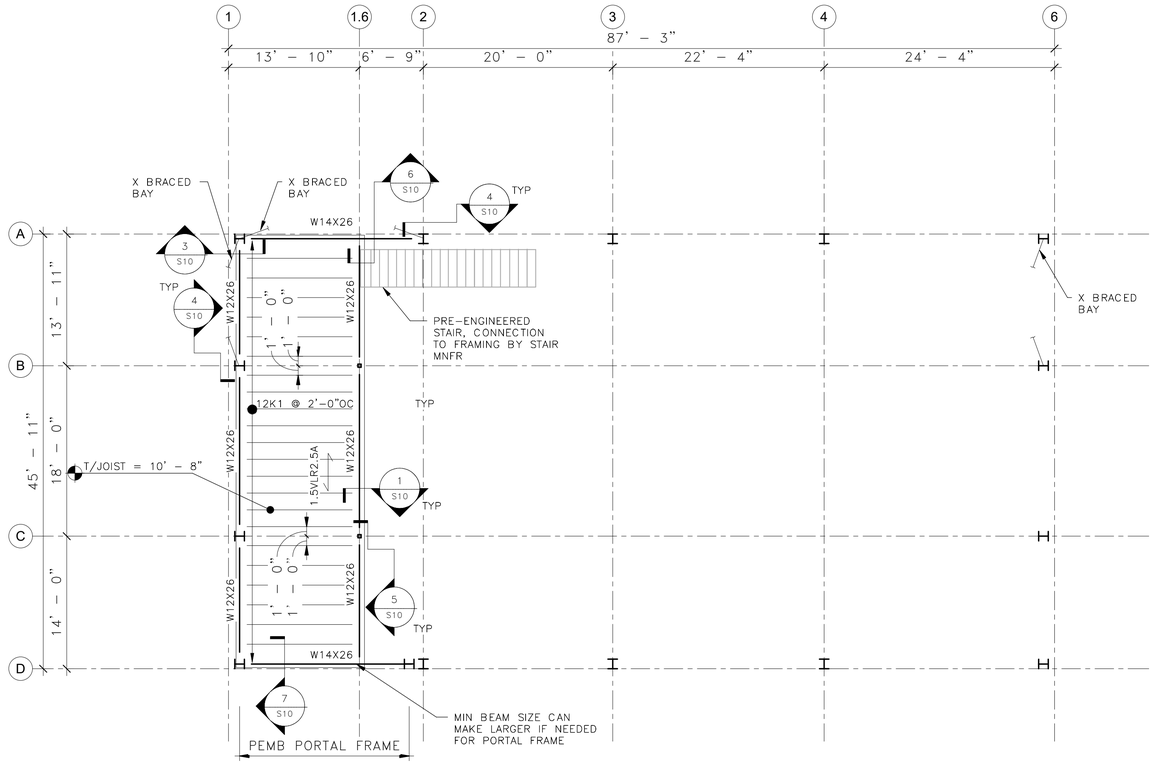
RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP
POLK ERSKINE, MN

FIRST FLOOR FRAMING PLAN

PROJECT NUMBER: 22–RF–027

S5

DESIGNED: ES	DRAWN: EM	DATE: 01.12.2024	CHECKED: TDF
CADD:RDL 156S0	DRAWING NO: 3R–MN–1176–156		SHEET 35 OF 64



1 S6 MEZZANINE FRAMING PLAN

0 8 16
SCALE IN FEET
SCALE: 1/8" = 1'-0"

TRUE NORTH

NORTH REF

NOTES:

1. SEE GENERAL NOTES, SPECIFICATIONS, AND DETAILS FOR ADDITIONAL INFORMATION.
2. ALL COLUMNS ARE CENTERED ON GRIDS UNLESS NOTED OTHERWISE.
3. TOP OF STEEL JOIST SHALL EQUAL BOTTOM OF METAL DECK UON. TOP OF STEEL BEAM IS AT BOTTOM OF JOIST SEAT, TYP.
4. PROVIDE SLEEVES IN SLAB ON METAL DECK PRIOR TO PLACEMENT FOR OPENINGS. DO NOT CUT DECK UNTIL AFTER CONCRETE IS CURED.
5. DECK NOTATED AS 1.5VLR2.5A IS 1 1/2" DEEP COMPOSITE DECK, 22 GAGE MINIMUM WITH 2 ½" CONCRETE ABOVE TOP FLUTE (4" TOTAL THICKNESS). REINFORCE SLAB WITH 6X6–W1.4XW1.4 MESH.
   a. DECK CONNECTION OPTIONS:
      1. 5/8" PUDDLE WELD IN 36/4 PATTERN TO PERP SUPPORTS, @ 12" OC TO PARALLEL SUPPORTS, & #10 SCREWS @ 36" OC FOR SIDELAPS
      2. HILTI X–HSN 24 (OR APPROVED EQUAL PAF) IN 36/4 PATTERN TO PERP SUPPORTS, @ 12" OC TO PARALLEL SUPPORTS, & #10 SCREW @ 36" OC FOR SIDELAPS
6. METAL BUILDING SUPPLIER TO DESIGN COLUMNS FOR FORCES IDENTIFIED IN DETAILS WHERE MEZZANINE BEAMS CONNECT TO COLUMNS.

VERIFY SCALE

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0" —— 1"

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REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

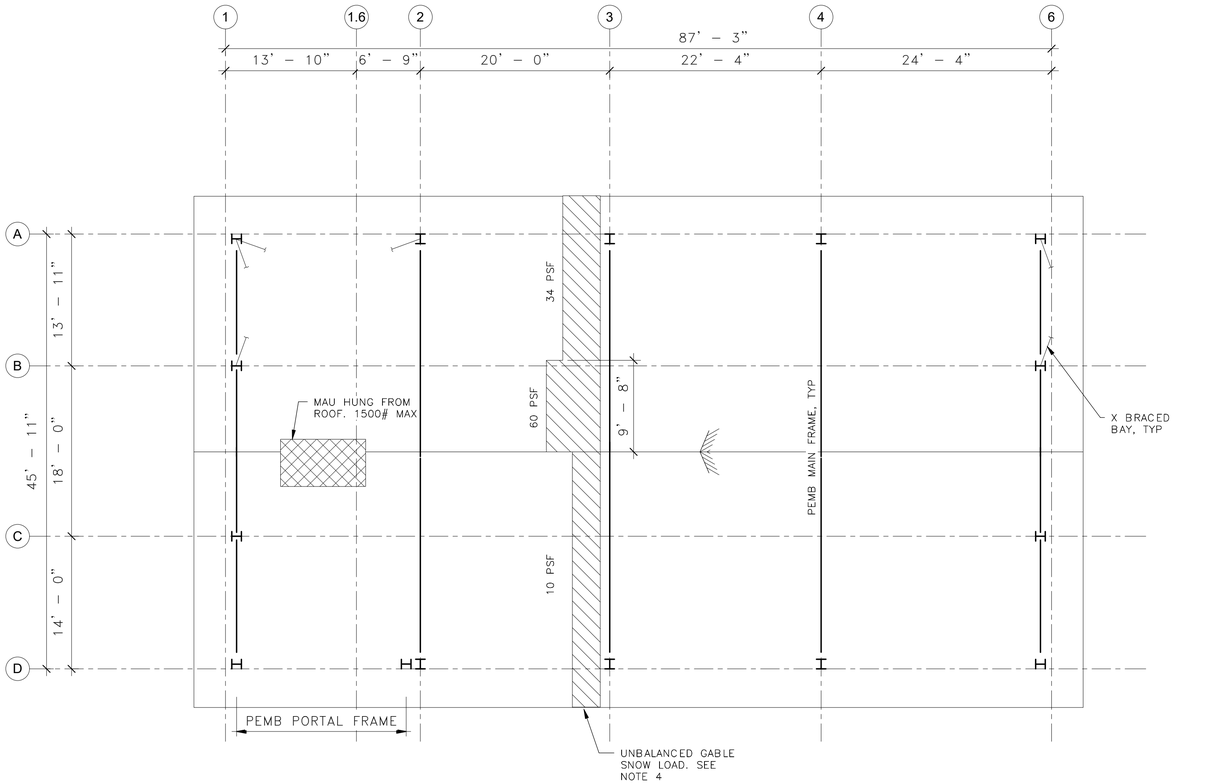
POLK ERSKINE, MN

MEZZANINE FRAMING PLAN

PROJECT NUMBER: 22–RF–027

DESIGNED: ES	DRAWN: EM	DATE: 01.12.2024	CHECKED: TDF
CADD:RDL 157S0	DRAWING NO: 3R–MN–1176–157		SHEET 36 OF 64

S6



1/S7 ROOF FRAMING PLAN

0 8 16
SCALE IN FEET
SCALE: 1/8" = 1'-0"

TRUE NORTH

NORTH REF

NOTES:
1. SEE GENERAL NOTES, SPECIFICATIONS, AND DETAILS FOR ADDITIONAL INFORMATION.
2. ALL COLUMNS ARE CENTERED ON GRIDS UNLESS NOTED OTHERWISE.
3. SEE METAL BUILDING NOTES ON S3 AND S5.
4. SNOW LOAD CAN OCCUR ON EITHER SIDE OF THE BUILDING RIDGE
5. SEE ARCH FOR METAL BUIILDING DIMENSIONS

VERIFY SCALE

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0" 1"

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REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK ERSKINE, MN

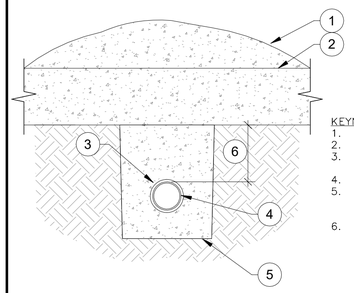
ROOF FRAMING PLAN

PROJECT NUMBER: 22-RF-027

S7

DESIGNED: ES | DRAWN: EM | DATE: 01.12.2024 | CHECKED: TDF

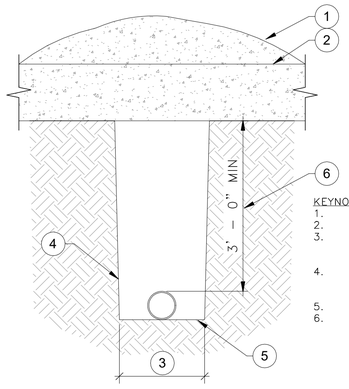
CADD:RDL 158S0 | DRAWING NO: 3R-MN-1176-158 | SHEET 37 OF 64



KEYNOTES:
1. STEM WALL, AS OCCURS
2. CONCRETE FOOTING OR FOUNDATION
3. PIPE SLEEVE, PROVIDE 1/2" MIN CLEARANCE AROUND PIPE
4. PIPE
5. CONCRETE FILL TO BE PLACE BEFORE FOOTING IS POURED AND POUR FULL WIDTH OF PIPE TRENCH
6. 8" MIN, 3'-0" MAX WHERE DEPTH IS GREATER THAN 3'-0" SEE DETAIL 2/S8

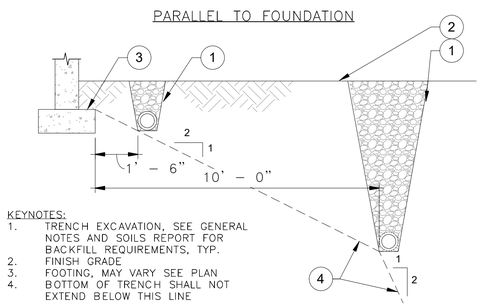
NOTES:
1. PIPES SHALL NOT PASS THRU FOOTINGS NOR BE LOCATED BELOW ISOLATED COLUMN FOOTINGS.

1 PIPE PASSING BELOW CONT. FOOTING - SHALLOW
NTS



KEYNOTES:
1. STEM WALL, AS OCCURS
2. CONCRETE FOOTING OR FOUNDATION
3. 1'-6" MAX WHERE TRENCH EXCEEDS 1'-6" NOTIFY STRUCTURAL ENGINEER PRIOR TO PLACEMENT OF FOOTING
4. BACKFILL AND RECOMPACT TRENCH PER SOILS REPORT AND SPECIFICATIONS
5. BOTTOM OF TRENCH
6. SEE DETAIL 1/S8 FOR DEPTHS 3'-0" AND LESS

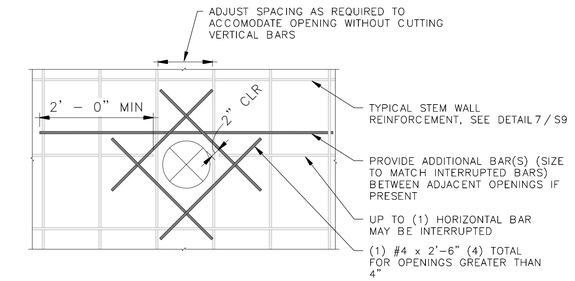
2 PIPE PASSING BELOW CONT. FOOTING - DEEP
NTS



KEYNOTES:
1. TRENCH EXCAVATION, SEE GENERAL NOTES AND SOILS REPORT FOR BACKFILL REQUIREMENTS, TYP.
2. FINISH GRADE
3. FOOTING, MAY VARY SEE PLAN
4. BOTTOM OF TRENCH SHALL NOT EXTEND BELOW THIS LINE

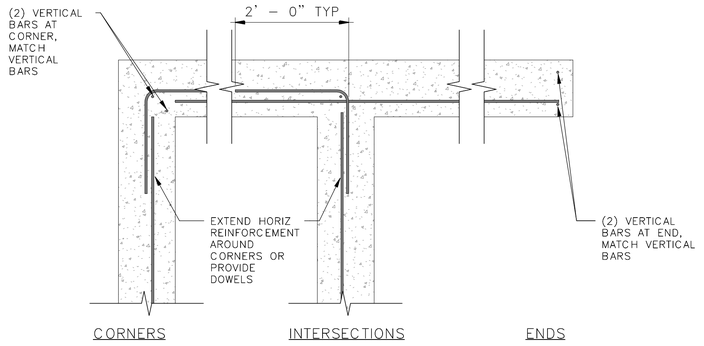
NOTES:
1. THE CONTRACTOR SHALL COORDINATE ALL EXCAVATION OPERATIONS WITH BUILDING FOUNDATION REQUIREMENTS
2. SEE DETAILS 1/S8 AND 2/S8 FOR ADDITIONAL INFORMATION FOR UTILITIES PASSING BELOW FOUNDATION

3 TYP TRENCH DETAIL
NTS

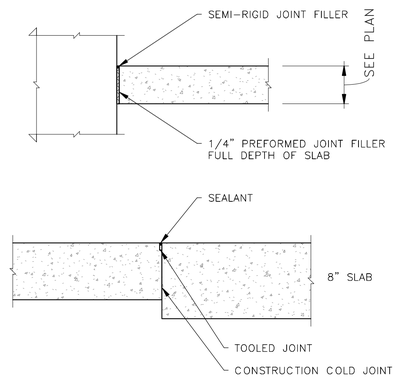


NOTES:
1. MAXIMUM OPENING DIMENSION IS 10"
2. MINIMUM CLEAR DISTANCE BETWEEN OPENINGS IS 2 TIMES MAXIMUM OPENING SIZE
3. FOR OPENINGS NOT SHOWN ON STRUCTURAL DRAWINGS, CONTRACTOR TO SUBMIT LOCATIONS AND SPACING TO SEOR FOR APPROVAL

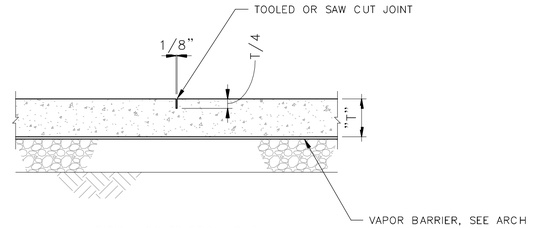
4 TYP PIPE PASSING THROUGH STEM WALL
3/4" = 1'-0"



5 TYP REINFORCEMENT AT CORNERS AND INTERSECTIONS
NTS



6 TYP SOG ISOLATION JOINT
1 1/2" = 1'-0"

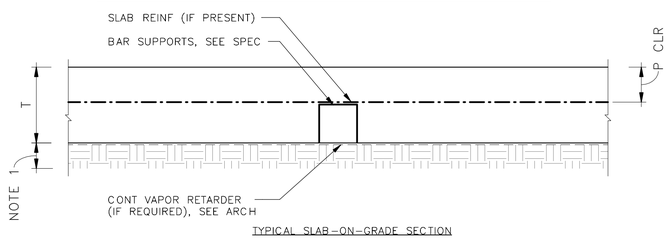


TYPICAL CONTRACTION JOINT

NOTES:
1. PROVIDE TOOLED OR SAW CUT JOINT AS SOON AS CONRETE HAS HARDENED, BUT NO MORE THAN 12 HOURS AFTER CASTING
2. FILL JOINT FULL DEPTH WITH SEMI-RIGID JOINT FILLERS.

7 TYP SLAB CONSTRUCTION JOINTS
1 1/2" = 1'-0"

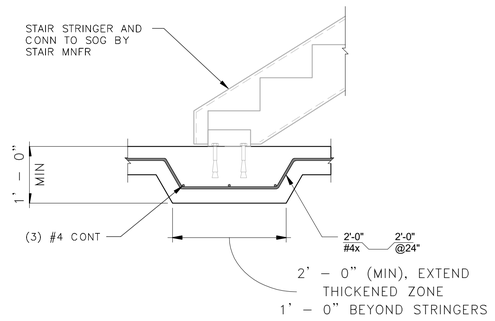
SLAB ON GRADE SCHEDULE				
TYPE	THICKNESS "T"	REINF	MAX JOINT SPACING	JOINT DETAIL
6" SOG	6	#4 @ 18" OC EW	12'	7/S8
8" SOG	8	#5 @ 12" OC EW	20'	7/S8



TYPICAL SLAB-ON-GRADE SECTION

NOTES:
1. PREPARED/COMPACTED SUBGRADE, SEE FOUNDATION NOTES AND GEOTECH REPORT

8 TYP SLAB-ON-GRADE SCHEDULE
1 1/2" = 1'-0"



9 SOG SUPPORTING METAL PAN STAIR
NTS

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Date: 1/12/24 License Number: 61484

REV.	DATE	DESCRIPTION	BY

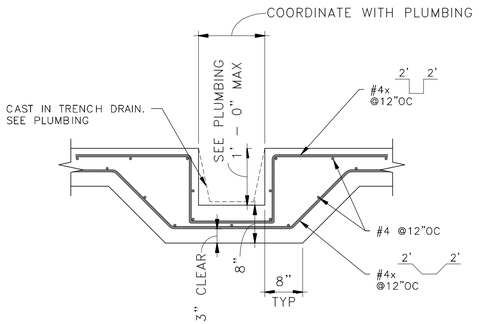
RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP
POLK ERSKINE, MN

STRUCTURAL DETAILS

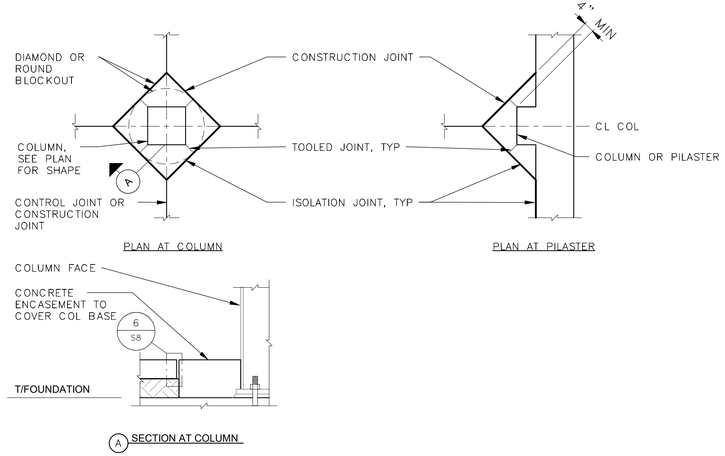
PROJECT NUMBER: 22-RF-027

DESIGNED: ES	DRAWN: EM	DATE: 01.12.2024	CHECKED: TDF
CADD:RDL 159S2	DRAWING NO: 3R-MN-1176-159		SHEET 38 OF 64

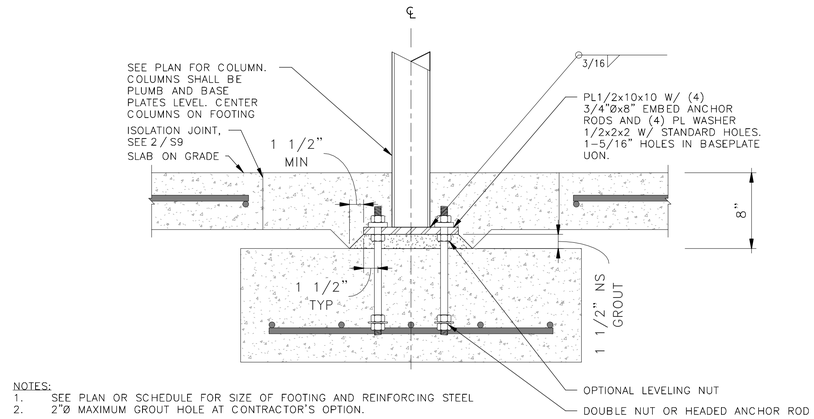
S8



1 TYPICAL TRENCH DRAIN
3/4" = 1'-0"

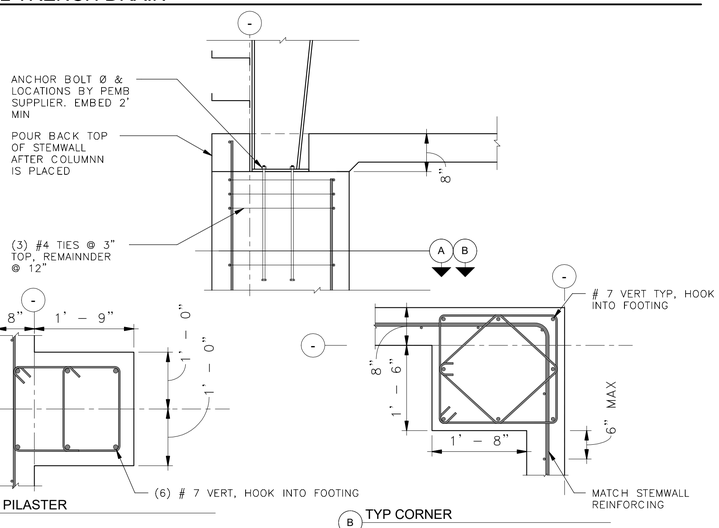


2 SOG BLOCKOUT AT COLUMN/PILASTER
NTS

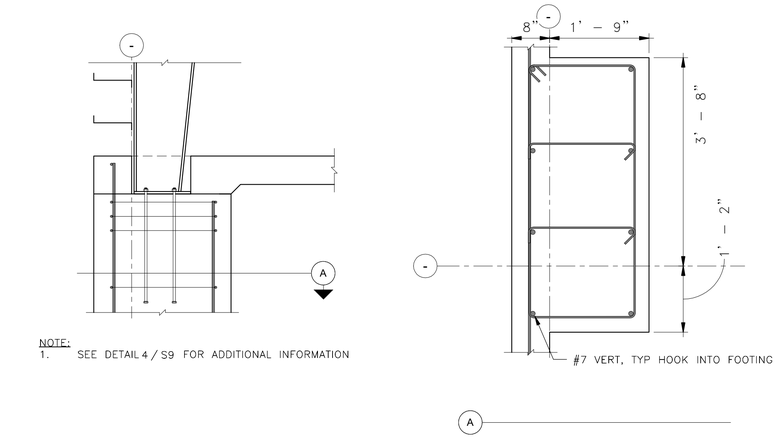


NOTES:
1. SEE PLAN OR SCHEDULE FOR SIZE OF FOOTING AND REINFORCING STEEL
2. 2"Ø MAXIMUM GROUT HOLE AT CONTRACTOR'S OPTION.

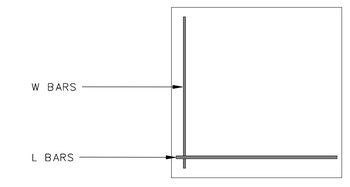
3 TYP COLUMN BASE
1 1/2" = 1'-0"



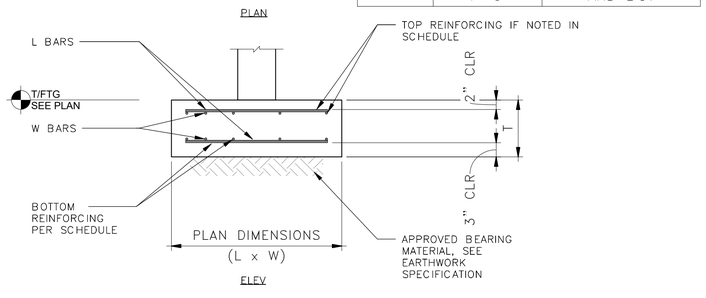
4 TYP PEMB COLUMN BASE
3/4" = 1'-0"



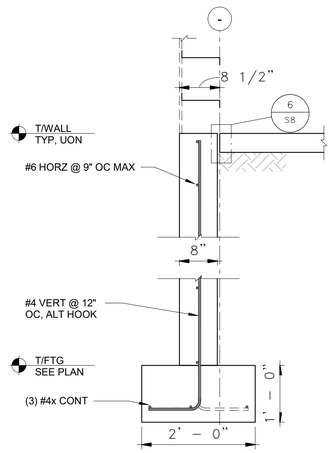
5 PORTAL FRAME COLUMN BASE
3/4" = 1'-0"



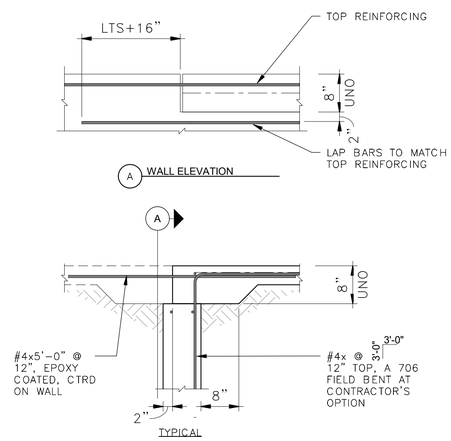
SPREAD FOOTING SCHEDULE		
MARK	FOOTING SIZE LxWxT	REINFORCING
F3x3	3'-0"x3'-0"x 1'-0"	(4) #4 EW TOP AND BOT
F5x5	5'-0"x5'-0"x 1'-0"	(4) #5 EW BOT
F6x6	6'-0"x6'-0"x 1'-0"	(5) #5 EW TOP AND BOT



6 TYP SPREAD FOOTING
NTS



7 TYP PEMB STEM WALL
3/4" = 1'-0"



8 TYP SOG EXT THRESHOLD
NTS

VERIFY SCALE

THIS BAR IS ONE INCH ON ORIGINAL DRAWING

0" — 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

Professional Engineer
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota

Signature: Edward Sabia

Typed or Printed Name: Edward Charles Sabia

Date: 1/12/24 License Number: 61484

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

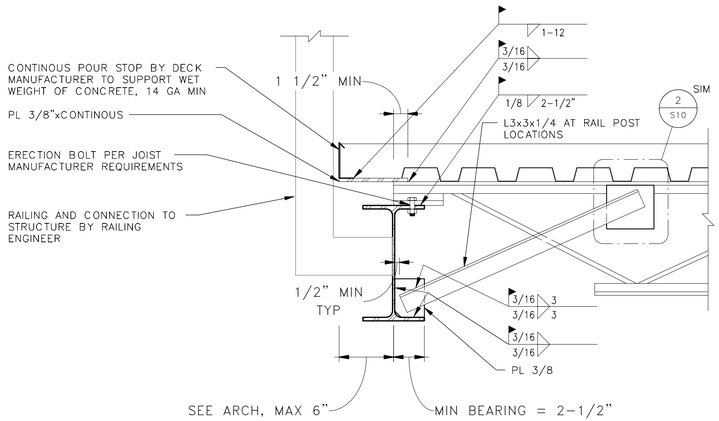
POLK ERSKINE, MN

STRUCTURAL DETAILS

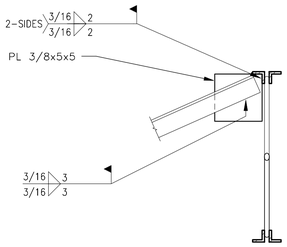
PROJECT NUMBER: 22-RF-027

DESIGNED: ES	DRAWN: EM	DATE: 01.12.2024	CHECKED: TDF
CADD:RDL 160S2	DRAWING NO: 3R-MN-1176-160		SHEET 39 OF 64

S9

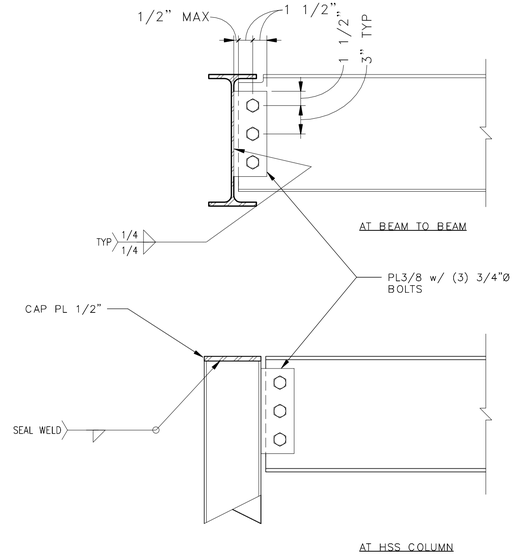


1 TYP JOIST BEARING
1 1/2" = 1'-0"



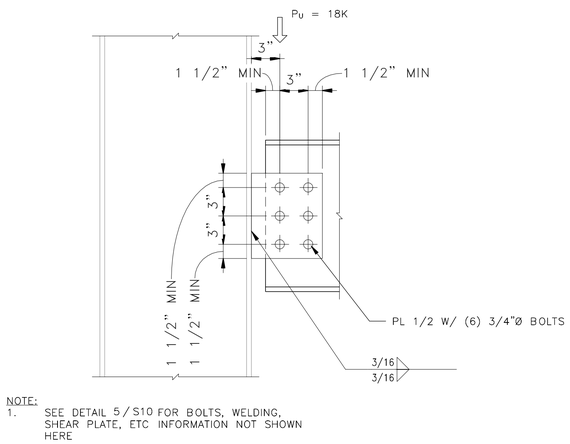
PERPENDICULAR TO JOIST

2 TYP ANGLE BRACE TO JOIST
1 1/2" = 1'-0"



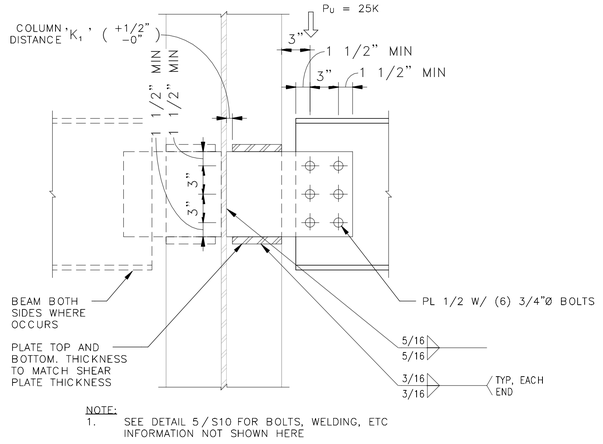
AT BEAM TO BEAM

AT HSS COLUMN



NOTE:
1. SEE DETAIL 5/S10 FOR BOLTS, WELDING, SHEAR PLATE, ETC INFORMATION NOT SHOWN HERE

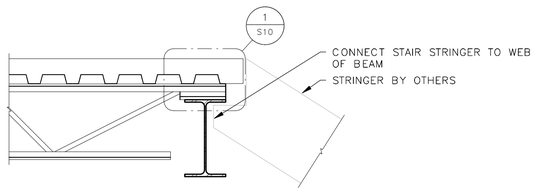
3 BEAM TO COLUMN FLANGE
1 1/2" = 1'-0"



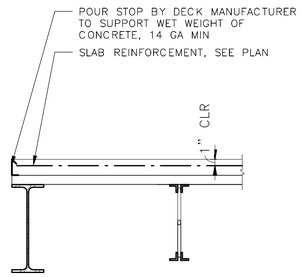
NOTE:
1. SEE DETAIL 5/S10 FOR BOLTS, WELDING, ETC INFORMATION NOT SHOWN HERE

4 BEAM TO COLUMN WEB
1 1/2" = 1'-0"

5 TYP STEEL BEAM CONNECTIONS
1 1/2" = 1'-0"



6 TYP STAIR TO MEZZANINE BEAM
1" = 1'-0"



7 SLAB EDGE PARALLEL TO DECK SPAN
1" = 1'-0"

VERIFY SCALE

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ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

REV.	DATE	DESCRIPTION	BY

Professional Engineer
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Signature: Edward Sabia

Typed or Printed Name: Edward Charles Sabia

Date: 1/12/24 License Number: 61484

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK ERSKINE, MN

STRUCTURAL DETAILS

PROJECT NUMBER: 22-RF-027

S10

DESIGNED: ES	DRAWN: EM	DATE: 01.12.2024	CHECKED: TDF
CADD:RDL161S2	DRAWING NO: 3R-MN-1176-161		SHEET 40 OF 64

PLUMBING FIXTURE AND CONNECTION SCHEDULE

PLAN	FIXTURE						TRIM			ACCESSORIES			CONNECTIONS				NOTES
CODE	ITEM	MFGR	MODEL	TYPE	MATERIAL	COLOR/FINISH	ITEM	MFGR	MODEL	ITEM	MFGR	MODEL	COLD	HOT	WASTE	VENT	
EW-1	EMERGENCY EYE WASH	HAWS	7361-7461	PEDESTAL MOUNTED FACE/EYE WASH	STAINLESS STEEL	STANDARD	MIXING VALVE	HAWS	9201EW	–	–	–	1/2"	1/2"	–	–	8
FCO	CLEAN OUT	JAY R SMITH	4024S	ADJUSTABLE, FLOOR	CAST IRON	NICKEL BRONZE	–	–	–	–	–	–	–	–	–	–	1
HB-1	HOSE BIBB	WOODFORD	MODEL 24	ANTI-SIPHON WALL FAUCET	BRASS	CHROME	–	–	–	–	–	–	1/2"	–	–	–	
FD-1	FLOOR DRAIN	JAY R SMITH	2005-NB	LIGHT DUTY	CAST IRON	STANDARD	STRAINER	JAY R SMITH	-CP	–	–	–	–	–	2"	2"	4, 9
FS-1	FLOOR SINK	JAY R SMITH	3100Y-FSB-12	8 x 8"x6"	CAST IRON	STANDARD	HALF GRATE	JAY R SMITH	-12	–	–	–	–	–	–	2"	1, 4, 9
GCO	CLEAN OUT	JAY R SMITH	4224S	GRADE HEAVY DUTY	CAST IRON	CAST IRON	–	–	–	–	–	–	–	–	–	–	1
HR-1	HOSE REEL	REELCRAFT	7850 OLP121-1/2"	PREMIUM DUTY SPRING DRIVE W/ 50FT HOSE	STEEL	STANDARD	–	–	–	–	–	–	–	–	–	–	
L-1	LAVATORY	KOHLER	K-2031-N	WALL MOUNT	VITREOUS CHINA	WHITE	HARDWIRED INFRARED SENSOR FAUCET	CHICAGO FAUCET	EQ-A11A-53ABCP	GRID STRAINER	ELKAY	LK174	1/2"	1/2"	1-1/2"	1-1/2"	2, 5, 6
MV-1	MIXING VALVE	WATTS	LFUSG-B	ASSE 1070 THERMOSTATIC MIXING VALVE	LEAD FREE BRONZE	STANDARD	–	–	–	–	–	–	1/2"	1/2"	–	–	6
S-1	SINK	ELKAY	ELUHH1616TPD	UNDERMOUNT SINGLE BOWL	STAINLESS STEEL	STAINLESS STEEL	FAUCET WITH SPRAYER	KOHLER	K-596-CP	BASKET STRAINER	ELKAY	INCLUDED	1/2"	1/2"	2"	2"	2
SH-1	SHOWER	BESTBATH	5LES26337A1FTT.V2	GELCOAT/FIBERGLASS SHOWER PAN	FIBERGLASS	WHITE	SHOWER VALVE	SYMMONS	9603-PLR-1.5-X	DRAIN	SIOUX CHIEF	826-2P	1/2"	1/2"	2"	2"	7
T-1	ADA TOILET WALL MTD	KOHLER	K-84325-0	WALL MTD ADA	VITREOUS CHINA	WHITE	SENSOR FLUSH VALVE, TOP SPUD	SLOAN	ROYAL 111 SMOOTH-1.28-HW	SEAT	KOHLER	K-4670-CA	1"	–	4"	2"	3
TF-1	TRUCK FILL	GUARDIAN	6515	FIRE HOSE OUTLET	BRASS	STANDARD	–	–	–	–	–	–	2-1/2"	–	–	–	
TG-1	TRAP GUARD	SIOUX CHIEF	200 SERIES	TRAP PRIMER TAILPIECE	CHROME	CHROME	–	–	–	–	–	–	1/2"	–	–	–	
U-1	URINAL	KOHLER	K-4991-ET-0	WALL MOUNT WASHOUT	VITREOUS CHINA	WHITE	SENSOR FLUSH VALVE, 0.128GPF	SLOAN	ROYAL 186 SMOOTH-0.125-HW	–	–	–	3/4"	–	2"	1 1/2"	3
US-1	UTILITY SINK	FIAT	SB3624	36x24x6 BASIN	TERRAZZO	STANDARD	FAUCET	T&S BRASS	B-1193 W/ MOD B-0107	–	–	–	1/2"	1/2"	3"	2"	10
WSB-1	WATER SUPPLY BOX	SIOUX CHIEF	696-G1010MF	SUPPLY BOX W/ HAMMER ARRESTER	ABS	WHITE	–	–	–	–	–	–	1/2"	–	2"	2"	
CWB-1	CLOTHES WASHER VALVE BOX	SIOUX CHIEF	696-G2313MF	RECESSED DOUBLE BOXES	ABS	WHITE	HOSE BIBB	SIOUX CHIEF	NO LEAD VALVES WITH ARRESTERS	OUTLET BOX	SIOUX-CHIEF	2" HUB DRAIN	1/2"	1/2"	2"	2"	
WCO	WALL CLEAN OUT	JAY R SMITH	4422	PLUG WITH COVER AND SCREW	CAST IRON	STAINLESS STEEL	–	–	–	–	–	–	–	–	4"	–	
WH-1	WALL HYDRANT	WOODFORD	MODEL 67	FREEZELESS	BRASS	STANDARD	–	–	–	–	–	–	3/4"	–	–	–	

ALL STOP VALVES TO BE QUARTER TURN, ALL FAUCET RISERS TO BE BRAIDED STAINLESS STEEL. ALL P-TRAP TO BE CHROME PLATED CAST BRASS. ALL BENDS TO BE CHROME PLATED TUBULAR BRASS WITH DIE CAST NUTS AND SHALLOW ESCUTCHEONS.

SCHEDULE NOTES:

1. SIZE VARIES SEE DRAWINGS FOR SIZES.
2. ORDER SINK WITH FAUCET HOLES TO MATCH FAUCET AND OTHER ACCESSORY REQUIREMENTS.
3. SEE ARCHITECTURAL PLANS FOR MOUNTING HEIGHTS AND PROVIDE WITH CARRIER.
4. TRAP GUARD ALL FLOOR DRAINS AND FLOOR SINKS.
5. PROVIDE WITH TRUEBRO LAVGUARD 2 ADA INSULATION KIT.
6. PROVIDE MIXING VALVE MV-1 ON PIPING FOR SENSOR FAUCET. INSTALL MIXING VALVE PER MFG INSTALLATION INSTRUCTIONS. INSTALL MIXING VALVE UNDER LAVATORY AS HIGH AS POSSIBLE WITH ACCESSIBLE MIXING DIAL.
7. PROVIDE SHOWER WITH OPTIONAL T-SHAPED RUBBER WATER STOPPER KIT.
8. INSTALL WITH MIXING VALVE PER DETAIL 7/P7.
9. PROVIDE TG-1 IN ALL FLOOR DRAINS AND FLOOR SINK EXCEPT SHOWERS.
10. PROVIDE WITH P-TRAP. SEE ARCHITECTURAL DRAWINGS FOR MOUNTING HEIGHT OF FAUCET.

GENERAL PLUMBING NOTES

1. COORDINATE PLUMBING FIXTURES AND RELATED PIPING WITH ALL OTHER TRADES AS REQUIRED.
2. REFER TO ARCHITECTURAL FLOOR PLANS AND INTERIOR ELEVATIONS FOR EXACT FIXTURE LOCATIONS AND MOUNTING HEIGHTS.
3. LOCATE WATER PIPING IN HEATED AREAS ONLY. DO NOT LOCATE PIPING IN NON-INSULATED ATTIC, CEILING OR WALL SPACES. DO NOT LOCATE WATER PIPING IN ANY EXTERIOR WALL.
4. SLOPE ALL WASTE PIPING 3" AND SMALLER AT 1/4" PER FOOT. SLOPE ALL WASTE PIPING 4" OR LARGER AT 1/8" PER FOOT. UNLESS NOTED OTHERWISE ON DRAWINGS.
5. PROVIDE WATER HAMMER ARRESTORS FOR ALL FLUSH VALVE FIXTURES. SIZE AND INSTALL PER MANUFACTURERS REQUIREMENTS.
6. ACCESS PANEL LOCATIONS MUST BE COORDINATED WITH EITHER ARCHITECT OR GENERAL CONTRACTOR.
7. ALL FLOOR DRAINS AND FLOOR SINKS TO BE INSTALLED WITH TRAP GUARDS.

PLUMBING ABBREVIATIONS

(E)	EXISTING	HWC	HOT WATER CIRCULATION
(N)	NEW	IDW	INDIRECT WASTE
AFF	ABOVE FINISHED FLOOR	IE	INVERT ELEVATION
BFF	BELOW FINISHED FLOOR	IRR	IRRIGATION
BG	BELOW GRADE	LPG	LIQUEFIED PETROLEUM GAS
CA	COMPRESSED AIR	MAX	MAXIMUM
CD	CONDENSATE DRAIN	MIN	MINIMUM
CO	CLEANOUT	NC	NORMALLY CLOSED (VALVE)
CW	COLD WATER	NO	NORMALLY OPEN (VALVE)
CX	CONNECT TO EXISTING	SCW	SOFT COLD WATER
DN	PIPE DROP TO NEXT LEVEL	SS	SANITARY SEWER
F	FIRE SERVICE	UP	PIPE RISE TO NEXT LEVEL
FCO	FLOOR CLEANOUT	V	VENT
FND	FOUNDATION DRAIN	VA	VALVE
GCO	GRADE CLEANOUT	VTR	VENT THRU ROOF
HW	HOT WATER	WCO	WALL CLEANOUT

PLUMBING LEGEND

SYMBOL	DESCRIPTION
CW	DOMESTIC COLD WATER
HW	DOMESTIC HOT WATER
HWC	DOMESTIC HOT WATER CIRC.
SCW	SOFT COLD WATER
SS	SANITARY SEWER
SOS	SAND OIL SEWER
V	VENT
RV	RADON VENT
CO/WCO	CLEANOUT/ WALL CLEANOUT
FCO	FLOOR CLEANOUT
GCO	GRADE CLEANOUT
CD	CONDENSATE DRAIN
D	DRAIN
F	FIRE SERVICE WATER
LPG(V)	LIQUID PROPANE GAS (VAPOR)
	TEE UP
	TEE DOWN
	ELBOW UP
	ELBOW DOWN
	PIPE CAP
	PIPE DRAIN & CAP
	VALVE IN RISER
S=.XX%	SLOPE DOWN IN DIRECTION OF FLOW
	SHUTOFF VALVE
	GATE VALVE
	BALL VALVE

SYMBOL	DESCRIPTION
	BUTTERFLY VALVE
	GLOBE VALVE
	GAS SHUT-OFF COCK
	SWING CHECK VALVE
	SPRING CHECK VALVE
	STRAINER
	WATER OUTLET (TYPE INDICATED)
	BACKFLOW PREVENTER (TYPE INDICATED)
	SLEEVE (PIPE) THRU WALL OR FLOOR
	FLEX CONNECTOR (TYPE INDICATED)
	HOSE END DRAIN VALVE
	PRESSURE REDUCING VALVE
	TEMPERATURE & PRESSURE RELIEF VALVE
	AUTOMATIC AIR VENT
DF	DIELECTRIC UNION
	UNION
	AUTOMATIC FLOW BALANCING VALVE
	DIAL THERMOMETER
	PRESSURE GAUGE – PROVIDE WITH PIGTAIL FOR STEAM
X	PIPE ANCHOR
	SOLENOID VALVE
	L.P. VALVE
	ECCENTRIC PLUG BALANCING VALVE
	AIR OUTLET

VERIFY SCALE

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0" ——— 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

Professional Engineer

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature: _____

Typed or Printed Name: Shawn C. Murray

Date: 1/12/2024 License Number: 58940

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK COUNTY — ERSKINE, MN

PLUMBING SCHEDULES AND LEGENDS

PROJECT NUMBER: 22-RF-027

DESIGNED: JW	DRAWN: RD	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL162P4	DRAWING NO: 3R-MN-1176-162		SHEET 41 OF 64

P1

DOMESTIC WATER PRESSURE BOOSTER PUMP

PLAN CODE	SYSTEM SERVED	LOCATION	MFG	MODEL	SYSTEM PERFORMANCE										DESIGN BASIS/NOTES
					SYSTEM CAPACITY (GPM)	SUCTION PRESSURE (PSIG)	DISCHARGE PRESSURE (PSIG)	SYSTEM HEADER DIA./ CONNECTION	GPM	PUMP PRESSURE BOOST (PSI)	CHECK VALVE	MOTOR HP	MOTOR RPM	MOTOR VOLTAGE	
BP-1	DOMESTIC WATER	MECH ROOM	GRUNDFOS	CMBE 1-75 1XCBDE	5	28	70	1"	5	50	1"	1	360-400	115/60/1	SYSTEM DESIGNED FOR INDOOR OPERATION NOTES: 1, 2, 3

SCHEDULE NOTES:

1. INDIVIDUAL CHECK VALVE PER PUMP – MINIMUM SIZE LISTED
2. 2 GALLON HYDROPNEUMATIC TANK PROVIDED AS PART OF PACKAGE.
3. INTERGRAL SYSTEM CONTROLS.

AIR COMPRESSOR SCHEDULE

PLAN CODE	ITEM	MFGR	MODEL	HP	AMPS	TANK SIZE	ELECTRICAL SUPPLY	MAX PRESSURE	CFM AT MAX PRESS	AIR INLET CONNECTIONS		PARTICLE SIZE (IN MICRONS)	NOTES
										IN	OUT		
FR-1	FILTER/PRESSURE REGULATOR	SPEEDAIRE	4ZL51	--	--	--	--	250	140	3/4"	3/4"	5	1
AC-1	VERTICAL RECIPROCATING COMPRESSOR	INGERSOLL RAND	2475N5-P-200-3	5	14.4	80	200/3/60	175	16.8	--	3/4"	--	1

SCHEDULE NOTES:

1. INSTALL PER DETAIL 2/P6. SET REGULATOR TO PSI PER OWNERS INSTRUCTIONS.

WATER SOFTENER SCHEDULE

PLAN CODE	SERVICE	TYPE	MFGR	MODEL	DESIGN FLOW (GPM)	INLET/OUTLET SIZE	BRINE TANK	MEDIA QTY. VOLUME CU FT	CONTINUOUS FLOW @ 15 PSI DROP (GPM)	PEAK FLOW @ 25 PSI DROP (GPM)	REMARKS
WSF-1	DOMESTIC WATER	SINGLE	CULLIGAN	HET-90	25	1-1/2"	24" DIA x 40 HIGH	3	26.6	35.2	1, 2, 3

SCHEDULE NOTES:

1. ELECTRICAL OUTLET CONNECTION REQUIRED, 120V-1PH-60HZ. UNIT IS PROVIDED WITH 10' POWER CORD AND LOW VOLTAGE TRANSFORMER.
2. PROVIDE A FULL LOAD OF SALT AT PROJECT TURNOVER.
3. PRIOR TO ORDERING, PROVIDE WATER TEST PER SPEC SECTION 223100-2.1-C-1. PROVIDE TEST RESULTS TO CULLIGAN FOR FINAL SIZING SIMILAR TO SCHEDULED SOFTENER.

TRENCH DRAIN SCHEDULE

PLAN CODE	ITEM	MFGR	MODEL	TYPE	MATERIAL	LENGTH	GRATE	NOTES
TD-1	TRENCH DRAIN	JOSAM	PRO-PLUS 100C	SLOPING 4" INTERNAL DIM WITH RAILS	COMPOUND/GLASS REINFORCED POLYESTER	8 METERS	100-DIS-C-PS	1, 2, 3

SCHEDULE NOTES:

1. PROVIDE WITH DUCTILE IRON RAIL.
2. PROVIDE PRO-SNAP GRATES AS SPECIFIED.
3. PROVIDE SHOP DRAWINGS OF TRENCH DRAIN SYSTEM. EACH TRENCH TO SLOPE TO CATCH BASIN AS SHOWN ON DRAWINGS.

EXPANSION TANK SCHEDULE

MARK	MFGR	MODEL	SERVICE	LOCATION	TYPE	TOTAL VOLUME(GAL)	ACCEPTANCE VOLUME(GAL)	NOTES
XT-1	AMTROL	ST-12C	DWH-1	MEP ROOM	DIAPHRAGM	6.4	3.2	1

SCHEDULE NOTES:

1. SEE DETAIL 4/P6 FOR WATER HEATER DETAIL.

WATER METER SCHEDULE

PLAN CODE	TYPE	MFGR	MODEL	UTILITY TYPE	INLET/OUTLET SIZE	UTILITY PRESSURE	NOTES
WM-1	PULSE OUTPUT	EKM	EKM-SPWM-200-CF	WATER	2"	65 PSI	1

NOTES:

1. PROVIDE WITH "EKM" EKM-OMNIMETER PULSE UL, REMOTE READER. COORDINATE WITH OWNER FOR LOCATION.

GAS METER SCHEDULE

PLAN CODE	TYPE	MFGR	MODEL	UTILITY TYPE	INLET/OUTLET SIZE	FLOW RATE MIN/MAX (CFH)	MAX FLOW RATE (MBH)	OPERATING PRESSURE MIN/MAX (PSI)	NOTES
GM-1	PULSE OUTPUT	EKM	EKM-PGM-75	LPG	3/4"	1.41 / 211	527 LPG	0.0735 / 7.25	1,2

NOTES:

1. PROVIDE WITH "EKM" EKM-OMNIMETER PULSE UL, REMOTE READER. COORDINATE WITH OWNER FOR LOCATION.
2. MAX FLOW RATE AT 60F.

HOLDING TANK SCHEDULE

PLAN CODE	ITEM	MFGR	MODEL	MATERIAL	SIZE	CAPACITY	NOTES
CB-1	CATCH BASIN	CREST	E-Z CATCH BASIN	FIBERGLASS	36" ROUND X 48"DEEP DEEP	211 GALLONS	
HT-1	HOLDING TANK	CREST	1000-L	PRECAST CONCRETE	116" X 68" X	1000 GALLONS	1

NOTES:

1. SEAL OUTLET OPENING SOLID AND WATERTIGHT WITH GROUT.

WATER HEATER SCHEDULE

PLAN CODE	MFGR	MODEL	TYPE	STORAGE (GAL)	BREAKER SIZE (AMP)	FIRST HOUR RATING (GALLONS)	UEF	ELECTRIC V/PH/HZ	NOTES
DWH-1	A.O. SMITH	HPTU-66CTA	ELECT/HEAT PUMP	67	30	79	3.45	208/1/60	1, 2, 3

SCHEDULE NOTES:

1. DRAIN T&P VALVE AND CONDENSATE TO FLOOR SINK.
2. SET WATER HEATER TEMP TO 140 DEG.
3. CONTRACTOR TO TRAIN OWNER ON WATER HEATER OPTIONS, AND SET FOR EFFICIENCY MODE.

WATER HAMMER ARRESTOR SCHEDULE

PLAN CODE	SERVICE	MFGR	MODEL	PDI SYMBOL	PIPE SIZE	FIXTURE UNITS	NOTES
WHA-1	DOMESTIC WATER	ZURN	1260XL-A	A	1/2"	1-11	–
WHA-2	DOMESTIC WATER	ZURN	1260XL-B	B	3/4"	12-32	–

2ND STAGE PRESSURE REGULATOR SCHEDULE

MARK	MFGR	MODEL	INLET PRESSURE	OUTLET PRESSURE	TYPE	INLET/OUTLET SIZE	CAPACITY BTUH	NOTES
PRV-1	MAXITORL	325-5	10 PSI	12" W.C.	LEVER ACTING	1"	325,000	1

SCHEDULE NOTES:

1. PROVIDE PRV AS LISTED ABOVE OR APPROVED EQUAL.

VERIFY SCALE

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0" ——— 1"

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Professional Engineer

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Signature: _____

Typed or Printed Name: Shawn C. Murray

Date: 1/12/2024 License Number: 58940

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK COUNTY — ERSKINE, MN

PLUMBING SCHEDULES

PROJECT NUMBER: 22-RF-027

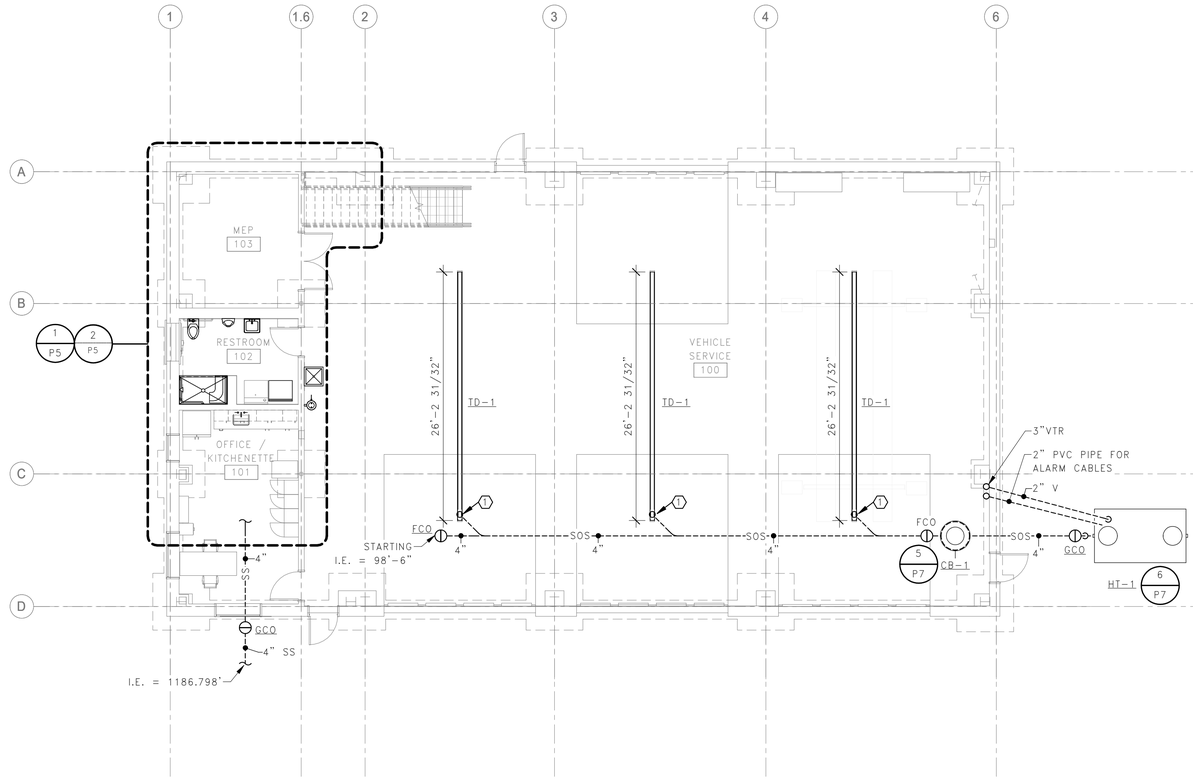
P2

DESIGNED: JW | DRAWN: RD | DATE: 1.12.2024 | CHECKED: TDF

CADD:RDL163P4 | DRAWING NO: 3R-MN-1176-163 | SHEET 42 OF 64

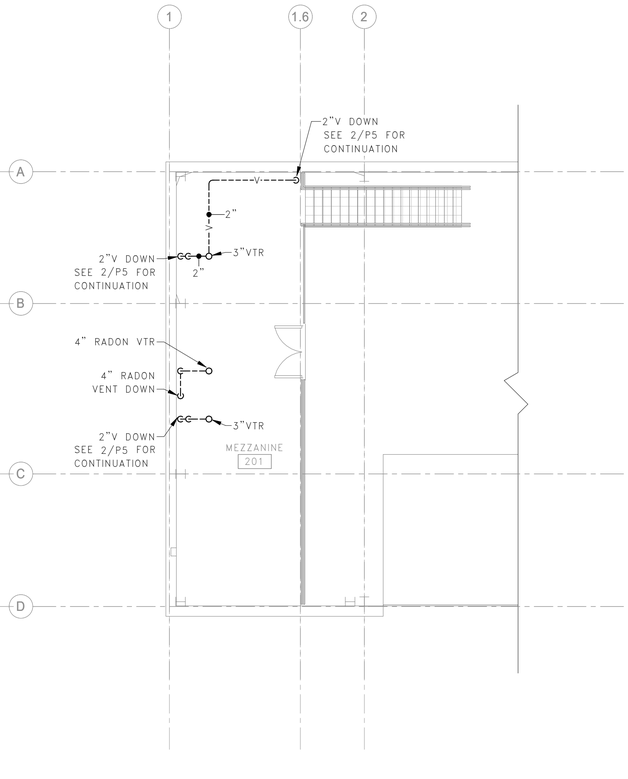
SHEET NOTES

1. NO P-TRAP REQUIRED. SEE DETAIL 1/P7.



1 P3 DWV PLAN

0 8 16
SCALE IN FEET
SCALE: 1/8" = 1'-0"
TRUE NORTH NORTH REF



2 P3 MEZZANINE DWV PLAN

0 8 16
SCALE IN FEET
SCALE: 1/8" = 1'-0"
TRUE NORTH NORTH REF

Professional Engineer
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Signature: _____
Typed or Printed Name: Shawn C. Murray
Date: 1/12/2024 License Number: 58940

VERIFY SCALE

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0" ———— 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

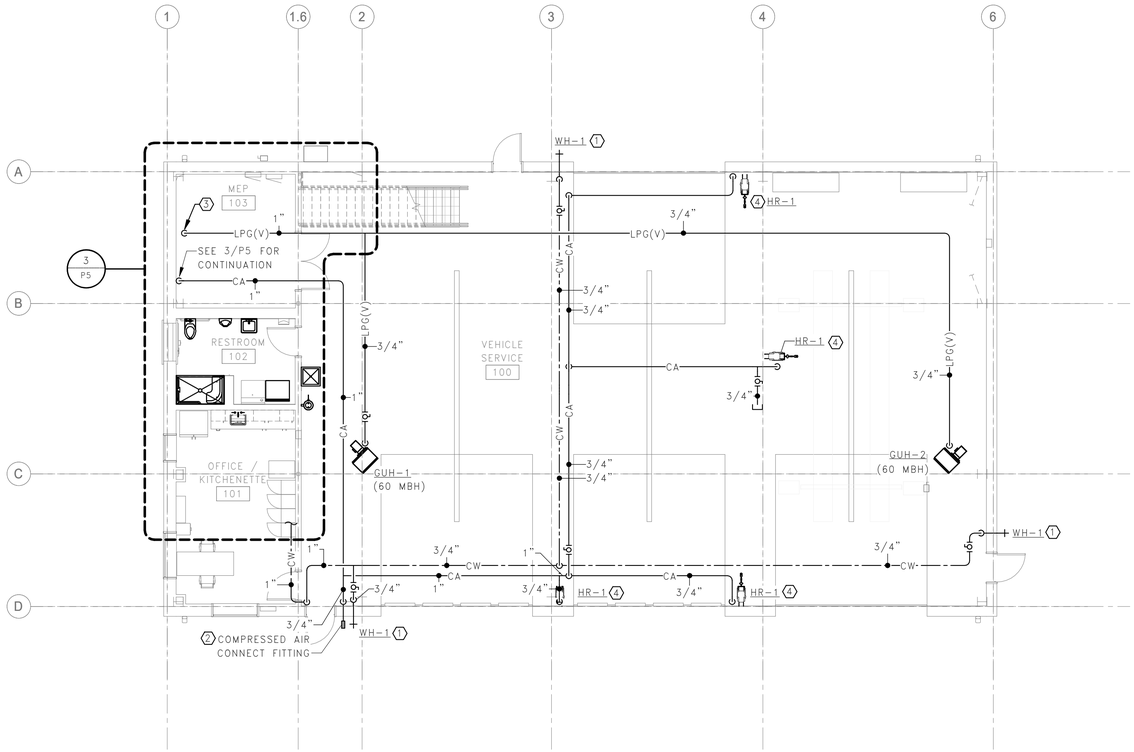
POLK COUNTY — ERSKINE, MN

DWV PLANS

PROJECT NUMBER: 22-RF-027

P3

DESIGNED: JW	DRAWN: RD	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL164P0	DRAWING NO: 3R-MN-1176-164		SHEET 43 OF 64



1 P4 PLUMBING PLAN

0 8 16
SCALE IN FEET
SCALE: 1/8" = 1'-0"

TRUE NORTH NORTH REF

SHEET NOTES

1. INSTALL WH-1 AT 24" ABOVE FINISHED FLOOR.
2. INSTALL COMPRESSED AIR CONNECT FITTING AT 24" ABOVE FINISHED FLOOR. SEE DETAIL 3/P7
3. 1" LPG GAS DOWN TO FLOOR BELOW. SEE 2/P5 FOR CONTINUATION.
4. INSTALL HR-1 AT 7'-0" AND COORDINATE WITH OWNERS TO SET STOP ON HOSE TO HANG OUTLET AT REQUIRED HEIGHT ABOVE FINISHED FLOOR.

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MAINTENANCE SHOP

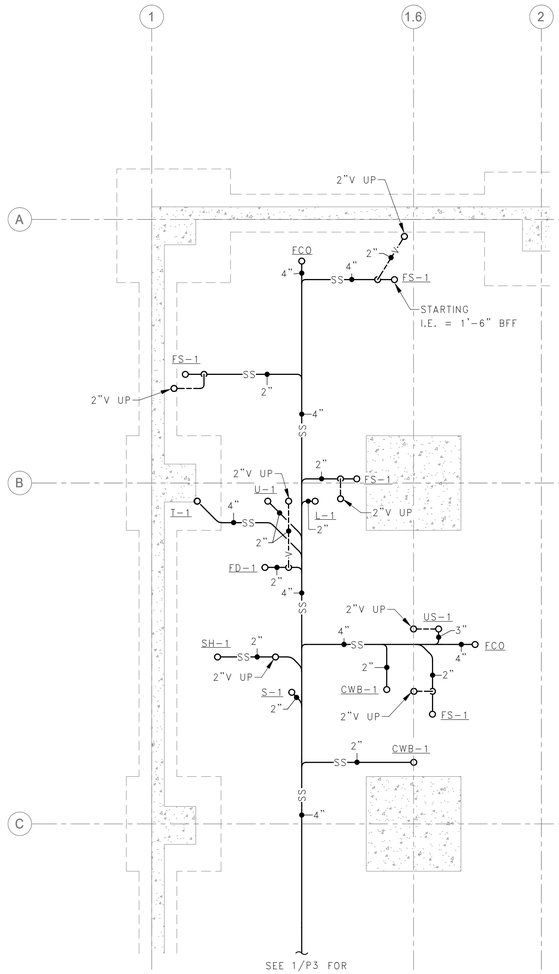
POLK COUNTY — ERSKINE, MN

PLUMBING PLANS

PROJECT NUMBER: 22-RF-027

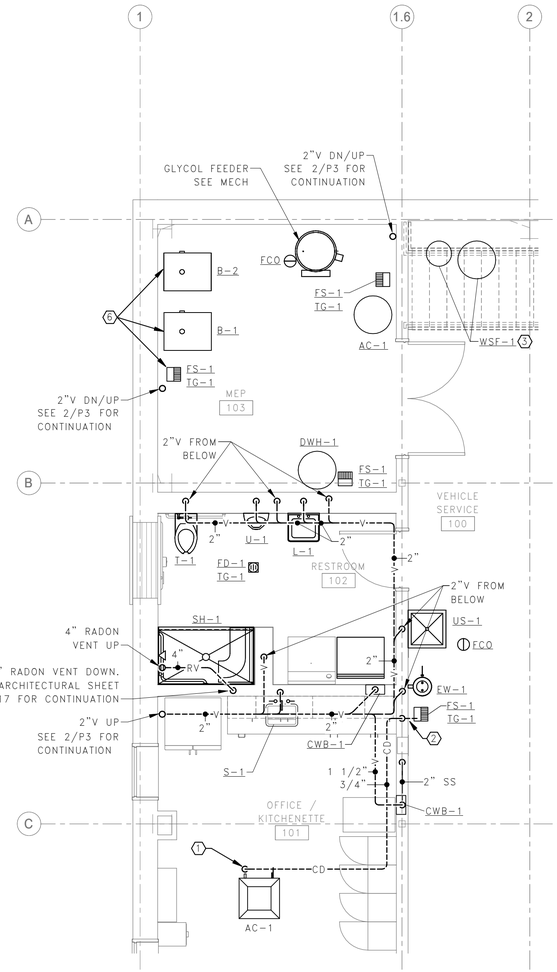
P4

DESIGNED: JW	DRAWN: RD	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL165P0	DRAWING NO: 3R-MN-1176-165		SHEET 44 OF 64



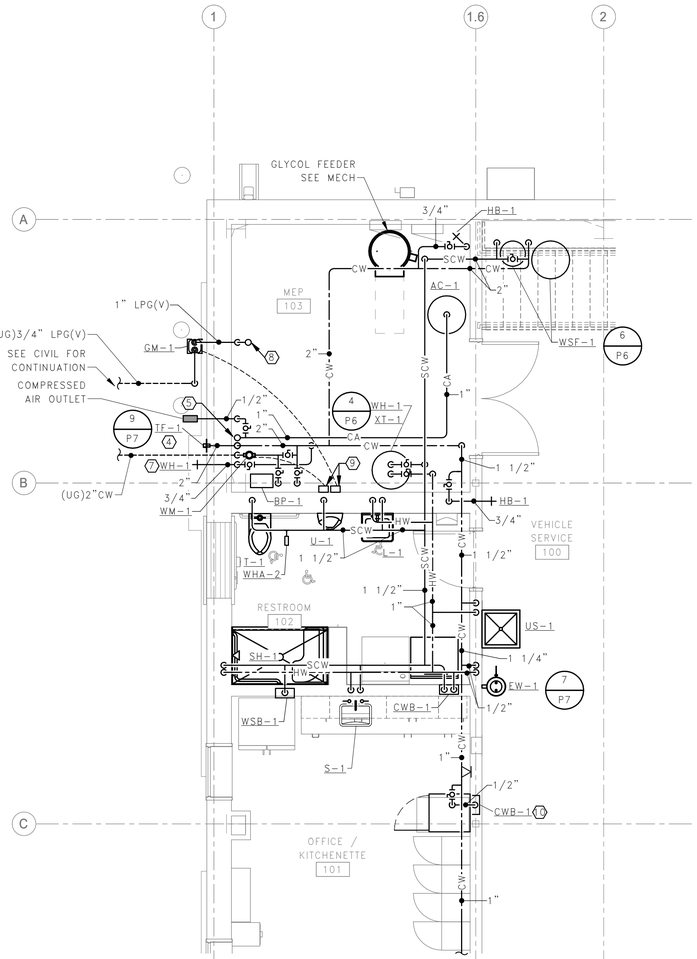
1 P5 ENLARGED FOUNDATION DWV PLAN

0 4 8
SCALE IN FEET
SCALE: 1/4" = 1'-0"
TRUE NORTH NORTH REF



2 P5 ENLARGED DWV PLAN

0 4 8
SCALE IN FEET
SCALE: 1/4" = 1'-0"
TRUE NORTH NORTH REF



3 P5 ENLARGED PLUMBING PLAN

0 4 8
SCALE IN FEET
SCALE: 1/4" = 1'-0"
TRUE NORTH NORTH REF

SHEET NOTES

1. PIPE CONDENSATE FROM PUMP PROVIDED WITH UNIT TO FLOOR SINK WITH AIR GAP.
2. DROP CONDENSATE INTO FLOOR SINK WITH AIR GAP.
3. PIPE DRAINS FROM WATER SOFTENER TO FS-1.
4. INSTALL TF-1 AT 36" ABOVE FINISHED FLOOR.
5. 1" CA UP TO BELOW ROOF SEE 1/P4 FOR CONTINUATION.
6. PIPE T&P AND CONDENSATE FROM BOILERS TO FLOOR SINK.
7. INSTALL WH-1 AT 24" ABOVE FINISHED FLOOR.
8. 1" LPG UP. SEE 1/P4 FOR CONTINUATION.
9. REMOTE METER READER LOCATION FOR GAS AND WATER METERS.
10. INSTALL CWB-1 IN WALL BEHIND ICE MAKER. PIPE CW TO BOTH SIDE OV VALVE BOX.

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MAINTENANCE SHOP

POLK COUNTY — ERSKINE, MN

ENLARGED PLUMBING PLANS

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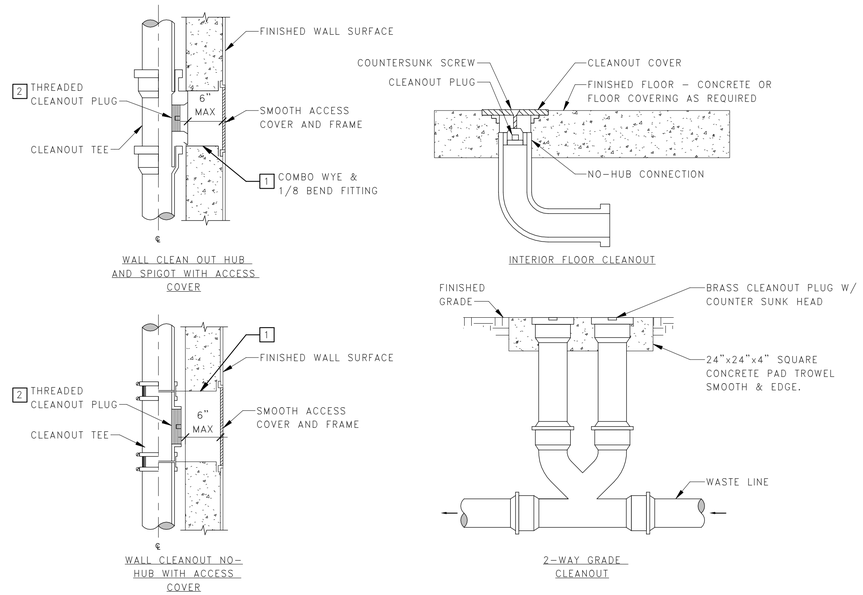
P5

PROJECT NUMBER: 22-RF-027			
DESIGNED: JW	DRAWN: RD	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL166P0	DRAWING NO: 3R-MN-1176-166		SHEET 45 OF 64

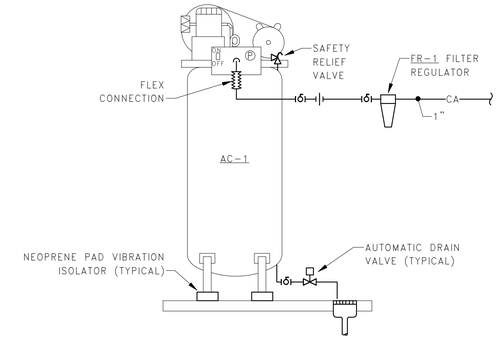


NOTES:

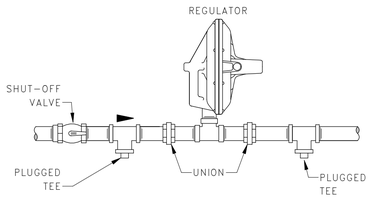
1 WHERE WCO OCCURS IN SOLID CONCRETE OR GROUTED CMU WALL, USE SLEEVE BETWEEN PIPE AND COVER PLATE TO KEEP ACCESS TO PLUG OPEN.

2 USE EXTENSIONS BETWEEN TEE AND ACCESS COVER AS NEEDED.

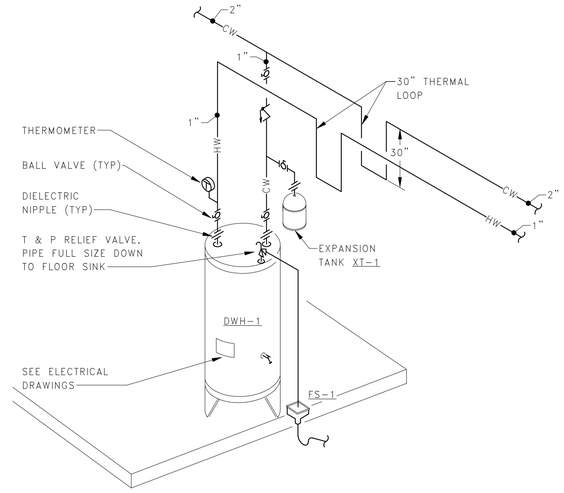
1 / P6 CLEANOUT DETAIL



2 / P6 AIR COMPRESSOR

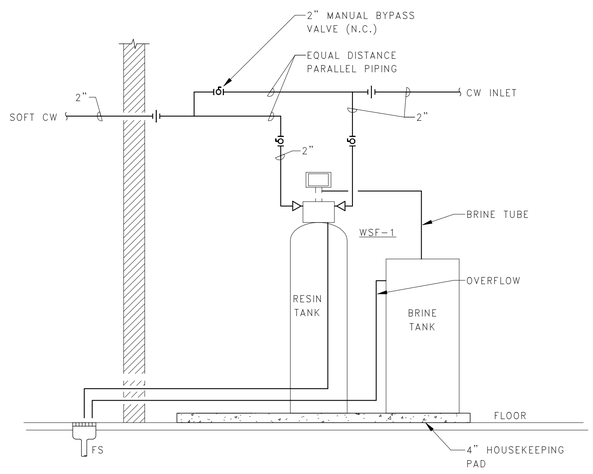


3 / P6 GAS REGULATOR DETAIL



4 / P6 WATER HEATER DWH-1 DETAIL

5 / P6 RIGID ROUGH-IN AT FLUSH VALVES



6 / P6 WATER SOFTENER PIPING

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RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK COUNTY — ERSKINE, MN

PLUMBING DETAILS

PROJECT NUMBER: 22-RF-027

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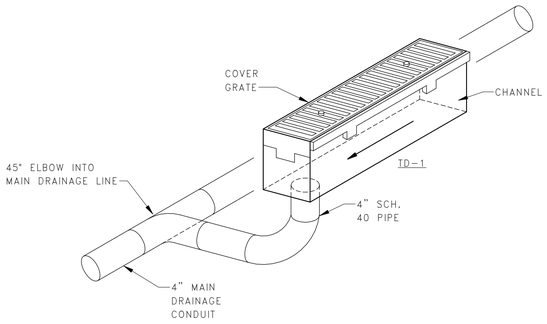
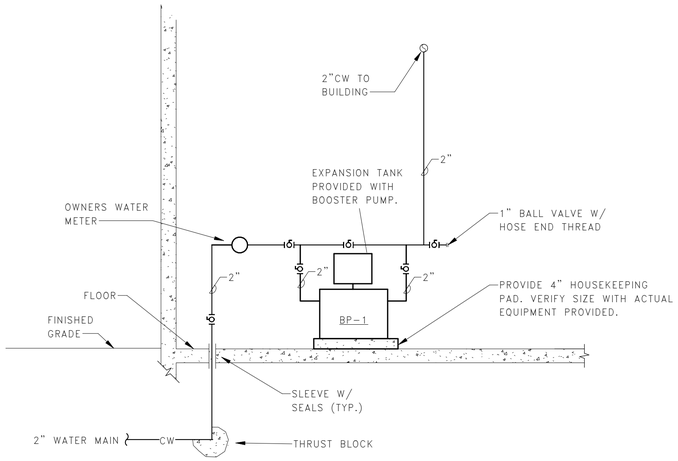
Date: 1/12/2024 License Number: 58940

P6	DESIGNED: JW	DRAWN: RD	DATE: 1.12.2024
	CADD:RDL167P2	DRAWING NO: 3R-MN-1176-167	SHEET 46 OF 64

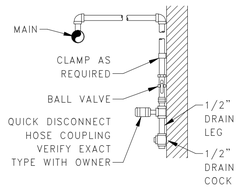
CHECKED: TDF

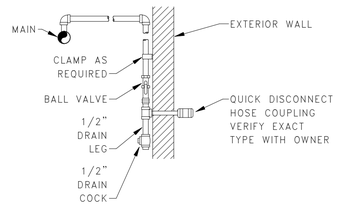


1 P7 TRENCH DRAINAGE DETAIL

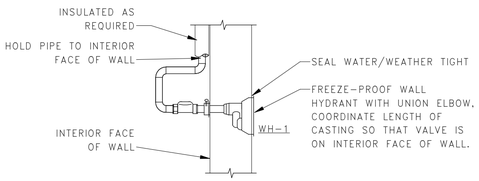


2 P7 WATER SERVICE DETAIL

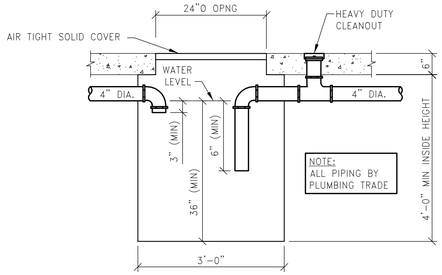




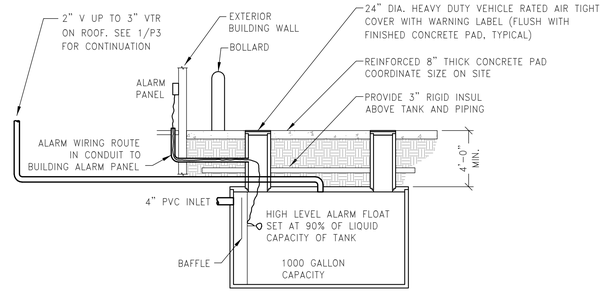
3 P7 AIR DROP DETAILS



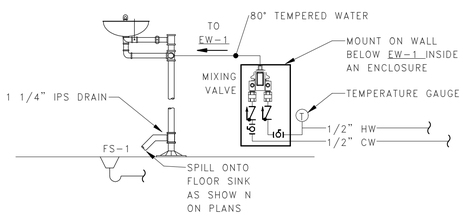
4 P7 FREEZE-PROOF WALL



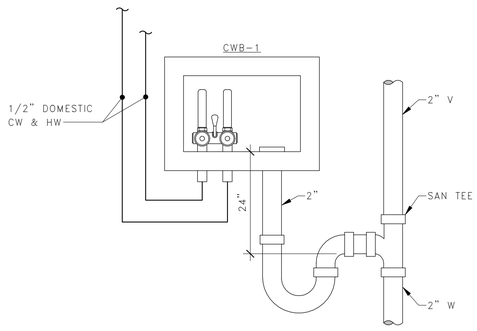
5 P7 CATCH BASIN TANK DETAIL



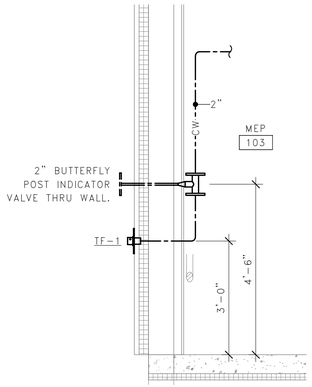
6 P7 HOLDING TANK DETAIL



7 P7 EMERGENCY EYE/FACE WASH



8 P7 LAUNDRY WALL & WASH MACHINE BOX DETAIL



9 P7 TANKER FILL STATION DETAIL

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RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK COUNTY — ERSKINE, MN

PLUMBING DETAILS

PROJECT NUMBER: 22-RF-027

P7

DESIGNED: JW | DRAWN: RD | DATE: 1.12.2024 | CHECKED: TDF

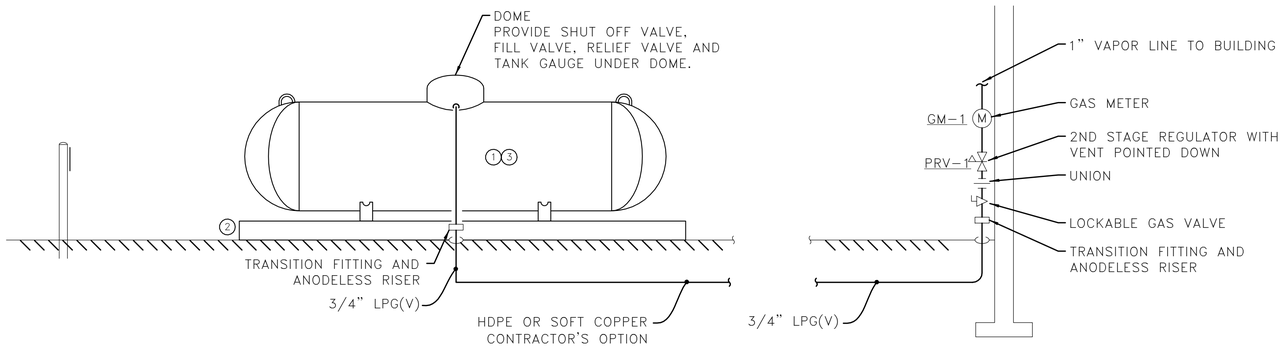
CADD:RDL168P2 | DRAWING NO: 3R-MN-1176-168 | SHEET 47 OF 64

MAINTENANCE BUILDING LPG(V) LOAD	
60 MBH	GUH-1
60 MBH	GUH-2
120 MBH	TOTAL LOAD

NOTE:

1ST STAGE REGULATOR OUTLET TO BE 10 PSIG

2ND STAGE REGULATOR OUTLET TO BE SET FOR 11" W.C.



1 / P8 PROPANE CONTAINER – ABOVE GROUND

NTS

(1) ABOVE GROUND PROPANE CONTAINER 500 GALLON WATER CAPACITY. SET CONTAINER ON CONCRETE PAD AND ANCHOR EACH LEG TO THE PAD. ANCHORAGE SHALL RESIST UPLIFT BUOYANCY FORCE WITH WATER UP TO TOP OF THE EMPTY CONTAINER.

(2) CONCRETE PAD. SEE DETAIL 5/C7.

(3) PROPANE CONTAINER IS TO BE FILLED TO 80% FULL AFTER FINAL TANK INSPECTION BASED ON LIQUID TEMPERATURE. PROPANE WILL BE PURCHASED BY CONTRACTOR.

PROPANE TANK SCHEDULE				
SIZE (GALLONS)	MFRG	MODEL	SIZE LxWxH	NOTES
500	COORDINATE W/ LOCAL PROPANE SUPPLIER	COORDINATE W/ LOCAL PROPANE SUPPLIER	COORDINATE W/ LOCAL PROPANE SUPPLIER	1, 2, 3

NOTES:

1. TANKS ARE ONLY FILLED 80% BY SUPPLIER.
2. 500 GALLON TANK SELECTED. 450 GAL OF PROPANE IN FULL TANK.
3. TANK TO COMPLY WITH ALL REQUIREMENTS OF NFPA 58, INCLUDE RELIEF VALVE(S), TANK GAUGE, 1ST STAGE REGULATOR, SHUT-OFF VALVE AND LOCKABLE DOME COVER.

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DESIGNED: JW	DRAWN: RD	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL169P2	DRAWING NO: 3R-MN-1176-169		SHEET 48 OF 64

P8

MECHANICAL LEGEND

SYMBOL	DESCRIPTION
HWS	HEATING WATER SUPPLY
HWR	HEATING WATER RETURN
	BALL VALVE
	SWING CHECK VALVE
	MOTORIZED T.C. VALVE / 3-WAY
	TEE UP
	TEE DOWN
	ELBOW UP
	ELBOW DOWN
	PIPE SIZE CHANGE
T	THERMOSTAT/TEMPERATURE SENSOR
H	HUMIDISTAT
CO	CARBON MONOXIDE SENSOR
CO2	CARBON DIOXIDE SENSOR
NO2	NITROGEN DIOXIDE SENSOR

SYMBOL	DESCRIPTION
	ACOUSTICALLY LINED SHEET METAL DUCT
	MANUAL BALANCING DAMPER
M M	MOTORIZED DAMPERS
	TURNING VANE ELBOW
	HIGH EFFICIENCY BRANCH TAKE-OFF "HETO" WITH VOLUME DAMPER & FLEXIBLE DUCT
	HIGH EFFICIENCY BRANCH TAKE-OFF "HETO" WITH VOLUME DAMPER & FLEXIBLE DUCT
S-1 (PLAN CODE) 200 (CFM)	SUPPLY DIFFUSER, 4-WAY THROW UNLESS INDICATED OTHERWISE (W/ FLEXIBLE DUCT)
R-1 (PLAN CODE) 200 (CFM)	RETURN GRILLE
E-1 (PLAN CODE) 200 (CFM)	EXHAUST GRILLE (W/ RIGID BRANCH DUCT)

HVAC ABBREVIATIONS

%	PERCENT
AFF	ABOVE FINISHED FLOOR
AMP	AMPERE (AMP, AMPS)
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APD	AIR PRESSURE DROP
BHP	BRAKE HORSEPOWER, BOILER HORSEPOWER
BOD	BOTTOM OF DUCT
BTU	BRITISH THERMAL UNIT
CFM	CUBIC FEET PER MINUTE
DB	DRY-BULB
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
EWT	ENTERING WATER TEMPERATURE
F	FAHRENHEIT
FPM	FEET PER MINUTE
FT	FOOT OR FEET
GA	GAGE OR GUAGE
GAL	GALLONS
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
HD	HEAD
HGT	HEIGHT
HP	HORSEPOWER
HZ	FREQUENCY
KW	KILOWATT
KWH	KILOWATT HOUR
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LF	LINEAR FEET
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	BTU PER HOUR (THOUSAND)
MC	MECHANICAL CONTRACTOR
N/A	NOT APPLICABLE
NTS	NOT TO SCALE
OA	OUTSIDE AIR
PD	PRESSURE DROP
PH	PHASE (ELECTRICAL)
PSI	POUNDS PER SQUARE INCH
RA	RETURN AIR
RH	RELATIVE HUMIDITY
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SP	STATIC PRESSURE
T STAT	THERMOSTAT
TEMP	TEMPERATURE
TONS	TONS OF REFRIGERATION
V	VOLT
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY
VFD	VARIABLE FREQUENCY DRIVE
VOL	VOLUME
W/	WITH
WPD	WATER PRESSURE DROP

GENERAL NOTES

1. COORDINATE INSTALLATION OF PIPING AND DUCTWORK WITH STRUCTURAL COMPONENTS AND OTHER SYSTEM INSTALLATIONS.
2. COORDINATE LOCATION OF DIFFUSERS AND GRILLES WITH ARCHITECTURAL REFLECTED CEILING PLANS.
3. FLEX DUCT RUN-OUTS LIMITED TO 5'-0" MAXIMUM.
4. DUCT PENETRATIONS THRU ROOF ARE TO BE COORDINATED WITH ROOF FRAMING. REFER TO STRUCTURAL PLANS FOR LOCATIONS.
5. ALL DUCT DIMENSIONS SHOWN ARE INTERIOR DIMENSIONS.
6. COORDINATE LOCATION OF HVAC EQUIPMENT WITH ALL OTHER TRADES TO MAINTAIN ACCESS AND SERVICE CLEARANCE.
7. COORDINATE ACCESS PANELS AND DOORS FOR MECHANICAL ITEMS REQUIRING ACCESS THAT ARE CONCEALED BEHIND FINISHED AREAS WITH ARCHITECTURAL DRAWINGS.
8. SEE ARCHITECTURAL SHEETS FOR BUILDING CODE REQUIREMENTS AND WALL, FLOOR AND ROOF RATINGS.
9. ALL DUCTWORK SHALL BE GALVANIZED SHEET METAL AND BE CONSTRUCTED ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE".
10. DUCT TAKE-OFFS SHALL BE HIGH EFFICIENCY WITH INTEGRAL VOLUME DAMPERS.
11. REVIEW ARCHITECTURAL, STRUCTURAL AND ELECTRICAL PLANS THOROUGHLY TO BECOME FAMILIAR WITH THIS PROJECT. ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND STRUCTURAL PLANS COMPRISE ONE DOCUMENT OF WHICH THIS SET IS ONLY A PART.
12. INSTALL ALL EQUIPMENT PER MANUFACTURERS WRITTEN INSTRUCTIONS. INSTALL EQUIPMENT LEVEL AND PLUMB. FIRMLY ANCHORED IN LOCATION INDICATED AND MAINTAIN MANUFACTURERS RECOMMENDED CLEARANCE.
13. INSTALL PIPE ESCUTCHEONS FOR EXPOSED PIPE AND DUCT PENETRATIONS OF CONCRETE AND MASONRY WALLS, WALL BOARD PARTITIONS, AND CEILINGS.

PUMP SCHEDULE

PLAN CODE	MFGR	MODEL	TYPE	GPM	HEAD (FT WC)	HP	VOLTAGE	SERVES	NOTES
P-1	BELL & GOSSETT	ECOCIRC XL 20-35	IN-LINE	12.9	13	1/12	115/1/60	B-1	1,2,3
P-2	BELL & GOSSETT	ECOCIRC XL 20-35	IN-LINE	12.9	13	1/12	115/1/60	B-2	1,2,3
P-3	BELL & GOSSETT	ECOCIRC XL 55-45	IN-LINE	9	30	1	208/1/60	VEHICLE SERVICE	1,2,3
P-4	BELL & GOSSETT	ECOCIRC XL 55-45	IN-LINE	9	30	1	208/1/60	VEHICLE SERVICE	1,2,3
P-5	BELL & GOSSETT	PL-36	IN-LINE	1.5	12	1/6	115/1/60	OFFICE/KITCHENETTE/RR	1,2,3

NOTES:
1) PUMPS TO HAVE ECM MOTOR
2) PUMP SELECTED FOR 35% PROPYLENE GLYCOL
3) WET ROTOR PUMP

GLYCOL FEED UNIT SCHEDULE

PLAN CODE	MFGR	MODEL NO.	SERVICE	CAPACITY (GAL)	PUMP (HP)	WORKING RANGE(PSI)	POWER (V/PH/HZ)	MCA	MOCP	NOTES:
GF-1	GTP	GP15-E4-1	HOT WATER LOOP	15	1/3	10-45	120/1/60	9	20	1, 2

NOTES:
1. PROVIDE COMPLETE GLYCOL FEED PACKAGE INCLUDING CONTROL PANEL, MOTOR STARTER, DISCONNECT AND AUDIBLE ALARM.
2. FILL WITH 15 GALLONS OF PREMIXED 35% GLYCOL SOLUTION.

HYDRAULIC SEPARATOR SCHEDULE

PLAN CODE	MFGR	MODEL NO.	MAX GPM	WORKING FLUID	PIPE SIZE (IN)	SERVICE	NOTES
HS-1	BELL AND GOSSETT	PSH-1.5	40	35% PROPYLENE GLYCOL	1.5"	RADIANT	1, 2

SCHEDULE NOTES:
1. ASME CERTIFIED.
2. PROVIDE WITH STRAINER, AUTOMATIC AIR VENT, AND MANUAL BLOWDOWN VALVE.

EXPANSION TANK SCHEDULE

PLAN CODE	MFGR	MODEL NO.	WORKING FLUID	TOTAL VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	SERVICE	NOTES
XT-1	BELL AND GOSSETT	D-15	50% PROPYLENE GLYCOL	7.8	6.3	RADIANT	1

RADIANT MANIFOLD SCHEDULE

PLAN CODE	AREA SERVED	MFGR	MODEL	# OF CIRCUITS	MAX CIRCUIT LENGTH (FT)	TUBE DIA. (IN)	TUBE SPACING (IN)	MANIFOLD DIA. (IN)	SUPPLY TEMP (°F)	DESIGN TEMP DROP (°F)	DESIGN FLOW (GPM)	WPD (FT WC)	MANIFOLD MATERIAL	NOTES
RM-1	VEHICLE SERVICE	UPONOR	A2720802	8	300	1/2"	12"	1 1/4"	115	20	9.0	20.1	STAINLESS STEEL	1,2,3
RM-2	VEHICLE SERVICE	UPONOR	A2720802	8	300	1/2"	12"	1 1/4"	115	20	9.0	20.1	STAINLESS STEEL	1,2,3
RM-3	OFFICE/KITCHENETTE/RR	UPONOR	A2660201	2	300	3/8"	8"	1"	115	20	1.5	8.7	BRASS	1,2,3

NOTES:
1) MANIFOLD INCLUDES BALANCING VALVES AND FLOW METER FOR EACH CIRCUIT.
2) PRIME VALVE BOX COVER FOR PAINTING. COORDINATE WITH ARCH.
3) SELECTION HAS BEEN MADE WITH 35% PROPYLENE GLYCOL.

ELECTRIC BOILER SCHEDULE

PLAN CODE	MFGR	MODEL	RATED OUTPUT (KW)	STEPS	FUEL	POWER (V/PH/HZ)	FLA	FLOW (GPM)	WPD (FT)	EWT (°F)	LWT (°F)	NOTES
B-1	LOCHINVAR	BWK1-045C	45	1@15KW 1@30KW	ELECTRIC	208/3/60	125	12.9	1.3	95	115	1,2,3
B-2	LOCHINVAR	BWK1-045C	45	1@15KW 1@30KW	ELECTRIC	208/3/60	125	12.9	1.3	95	115	1,2,3

NOTES:
1) BOILER CONTROLS AND SAFETIES TO BE ASME CSD-1 COMPLIANT.
2) PROVIDE WITH RELIEF VALVE, TEMP/PRESS GAUGE, HIGH LIMIT W/ MANUAL TEST SWITCH AND LOW WATER CUT-OFF W/ RESET AND TEST & FLOW SWITCH.
3) BOILERS SHALL INCLUDE AN INTERFACE OR TERMINAL STRIP TO ACCEPT (0-10 VDC) PROPORTIONAL SIGNAL TO RESET INTERNAL TARGET SET POINT TEMPERATURE.

DETAILING CONVENTIONS

DETAILS:
X — DETAIL NUMBER
XX — SHEET WHERE DETAIL IS SHOWN

SECTIONS AND VIEWS:
X — SECTION LETTER
XX — SHEET WHERE SECTION IS SHOWN

VERIFY SCALE

THIS BAR IS ONE INCH ON ORIGINAL DRAWING
0" —— 1"
ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

Professional Engineer
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: _____
Typed or Printed Name: Shawn C. Murray
Date: 1/12/2024 License Number: 58940

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP
POLK COUNTY — ERSKINE, MN

MECHANICAL NOTES, LEGENDS, AND SCHEDULES

PROJECT NUMBER: 22-RF-027

M1

DESIGNED: PH	DRAWN: PH	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL170M4	DRAWING NO: 3R-MN-1176-170		SHEET 49 OF 64

ENERGY RECOVERY VENTILATOR SCHEDULE

PLAN CODE	MFGR	MODEL NO.	ER TYPE	MOUNTING LOCATION	WEIGHT (LBS)	O.A. CFM	SUPPLY ESP IN. WG	EXHAUST CFM	EXHAUST ESP IN. WG	FRPM	EXHAUST MOTOR HP	V/HZ/PHASE	MCA (A)	MOCP(A)	NOTES
ERV-1	RENEWAIRE	EV200	CORE	103 MEP	68	125	0.690	150	0.690	1750	1/10	120/60/1	10.0	15	1-7

PLAN CODE	HEAT RECOVERY									
	WINTER DESIGN °F					SUMMER DESIGN °F				
	O.A. DB/WB (F)	S.A. DB/WB (F)	R.A. DB/WB (F)	ENTHALPY RECOVERY RATIO	HEATING LOAD REDUCTION (kBTU)	O.A. DB/WB(F)	S.A. DB/WB(F)	R.A. DB/WB(F)	ENTHALPY RECOVERY RATIO	COOLING LOAD REDUCTION (Tons)
ERV-1	-20.6 / -23.9	48.6 / 37.1	65.0 / 48.1	78.6	10.9	91.0 / 71.2	75.6 / 63.9	72 / 60.1	68.1	0.3

NOTES:
1. OA - OUTSIDE AIR TEMPERATURE; RA - RETURN AIR TEMPERATURE; SA - VENTILATION AIR TEMPERATURE FROM ENERGY CORE; EA - EXHAUST AIR TEMPERATURE.
2. SYSTEMS ARE REQUIRED TO PROVIDE TEMPERED AIR ONLY.
3. PROVIDE ALL SERVICE AND OPERATIONAL CLEARANCES AS REQUIRED, INCLUDING ALL CLEARANCES REQUIRED BY NEC ARTICLE 110. PROVIDE WITH HANGING ISOLATION KIT.
4. PROVIDE WITH 1" MERV 8 OUTDOOR AIR AND 1" MERV 8 EXHAUST AIR FILTERS.
5. UNIT SELECTED AT 1191 FT ELEVATION.
6. PROVIDE WITH INTEGRAL GRAVITY BACKDRAFT DAMPERS.
7. FACTORY WIRED DISCONNECT SWITCH, AND BOLT ON ACCESS PANELS.

SPLIT SYSTEM HEAT PUMP SCHEDULE

MFGR	INDOOR EVAPORATOR DATA						OUTDOOR UNIT						ACCESSORIES
	PLAN CODE	MODEL	SEER	HSPF	POWER	REFRIGERANT	PLAN CODE	MODEL	COOLING CAPACITY (BTUH) (NOTE 2)	HEATING CAPACITY (BTUH) (NOTE 3)	V/HZ/PH	MCA	
MITSUBISHI	AC-1	SLZ-KF15NA	19.8	11.2	50 W	R410A	SHP-1	SUZ-KA15NAH2	14,100	18,000	208/60/1	10	A, B, C

NOTES:
1) INDOOR UNIT POWERED FROM OUTDOOR UNIT. E.C. TO PROVIDE CONNECTING WIRING.
2) BASED ON 80°F DB / 67°F ENTERING AIR TEMPERATURE AND 95°F DB / 75°F WB OUTDOOR AIR TEMPERATURE.
3) BASED ON 70°F DB / 60°F ENTERING AIR TEMPERATURE AND 47°F DB / 43°F WB OUTDOOR AIR TEMPERATURE.

ACCESSORIES:
A) COOLING / HEAT COMMAND FROM T.C. SYSTEM
B) MANUFACTURER'S CONDENSATE PUMP FOR INDOOR UNITS.
C) PROVIDE WITH WALL MOUNTING BRACKET FOR OUTDOOR UNIT

EXHAUST FAN SCHEDULE

PLAN CODE	MANUFACTURER	MODEL	FAN TYPE	SYSTEM	DRIVE	CFM	RPM	ESP ("H2O)	MOTOR HP	POWER (V/PH/HZ)	NOTES
EF-1	GREENHECK	SBE-1H20-4	PROPELLER	GENERAL EXHAUST	DIRECT	2475	912	.3"	1/4	115/1/60	1, 2, 3
EF-2	LINCOLN ELECTRIC	SF2400	INLINE	WELDING EXHAUST	DIRECT	1200	-	4"	1	115/1/60	2, 3, 4

NOTES:
1. GRAVITY BACKDRAFT DAMPER
2. INTERLOCK EXHAUST FANS WITH MAKEUP AIR UNIT. SEE CONTROL DRAWING 1/M7.
3. DISCONNECT PROVIDED AND INSTALLED BY MECHANICAL CONTRACTOR
4. LINCOLN ELECTRIC CAPTURE ARM, AS FOLLOWS:
   A. K1655-9 EXTRACTION ARM.
   B. K1656-9 FAN/MOTOR.
   C. K1656-2 WALL MOUNT BRACKET LOCATED AT WELDING BENCH.
   D. K1669-4 LAMP KIT WITH LIGHT SENSOR.
   E. K1494-2 STARTER OVERLOAD SWITCH FOR 115V.

LOUVER SCHEDULE

PLAN CODE	MFGR	MODEL	SERVICE	FRAME TYPE	SIZE (W"xH")	FREE AREA (SF)	CFM	VELOCITY (FPM)	PRESSURE DROP (IN WG)	MATERIAL	DEPTH	NOTES
L-1	GREENHECK	ESJ-602	INTAKE	CHANNEL	12x16	0.44	125	269	0.010	ALUMINUM	6"	1, 2
L-2	GREENHECK	ESJ-602	EXHAUST	CHANNEL	12x16	0.44	125	269	0.010	ALUMINUM	6"	1, 2
L-3	GREENHECK	ESJ-602	INTAKE	CHANNEL	55x44	9.11	3,675	398	0.030	ALUMINUM	6"	1, 2

NOTES:
1. PROVIDE WITH BIRD SCREEN, BOX FRAME TYPE, AND DRAINABLE BLADES.
2. PROVIDE PREFINISHED LOUVER, FINAL COLOR TO BE SELECTED FROM MANUFACTURER'S FULL RANGE COLOR PALETTE.

MAKE-UP AIR UNIT SCHEDULE

PLAN CODE	MANUFACTURER	MODEL	LOCATION	MIN. SUPPLY CFM	MAX SUPPLY CFM	ESP	BLOWER HP	CAPACITY STAGES	FUEL	KW	MIN. AIR DISCHARGE TEMP (°F)	TEMP RISE (°F)	ELECTRICAL			WEIGHT (LBS)	NOTES
													POWER	MCA	MOP		
MAU-1	KING ELECTRIC	CKL20100-3-8-4.0-0.4-VFD3-D400	MEZZANINE	1200	3675	0.4	3	8	ELECTRIC	100	65	85	208/60/3	289	400	850	1 - 5

NOTES:
1) VFD FACTORY MOUNTED
2) DISCONNECT PROVIDED BY MANUFACTURER, WIRED BY E.C.
3) PROVIDE STEEL MOUNTING BRACKETS TO HANG FAN FROM STRUCTURAL STEEL FRAMING ABOVE.
4) ELECTRICALLY HEATED MAKE UP AIR UNIT WITH INTEGRAL PROPORTIONAL THERMOSTAT FOR DISCHARGE AIR TEMPERATURE CONTROL, WITH 8 STEPS OF CAPACITY CONTROL
5) PROVIDE WITH INTEGRAL FILTER RACKS, M.C. TO PROVIDE 2" PLEATED MERV 8 FILTERS.

ELECTRIC UNIT HEATER SCHEDULE

PLAN CODE	MFGR	MODEL	ELECTRICAL			NOTES
			KW	V/PH	MCA	
EUH-1	QMARK	CWH1201DSAF	1	120/1	8.4	1, 2

1. FURNISH WITH SURFACE MOUNTING FRAME
2. PROVIDE WITH INTEGRAL THERMOSTAT

ELECTRIC HEATING COIL SCHEDULE

PLAN CODE	MFGR	MODEL	DIMENSIONS		AIR TEMP (°F)		ELECTRICAL			NOTES
			WIDTH	HEIGHT	ENTERING	LEAVING	KW	V/PH	MCA	
EHC-1	GREENHECK	IDHE	8"	8"	49	66.7	0.7	120/1	5.833	1,2,3,4

1. FLANGE MOUNT
2. FURNISH WITH CONTACTORS
3. FURNISH WITH DISCONNECT SWITCH
4. PROVIDE WITH SCR CONTROL TO ACCEPT (0-10VDC) INPUT FOR HEAT DEMAND.

GAS FIRED UNIT HEATER SCHEDULE

PLAN CODE	MFGR	MODEL	NOMINAL CFM	HEATING		ELECTRICAL				NOTES
				INPUT (MBh)	OUTPUT (MBh)	HP	RPM	V/PH	MCA	
GUH-1	MODINE	HDB60	1111	60	49.2	1/4	1050	115/1	7.05	1,2,3
GUH-2	MODINE	HDB60	1111	60	49.2	1/4	1050	115/1	7.05	1,2,3

1. CONTROL VOLTAGE IS 24V. PROVIDE THERMOSTAT.
2. BLOWER UNIT MODEL
3. PROPANE FIRED

DIFFUSER & GRILLE SCHEDULE

PLAN CODE	MFGR	MODEL	CFM		NOMINAL FACE SIZE	NECK SIZE	MATERIAL	COLOR/ FINISH	MOUNTING	NC	NOTES
			MIN	MAX							
S-1	TITUS	OMNI	125	125	24 X 24	8"Ø	STEEL	WHITE	LAY-IN	-	1
S-2	TITUS	300FL	455	460	14 x 14	12 X 12	ALUMINUM	WHITE	SURFACE	26	2, 3
E-1	TITUS	50F	125	125	24 X 8	22 X 6	ALUMINUM	WHITE	LAY-IN	-	1, 4
T-1	TITUS	50F	125	125	24 X 8	22 X 6	ALUMINUM	WHITE	LAY-IN	-	1, 4

NOTES:
1. COORDINATE WITH ARCHITECURAL REFLECTED CEILING PLANS FOR MOUNTING TYPE (SURFACE / LAY-IN).
2. SEE DRAWINGS FOR LOCATIONS OF DAMPERS.
3. PROVIDE DIFFUSER WITH NECESSARY ACCESSORIES FOR SURFACE MOUNTING.
4. PROVIDE WITH OPPOSED BLADE DAMPER.

HIGH VOLUME LOW SPEED FAN SCHEDULE

PLAN CODE	TYPE	LOCATION	BASIS OF DESIGN		DRIVE	RPM	MOTOR	POWER	WEIGHT (LBS)	NOTES
			MFGR	MODEL			HP	(V/PH/HZ)		
HVLS-1	HIGH VOLUME LOW SPEED	100 VEHICLE SERVICE	GREENHECK	DS-3-8	DIRECT	145	3/4	208/1/60	106	1,2

NOTES:
1. PROVIDE WITH SOLID BEAM INSTALLATION KIT
2. PROVIDE FAN WITH WIRED WALL CONTROLLER TO CONTROL FAN ON / OFF AND FAN SPEED.

VERIFY SCALE

THIS BAR IS ONE INCH ON ORIGINAL DRAWING

0" ——— 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

Professional Engineer
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: _____
Typed or Printed Name: Shawn C. Murray
Date: 1/12/2024 License Number: 58940

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

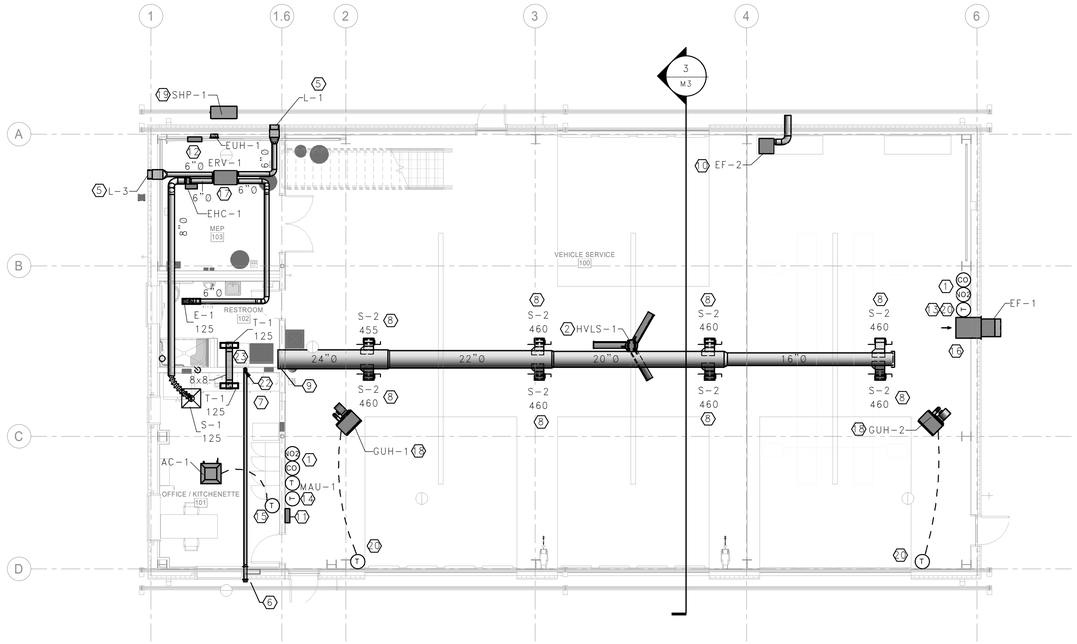
POLK COUNTY — ERSKINE, MN

MECHANICAL SCHEDULES

PROJECT NUMBER: 22-RF-027

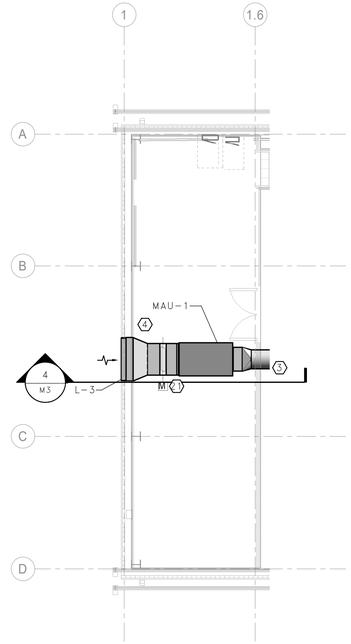
M2	DESIGNED: PH	DRAWN: PH	DATE: 1.12.2024
	CADD:RDL171M4	DRAWING NO: 3R-MN-1176-171	SHEET 50 OF 64

CHECKED: TDF



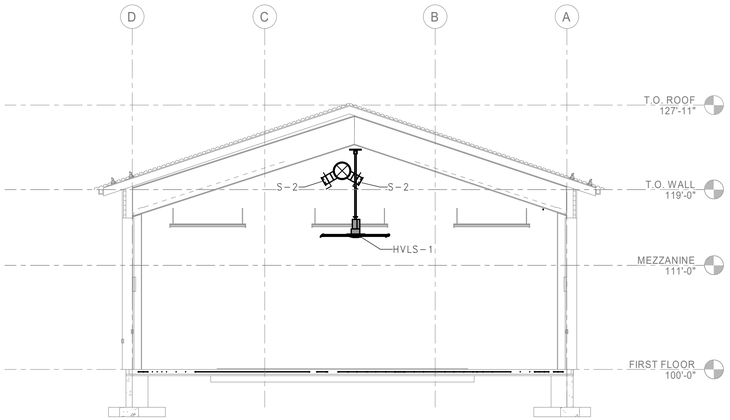
1 M3 MAIN LEVEL HVAC PLAN

SCALE IN FEET 0 8 16
SCALE: 1/8" = 1'-0"
TRUE NORTH NORTH REF



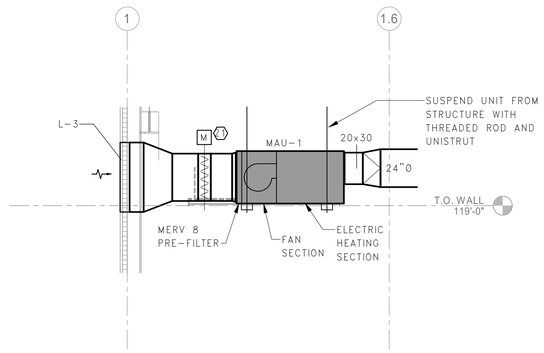
2 M3 MEZZANINE HVAC PLAN

SCALE IN FEET 0 8 16
SCALE: 1/8" = 1'-0"
TRUE NORTH NORTH REF



3 M3 HVAC ELEVATION

SCALE IN FEET 0 8 16
SCALE: 1/8" = 1'-0"



4 M3 MAU ELEVATION

SCALE IN FEET 0 4 8
SCALE: 1/4" = 1'-0"

SHEET NOTES

1. M.C. TO PROVIDE CARBON MONOXIDE/NITROGEN DIOXIDE AUTOMATIC DETECTION DEVICES AT THIS LOCATION. DEVICES SHALL ACTIVATE MAU-1 AND EF-1.
2. INSTALL HVLS FAN 14' AFF ACCORDING TO MANUFACTURER'S INSTRUCTIONS.
3. SEE MAIN LEVEL HVAC PLAN FOR CONTINUATION.
4. MAU SUSPENDED FROM ROOF STRUCTURE IN COMPLIANCE WITH MANUFACTURER'S MOUNTING REQUIREMENTS AT AT LEAST 8'-0" AFF. COORDINATE WITH STRUCTURAL.
5. BOTTOM OF LOUVER MOUNTED AT AT LEAST 7'-10" AFF.
6. DRYER VENT WALL CAP.
7. DRYER VENT RUN THROUGH JOIST SPACE. COMPLY WITH IMC 2018 FOR DRYER VENTING AND INSTALLATION.
8. MOUNT DIFFUSER AND BRANCH AT 30° DOWN FROM HORIZONTAL CENTERLINE OF DUCTWORK AT APPROXIMATELY 23'-0" AFF. SEE DETAIL 5/M6.
9. SEE MEZZANINE MAINTENANCE HVAC PLAN FOR CONTINUATION.
10. WELDING FUME CAPTURE ARM. VENT OUT SIDEWALL. INSTALL PER MANUFACTURER GUIDELINES AT 9' AFF. SEE DETAIL 3/M6.
11. HVLS FAN CONTROL PANEL LOCATION.
12. STAND ALONE TEMPERATURE CONTROL PANEL(S).
13. PLAN NORTH RADIANT FLOOR HEATING TEMPERATURE THERMOSTAT.
14. PLAN SOUTH RADIANT FLOOR HEATING TEMPERATURE THERMOSTAT.
15. OFFICE TEMPERATURE SENSOR. SEE CONTROL DETAIL 2/M7.
16. WALL MOUNTED PROPELLER EXHAUST FAN. SEE DETAIL 5/M5.
17. SUPPORT ERV UNIT FROM STRUCTURE WITH THREADED ROD AND RUBBER-IN-SHEAR ISOLATORS AT ALL (4) SUPPORT POINTS. CONNECT SUPPLY AND EXHAUST DUCTS WITH FLEXIBLE FABRIC CONNECTIONS. SEE DETAIL 4/M6.
18. PROPANE FIRED UNIT HEATER MOUNTED AT 10'-0" AFF. VENT 3" GALVANIZED STEEL FLUE VENT THROUGH ROOF ACCORDING TO MANUFACTURER'S INSTRUCTIONS. SEE DETAIL 2/M6.
19. HEAT PUMP FURNISHED WITH WALL MOUNTING BRACKET. MOUNT AT LEAST 4" OFF OF EXTERIOR WALL AT 4' 6" ABOVE GRADE.
20. THERMOSTATS ON EXTERIOR WALLS SHALL HAVE INSULATED BACKPLATES
21. 40"x 30" 24 VOLT, MOTORIZED DAMPER ON UNIT INLET BY M.C. EQUAL TO RUSKIN MODEL CD-60. DAMPER TO OPEN UPON MAU ACTIVATION. SEE CONTROL DRAWING SHEET M7.
22. DROP 4" DRYER VENT DOWN IN WALL TO DRYER VENT BOX, EQUAL TO "DRYER BOX" MODEL 425.
23. TRANSFER DUCT, SEE DETAIL 6/M5. COORDINATE INSTALLATION WITH PLUMBING.

VERIFY SCALE

THIS BAR IS ONE INCH ON ORIGINAL DRAWING

0" 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

Professional Engineer
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Typed or Printed Name: Shawn C. Murray
Date: 1/12/2024 License Number: 58940

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

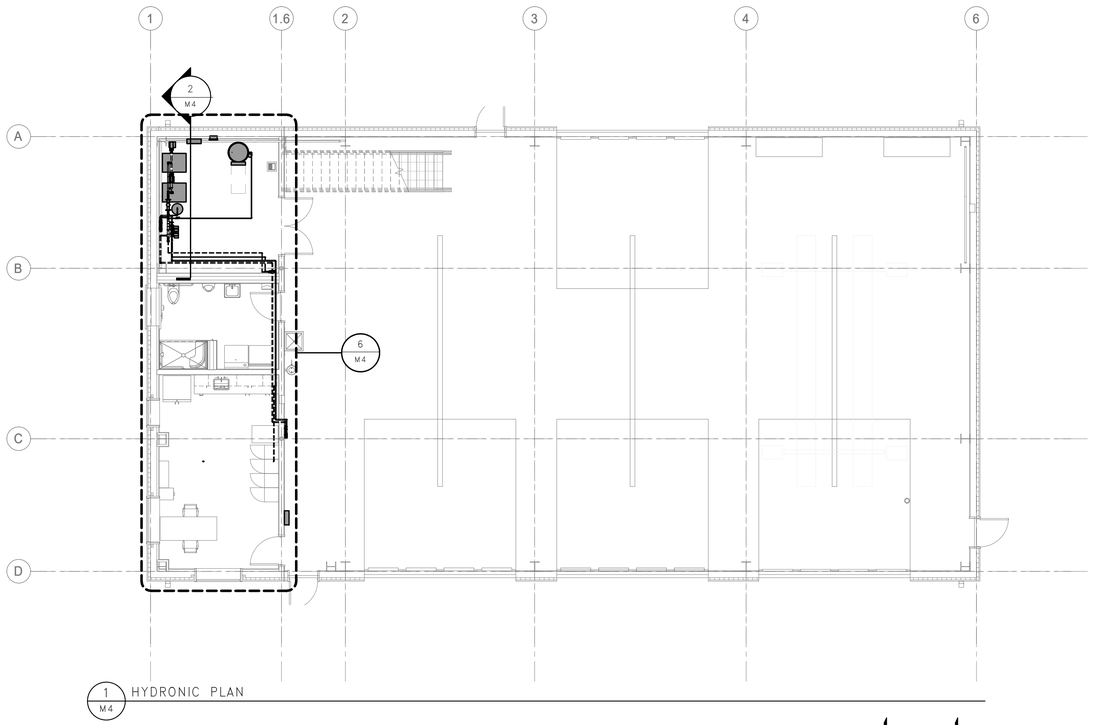
POLK COUNTY — ERSKINE, MN

HVAC PLANS

PROJECT NUMBER: 22-RF-027

DESIGNED: PH	DRAWN: PH	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL172M0	DRAWING NO: 3R-MN-1176-172		SHEET 51 OF 64

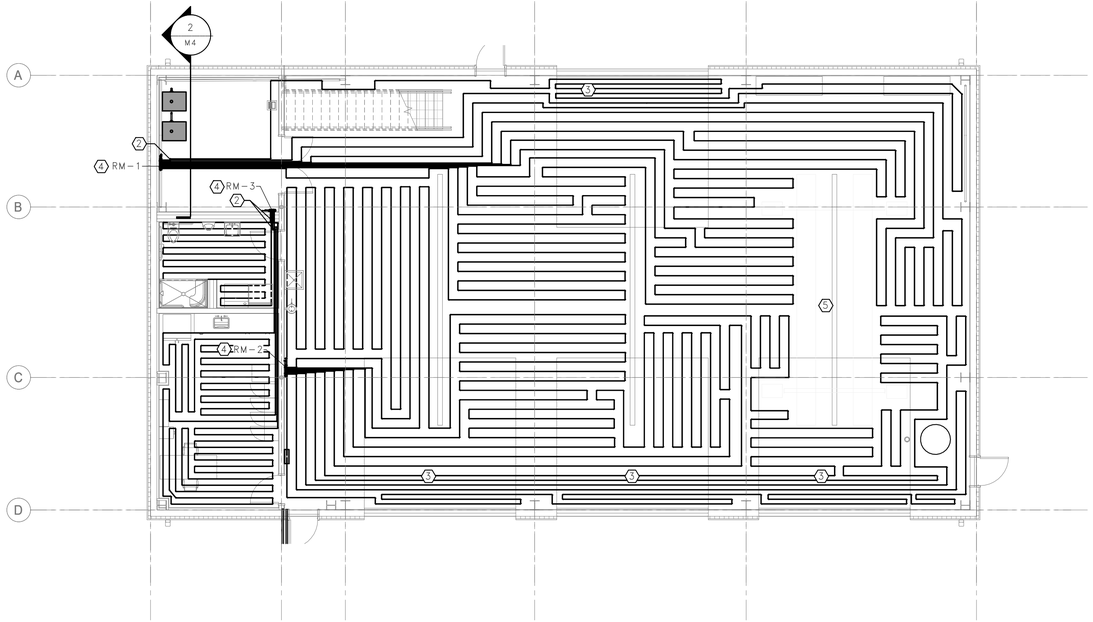
M3



1 M4 HYDRONIC PLAN

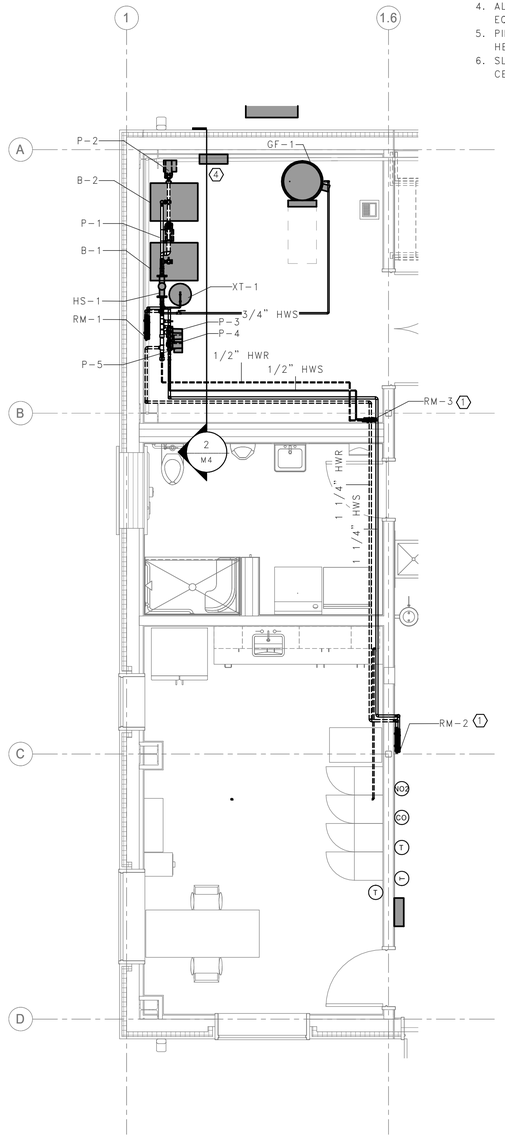
0 8 16
SCALE IN FEET
SCALE: 1/8" = 1'-0"

TRUE NORTH NORTH REF



3 M4 UNDERFLOOR HYDRONIC PLAN

TRUE NORTH NORTH REF



6 M4 ENLARGED HYDRONIC PLAN

0 4 8
SCALE IN FEET
SCALE: 1/4" = 1'-0"

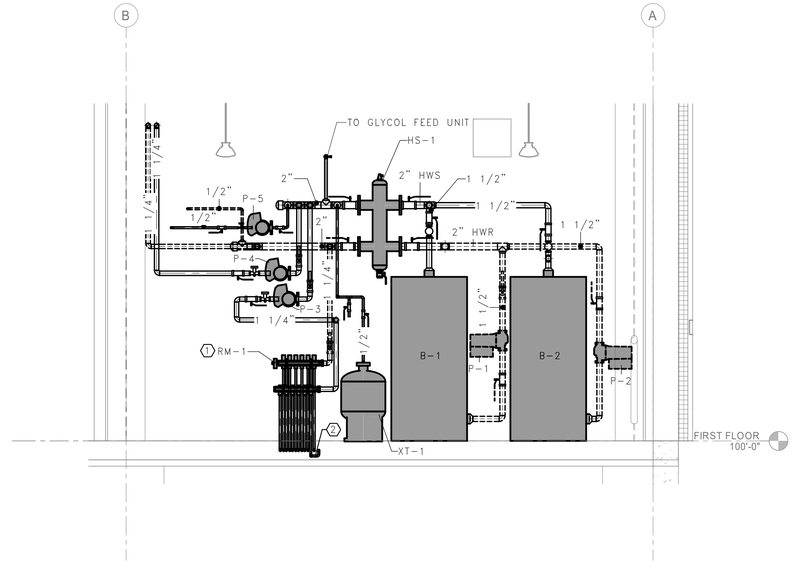
TRUE NORTH NORTH REF

RADIANT SLAB NOTES

1. MAINTAIN 80 PSIG AIR PRESSURE IN RADIANT PIPING DURING CONCRETE POUR.
2. ALL PIPING WITHIN SLAB SHALL BE CONTINUOUS PEX WITH OXYGEN BARRIER (NO JOINTS).
3. SECURE PIPING TO REBAR AT MAXIMUM OF 18" WITH PLASTIC ZIP TIES.
4. ALL CIRCUITS EXTENDING FROM EACH MANIFOLD SHALL BE EQUAL IN LENGTH (+/- 10 FEET TOLERANCE).
5. PIPING SHALL BE NEATLY SPACED AT DISTANCE INDICATED HEREIN.
6. SLEEVE THROUGH SLAB CONTROL JOINTS WITH 1" CLOSED CELL FLEXIBLE ELASTOMERIC INSULATION.

SHEET NOTES

1. RADIANT FLOOR MANIFOLD, SEE DETAIL 3/M5.
2. ROUTE SUPPLY END OF UNDERSLAB TUBING UNDER RETURN SUCH THAT SUPPLY SIDE OF LOOP IS NEXT TO EXTERIOR WALL.
3. SPACE UNDERFLOOR PIPING AT 6" O.C. WITHIN 3' 6" OF EXTERIOR OVERHEAD DOORS AS INDICATED.
4. TEMPERATURE CONTROL PANELS. SEE CONTROLS SHEET M7. T.C. IS RESPONSIBLE FOR POWER SUPPLY TO CONTROL PANELS.
5. NO PIPING TO BE INSTALLED IN VEHICLE LIFT AREA.



2 M4 HYDRONIC ELEVATION

0 4 8
SCALE IN FEET
SCALE: 1/4" = 1'-0"

VERIFY SCALE

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0" ——— 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK COUNTY — ERSKINE, MN

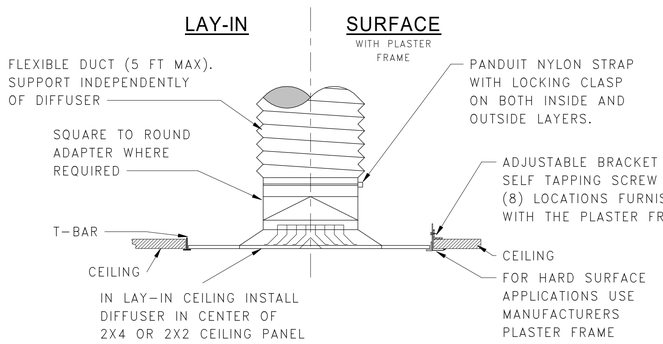
HYDRONIC PLANS

PROJECT NUMBER: 22-RF-027

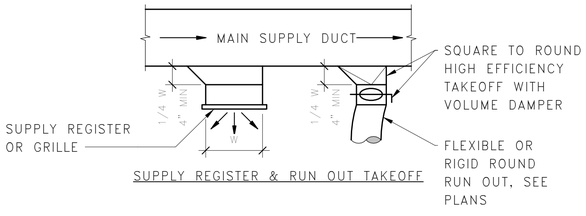
DESIGNED: PH	DRAWN: PH	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL173M0	DRAWING NO: 3R-MN-1176-173		SHEET 52 OF 64

M4

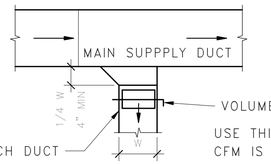
Professional Engineer
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: _____
Typed or Printed Name: Shawn C. Murray
Date: 1/12/2024 License Number: 58940



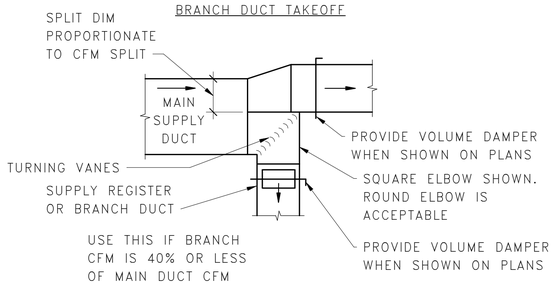
1 M5 CEILING DIFFUSER DETAIL



SUPPLY REGISTER & RUN OUT TAKEOFF

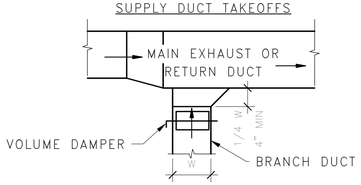


BRANCH DUCT TAKEOFF



AIR SPLIT TYPE DUCT TAKEOFF

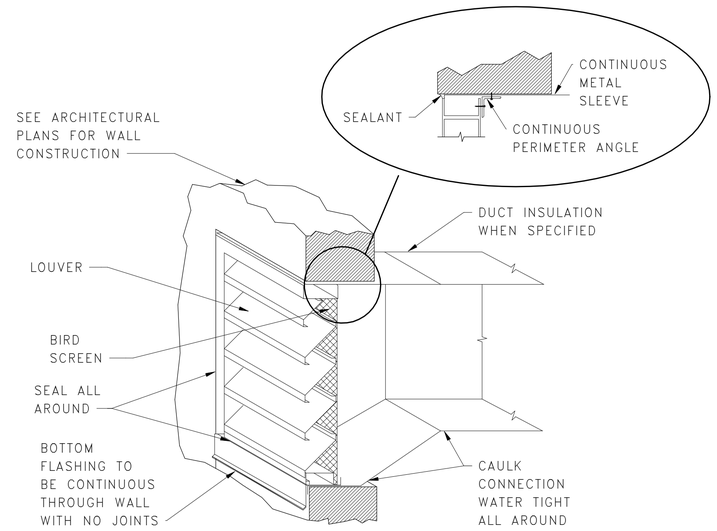
SUPPLY DUCT TAKEOFFS



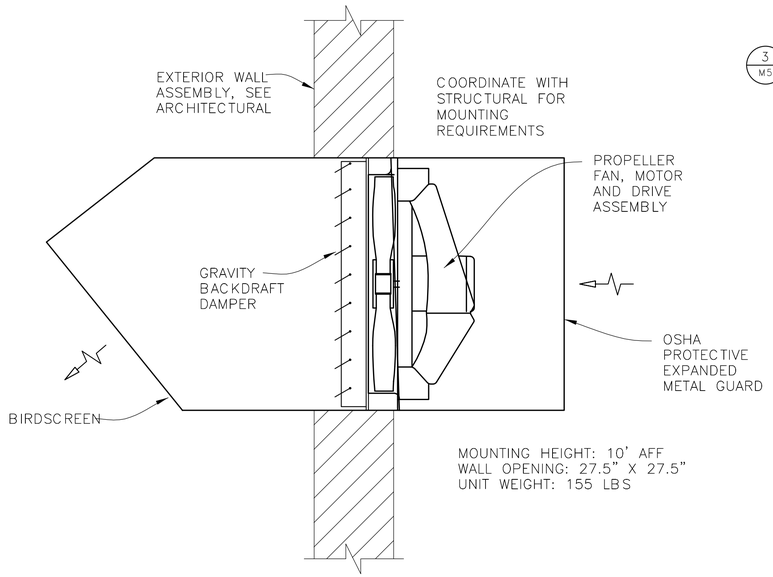
EXHAUST AND/OR RETURN BRANCH DUCT

RETURN / EXHAUST DUCT TAKEOFFS

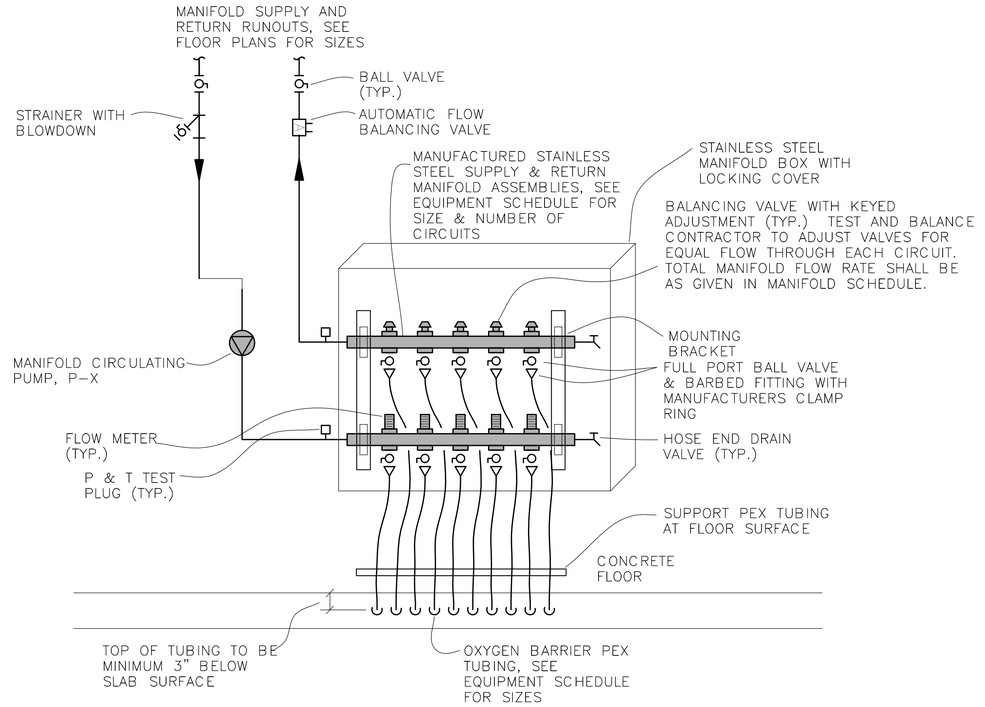
4 M5 LOW VELOCITY DUCT DETAILS



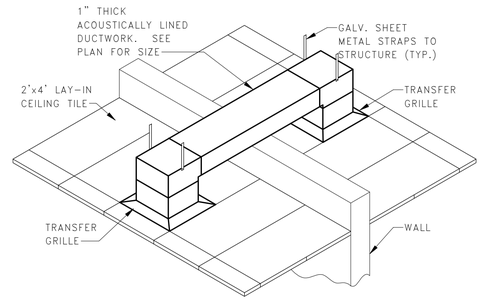
2 M5 LOUVER INSTALLATION DETAIL



5 M5 SIDEWALL PROPELLER FAN DETAIL



3 M5 RADIANT MANIFOLD DETAIL



6 M5 TRANSFER DUCT DETAIL

VERIFY SCALE

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0" 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

Professional Engineer

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature: _____

Typed or Printed Name: Shawn C. Murray

Date: 1/12/2024 License Number: 58940

REV.	DATE	DESCRIPTION	BY

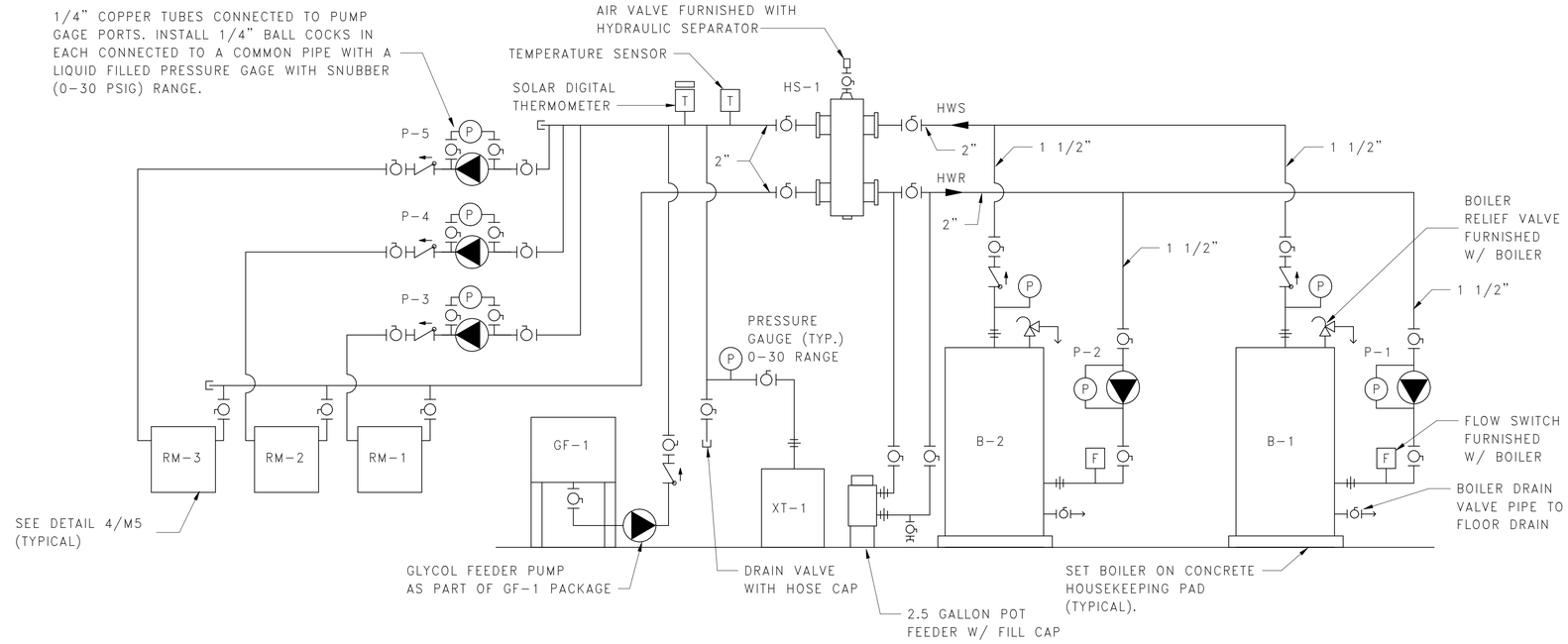
RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK COUNTY — ERSKINE, MN

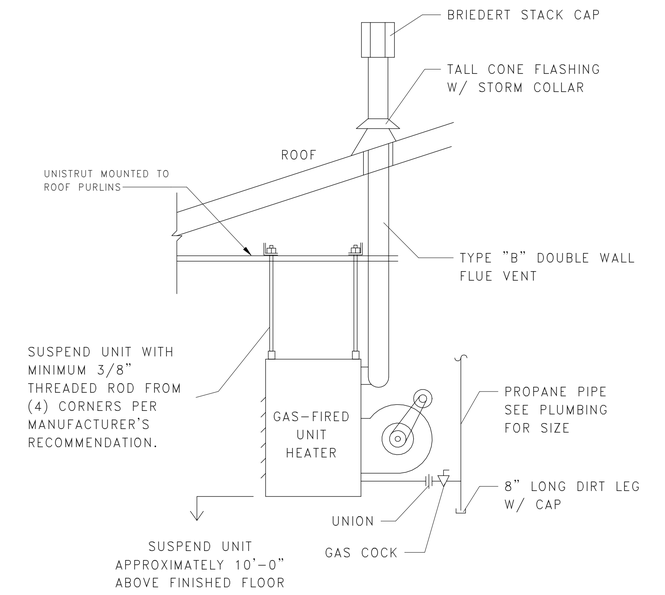
MECHANICAL DETAILS

PROJECT NUMBER: 22-RF-027

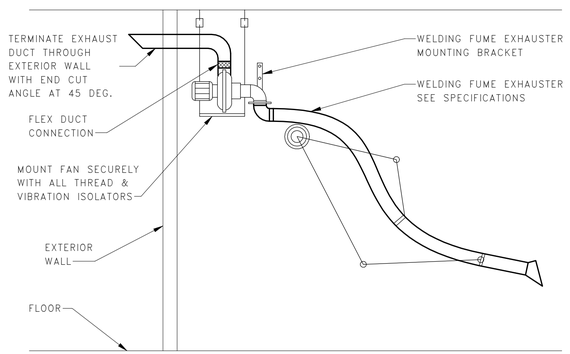
M5	DESIGNED: PH	DRAWN: PH	DATE: 1.12.2024	CHECKED: TDF
	CADD:RDL174M2	DRAWING NO: 3R-MN-1176-174		SHEET 53 OF 64



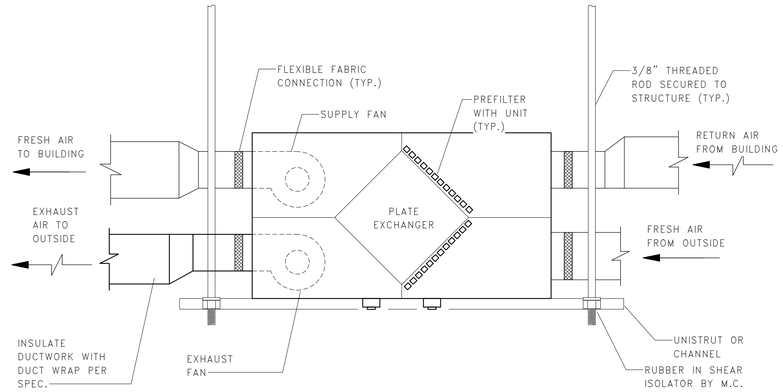
1 M6 RADIANT FLOW DIAGRAM



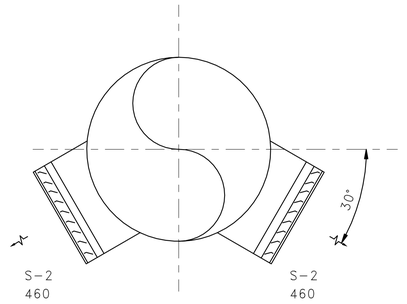
2 M6 PROPANE UNIT HEATER DETAIL



3 M6 WELDING EXHAUST SYSTEM DETAIL



4 M6 ENERGY RECOVERY VENTILATOR DETAIL



GENERAL NOTES:
1. DAMPER NOT SHOWN

5 M6 DUCT MOUNTED DIFFUSER DETAIL

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Professional Engineer
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Signature: _____
Typed or Printed Name: Shawn C. Murray
Date: 1/12/2024 License Number: 58940

REV.	DATE	DESCRIPTION	BY

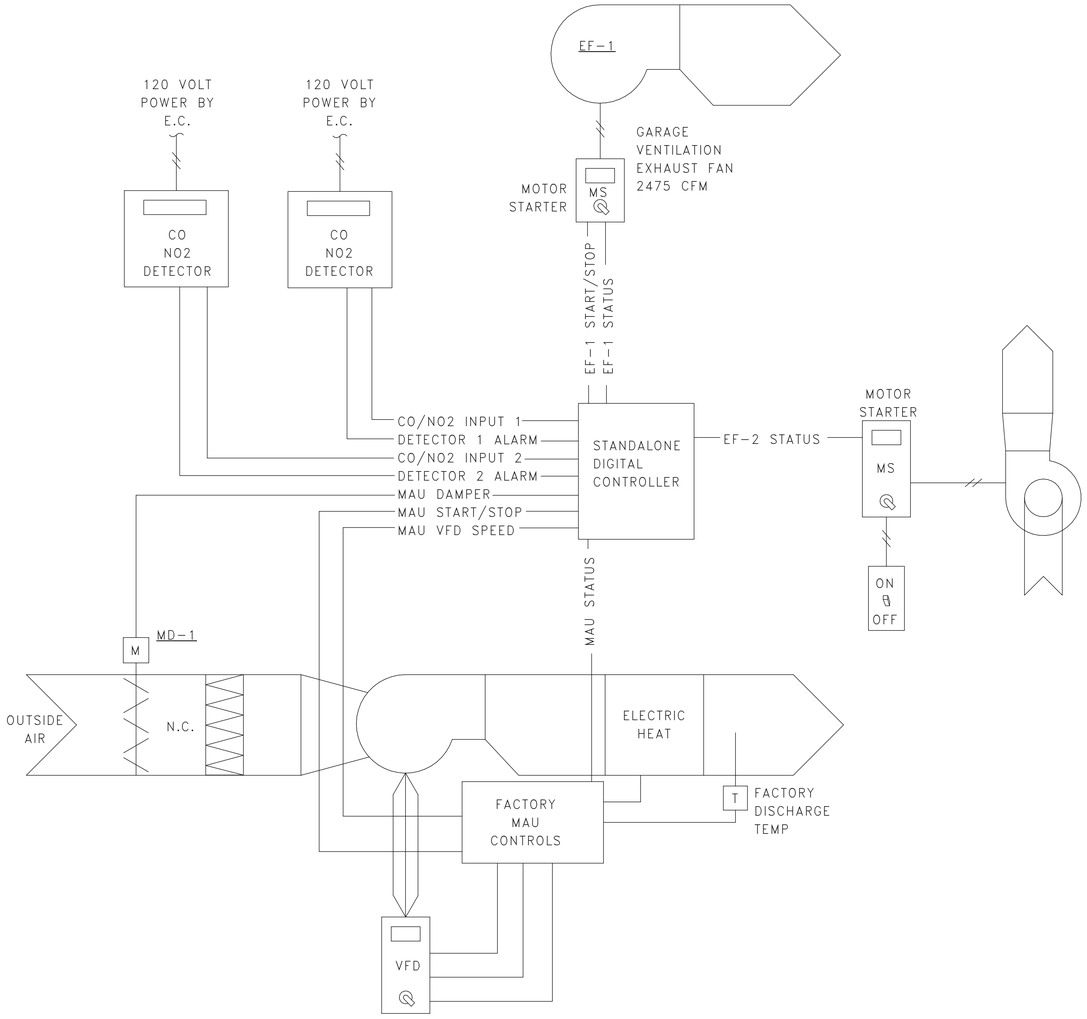
RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP
POLK COUNTY — ERSKINE, MN

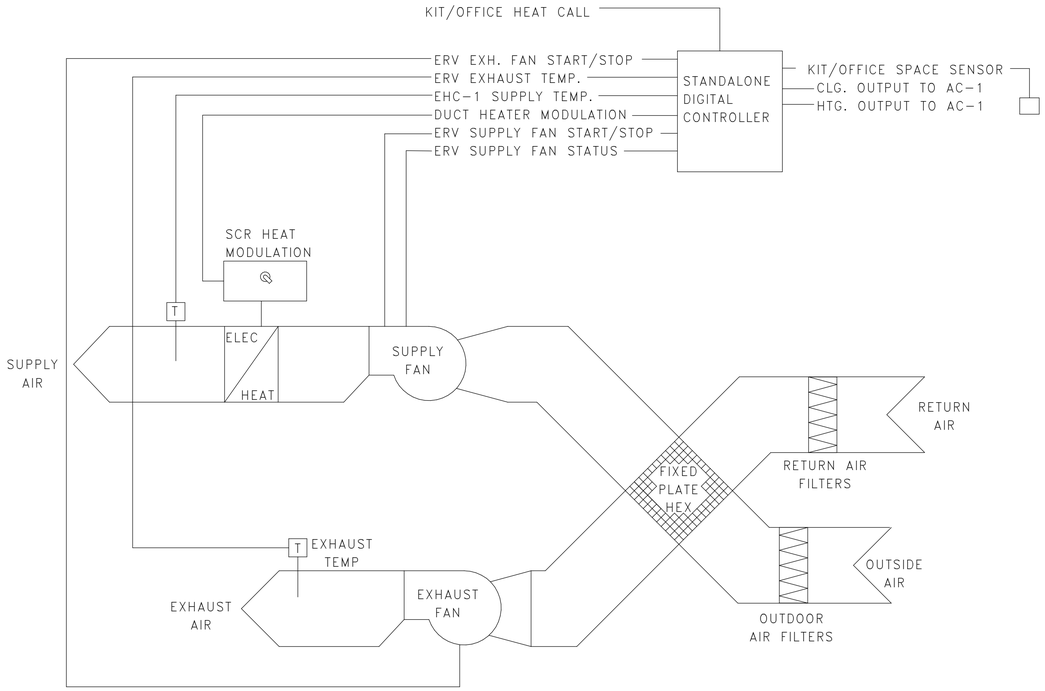
MECHANICAL DETAILS

PROJECT NUMBER: 22-RF-027

DESIGNED: PH	DRAWN: PH	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL175M2	DRAWING NO: 3R-MN-1176-175		SHEET 54 OF 64

M6





VEHICLE MAINTENANCE GARAGE VENTILATION CONTROL :

PROVIDE TWO STAND-ALONE MICROPROCESSOR BASED CARBON MONOXIDE AND NITROGEN DIOXIDE DETECTORS EQUAL TO CONSPEC "OPTIO V" WITH RELAYS, SENSORS, AND ALARM CONTACTS TO MEET REQUIREMENTS OF THE SEQUENCE OF OPERATION HEREIN. REFER TO PLAN VIEWS FOR LOCATIONS. WHEN THE PPM THRESHOLD FOR NO2 OR CO IS EXCEEDED (25 PPM CO & 1.5 PPM NO2), ENERGIZE EF-1 AND MAU-1 UNTIL THE PPM LEVEL HAS DROPPED BELOW THE THRESHOLD SET POINT (15 PPM CO / 0.7 PPM NO2). PROGRAM A MINIMUM RUNTIME OF 5 MINUTES. SEND AN ANALOG SIGNAL TO THE FACTORY PROVIDE MAU VFD, BASED UPON THE NUMBER OF OPERATING EXHAUST FANS AS FOLLOWS:

1. EF-1 OPERATING: MAU-1 VFD SPEED SETTING = 2475 CFM
2. EF-2 OPERATING: MAU-1 VFD SPEED SETTING = 1200 CFM
3. EF-1 & EF-2 BOTH OPERATING: MAU-1 SPEED SETTING= 3675 CFM.

MAKE UP AIR UNIT CONTROL (MAU-1) :

MAU-1 IS FACTORY FURNISHED WITH AN INTEGRAL DISCHARGE TEMPERATURE CONTROL & AN INTEGRAL FACTORY VFD. THE CONTROL SYSTEM SHALL MONITOR FAN STATUS, START/STOP AND PROVIDE SPEED CONTROL INPUT BASED ON EXHAUST FAN OPERATION.

MAU-1 SHALL BE INTERLOCKED TO OPERATE TO MAINTAIN A 65 DEG. F. DISCHARGE AIR TEMPERATURE WHEN EITHER EF-1 OR EF-2 IS ENERGIZED. PROVIDE AN ANALOG SPEED SIGNAL BASED UPON THE EXHAUST OPERATION. COORDINATE WITH THE BALANCE CONTRACTOR TO DETERMINE VFD SPEED CORRESPONDING TO THE REQUIRED MAKE UP AIR VOLUME. PRIOR TO ENERGIZING MAU-1 OPEN THE MOTORIZED INTAKE AIR DAMPER MD-1.

GUH-1 AND GUH-2 CONTROL: PROVIDE TRANSFORMER AND LOW VOLTAGE THERMOSTAT FOR MANUAL CONTROL OF HEAT IN VEHICLE SERVICE BAYS.

1 / M7 VEHICLE SERVICE HVAC CONTROL

ENERGY RECOVERY UNIT AND DUCT COIL CONTROL (ERV-1, EHC-1) :

PROVIDE DIGITAL CONTROLLER TO FOR CONTROL OF ERV-1 AND DUCT HEATING COIL EHC-1.

ENERGIZE ERV-1 SUPPLY AND EXHAUST FANS BASED UPON AN OCCUPANCY SCHEDULE. INITIALLY SET TO OPERATE 5 DAYS A WEEK FROM 7 AM TO 5 PM. WHEN THE EXHAUST AIR TEMPERATURE IS BELOW 40 DEG. F. THE SUPPLY FAN SHALL CYCLE ON/OFF FOR 5 MINUTES EVERY 30 MINUTES FOR FROST CONTROL.

EHC-1 CONTROL : ELECTRIC DUCT HEATER SHALL BE ENERGIZED TO MAINTAIN DISCHARGE AIR TEMPERATURE SET POINT WHEN ERV-1 SUPPLY FAN IS ENERGIZED. THE DUCT HEATER SHALL BE DE-ENERGIZED WHEN THE ERV-1 SUPPLY FAN IS OFF. PROVIDE A (0-10 VDC) ANALOG INPUT TO THE DUCT HEATER FOR CONTROL OF DISCHARGE AIR TEMPERATURE. THE DISCHARGE AIR TEMPERATURE SHALL BE RESET BASED UPON THE OFFICE / KITCHENETTE SPACE TEMPERATURE DEVIATION FROM SET POINT. RESET THE DISCHARGE AIR TEMPERATURE FROM 55 DEG. F WHEN THE ROOM TEMPERATURE IS 3 DEG. F ABOVE SETPOINT TO 70 DEG. F. WHEN THE ROOM TEMPERATURE IS 0 DEG. F. ABOVE SET POINT.

KITCHEN OFFICE HEAT/COOL: UPON THE CALL FOR HEAT, ENERGIZE AC-1 FOR HEAT PUMP OPERATION. LOCK OUT COMPRESSOR BELOW OUTDOOR TEMP OF 20 DEG F AND SEND CALL FOR HEAT TO RADIANT FLOOR CONTROLLER TO ENERGIZE PUMP P-3 TO MAINTAIN ROOM SETPOINT. UPON THE CALL FOR COOLING ENERGIZE AC-1 CONTACTS TO PROVIDE COOLING.

2 / M7 KITCHEN/OFFICE HVAC CONTROL

VERIFY SCALE

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ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK COUNTY — ERSKINE, MN

TC DIAGRAMS

PROJECT NUMBER: 22-RF-027

DESIGNED: SM	DRAWN: PH	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL176M4	DRAWING NO: 3R-MN-1176-176		SHEET 55 OF 64

M7

Professional Engineer
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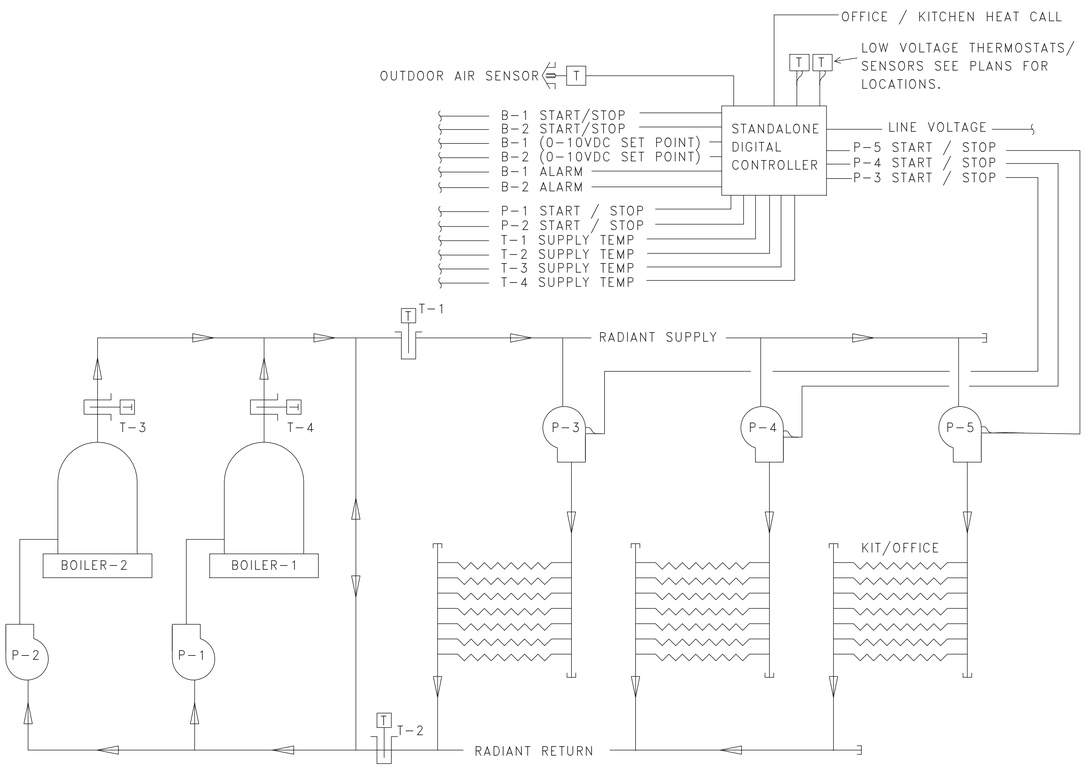
Signature: _____
Typed or Printed Name: Shawn C. Murray
Date: 1/12/2024 License Number: 58940



1 / M8 HOT WATER RADIANT FLOOR HEATING CONTROL

HOT WATER RADIANT FLOOR HEATING CONTROL:

PROVIDE A STANDALONE DIGITAL CONTROLLER(S) TO CONTROL ALL ASPECTS OF THE BOILER AND RADIANT FLOOR HEATING SYSTEM AS DESCRIBED HEREIN:

BOILER CONTROL (B-1, B-2): THE BOILERS WILL BE EQUIPPED TO ACCEPT A 0-10 VDC ANALOG SIGNAL FROM THE DIGITAL CONTROLLER FOR SET POINT CONTROL. STAGE AND ENABLE THE BOILERS AND THEIR RESPECTIVE BOILER PUMPS TO MAINTAIN THEIR RESPECTIVE SUPPLY TEMPERATURE SET POINT. PROVIDE PROGRAMMING TO ROTATE THE LEAD BOILER WITH THE LAG BOILER AFTER 168 HOURS OF RUNTIME. WIRE THE GENERAL ALARM CONTACTS ON THE BOILER INTERFACE AND ENERGIZE THE LAG BOILER TO LEAD POSITION UPON FAILURE OF THE LEAD BOILER.

1. THE BOILERS SHALL BE LOCKED OUT FROM OPERATION WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 65 DEG. F. THE LEAD BOILER AND ITS PRODUCTION PUMP SHALL BE ENERGIZED TO OPERATE WHEN THE OUTDOOR TEMPERATURE IS BELOW 60 DEG. F. AND THERE IS A CALL FOR HEAT FROM ANY OF THE (3) RADIANT ZONES.

2. RESET THE BOILER SUPPLY WATER TARGET TEMPERATURE SET POINT FROM 90 DEG. F. AT 60 DEG. F OUTDOORS TO 115 DEG. F AT 10 DEG. F. OUTDOORS WITH AN ANALOG (0-10VDC) SIGNAL TO EACH BOILER.

3. WHEN THE SYSTEM TEMPERATURE AT SENSOR (T-1) DROPS 6 DEG. F. BELOW THE SET POINT AND THE TEMPERATURE DIFFERENCE BETWEEN T-2 AND T-1 IS GREATER THAN 10 DEG. F., ENERGIZE THE LAG BOILER TO MAINTAIN THE TARGET RESET SET POINT. DE-ENERGIZE THE LAG BOILER WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 35 DEG. F. OR THE TEMPERATURE DIFFERENCE BETWEEN T-1 AND T-2 IS LESS THAN 5 DEG. F.

BOILER PUMPS (P-1 & P-2): INTERLOCK THE PUMPS TO OPERATE WHEN THEIR RESPECTIVE BOILER IS ENERGIZED TO OPERATE.

ZONE PUMPS (P-3,4,5): PUMPS SHALL BE ENERGIZED WHEN THEIR RESPECTIVE ZONE THERMOSTAT CALLS FOR HEAT AND DE-ENERGIZED WHEN THE ZONE DOES NOT CALL FOR HEAT.

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REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK COUNTY — ERSKINE, MN

TC DIAGRAMS

PROJECT NUMBER: 22-RF-027

DESIGNED: SM | DRAWN: PH | DATE: 1.12.2024 | CHECKED: TDF

CADD:RDL177M4 | DRAWING NO: 3R-MN-1176-177 | SHEET 56 OF 64

M8

Professional Engineer
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Signature: _____
Typed or Printed Name: Shawn C. Murray
Date: 1/12/2024 License Number: 58940

ELECTRICAL LEGEND

SYMBOLS APPLY ONLY WHEN USED ON DRAWINGS

LIGHTING

SYMBOL	DESCRIPTION
	LAY-IN OR RECESSED FIXTURE, SIZE ON PLANS
	WALL MOUNTED FIXTURE, SIZE ON PLANS
	SURFACE MOUNTED FIXTURE, SIZE ON PLANS
	PENDANT OR SURFACE MOUNTED FIXTURE, SIZE ON PLANS
	PENDANT MOUNTED FIXTURE, SIZE ON PLANS
	SHADED FIXTURE INDICATES FIXTURE IS UNSWITCHED AND ALSO INDICATES EMERGENCY POWER.
	RECESSED DOWNLIGHT FIXTURE
	SURFACE MOUNTED FIXTURE
	WALL MOUNTED FIXTURE
	WALL WASH OR DIRECTIONAL FIXTURE
	WALL SCONCE FIXTURE
	TRACK FIXTURE, SEE PLAN FOR SIZE AND HEADS
	CEILING FAN FIXTURE
	CEILING MOUNTED, WALL MOUNTED EXIT LIGHT (W/ DIRECTIONAL ARROWS)
	1 HEAD REMOTE EMERGENCY LIGHT
	2 HEAD EMERGENCY LIGHT BATTERY PACK
	1 HEAD REMOTE EMERGENCY LIGHT BATTERY PACK
	2 HEAD LIGHT WITH MOTION SENSOR
	SQUARE POLE MOUNTED FIXTURE, EXTERIOR
	ROUND POLE MOUNTED FIXTURE, EXTERIOR
	POST TOP FIXTURE, EXTERIOR
	BOLLARD FIXTURE, EXTERIOR
	DIRECTIONAL INGROUND FIXTURE, EXTERIOR

COMMUNICATIONS

SYMBOL	DESCRIPTION
	CATV JACK, WALL MOUNTED
CLG	CATV JACK CEILING MOUNTED
	MICROPHONE OUTLET
S	SPEAKER, SPEAKER WALL MOUNTED
C	CLOCK HANGER RECEPTACLE
	VOICE/DATA JACK
	# NUMERICAL SUBSCRIPT INDICATES NUMBER OF CABLES/JACKS, NO SUBSCRIPT ASSUMES TWO CABLES/JACKS
W	WALL MOUNT TELEPHONE READY JACK
WAP	WIRELESS ACCESS POINT NUMERICAL SUBSCRIPT INDICATES NUMBER OF CABLES/JACKS, NO SUBSCRIPT INDICATES TWO CABLES/JACKS
	EXISTING VOICE/DATA JACK
	DATA RACK
WAP	WIRELESS ACCESS POINT

ABBREVIATIONS AND MISCELLANEOUS

SYMBOL	DESCRIPTION
AC	ABOVE COUNTER, 4" BACK SPLASH
ATS	AUTOMATIC TRANSFER SWITCH
AFG	ABOVE FINISHED GRADE
AFF	ABOVE FINISHED FLOOR
BLG	BELOW GRADE
BOD	BOTTOM OF DEVICE
C	CONDUIT
CAS	CARD ACCESS SYSTEM
CCTV	CLOSED CIRCUIT TV
CLG	CEILING
COD	CENTER OF DEVICE
CU	COPPER
DVR	DIGITAL VIDEO RECORDER
(E)	EXISTING
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
GC	GENERAL CONTRACTOR
GND	GROUND
LSI	FIELD ADJUSTABLE LONG TIME, SHORT TIME AND INSTANTANEOUS
LSIG	FIELD ADJUSTABLE LONG TIME, SHORT TIME, INSTANTANEOUS AND GROUND FAULT
MC	MECHANICAL CONTRACTOR
(N)	NEW
NL	NIGHT LIGHT
PTZ	PAN-TILT-ZOOM
QTY	QUANTITY
(R)	RELOCATED
SF	SURFACE
TBB	TELECOMMUNICATIONS BONDING BACKBONE
TC	TEMPERATURE CONTROL CONTRACTOR
TMGB	TELECOMMUNICATIONS MAIN GROUNDING BUS BAR
TTB	TELEPHONE TERMINAL BOARD
TYP	TYPICAL
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
W/	WITH
WM	WIRE MOLD
WP	WEATHER PROOF (WHILE IN USE)
XFMR	TRANSFORMER
a,b,c etc	SWITCH DESIGNATION
BN1L-2,4,6	CIRCUIT DESIGNATION, PANEL BN1L, CIRCUITS 2,4,6
1/E501	INDICATES DETAIL 1 ON SHEET E501
(#)	SHEET WORK NOTE
(#)	SHEET DEMO WORK NOTE
	HOME RUN TO PANEL
	CONDUIT CONCEALED IN CEILING OR WALL
	CONDUIT CONCEALED UNDER FLOOR
LV	LOW VOLTAGE CIRCUIT
	FIBER OPTIC CABLE
	CABLE TRAY

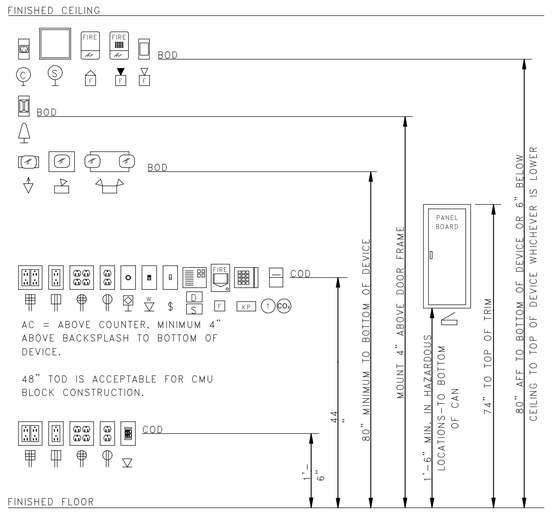
SECURITY SYSTEM

SYMBOL	DESCRIPTION
CR	CARD READER
A	SPEAKER SIGNAL DEVICE
DC	DOOR CONTROLLER
DS	DOOR SWITCH CONTACT
KP	KEYPAD
PT	POWER TRANSFER SWITCH
MRX	MOTION SENSOR REQUEST TO EXIT
REX	MANUAL REQUEST TO EXIT
PS	POWER SUPPLY W/BATTERY, BY DIV 8, INSTALLED AND CONNECTED BY DIV 27
LX	CONNECTION TO REQUEST TO EXIT & LATCH BOLT MONITORING
PRX	CONNECTION TO PANIC REQUEST TO EXIT
ML	CONNECTION TO MAGNETIC DOOR LOCK
DPS	CONNECTION TO MAGNETIC DOOR POSITION SWITCH
ES	CONNECTION TO ELECTRIC DOOR STRIKE
EL	CONNECTION TO ELECTRIC LATCH
AO	CONNECTION TO ELECTRIC AUTO OPENER
FA	CONNECTION TO FIRE ALARM CONTACT
1	INDICATES SECURITY DOOR 1
	PANEL SCP SECURITY CONTROL PANEL SDC SECURITY DOOR CONTROLLERS

DEVICES AND POWER

SYMBOL	DESCRIPTION
$	SWITCH - SPST 2 SINGLE POLE, DOUBLE THROW 3 THREEWAY 4 FOURWAY K KEY OPERATED P PILOT LIGHT WP WEATHERPROOF OS OCCUPANCY SENSOR D DIMMER MC SPOT-MOMENTARY CONTACT LV LOW VOLTAGE T TIMER SWITCH TS TEST SWITCH
OS	OCCUPANCY SENSOR (CEILING) - SUBSCRIPT IS TYPE
	RECEPTACLE - SIMPLEX
CLG	RECEPTACLE - DUPLEX, MOUNTING IN CEILING
CLG	GFI RECEPTACLE - DUPLEX, MOUNTING IN CEILING
	RECEPTACLE - DUPLEX GFI RECEPTACLE - DUPLEX (GROUND FAULT INTERRUPT) USB DEVICE RECEPT W/2 USB PORTS DC DROP CORD WP WEATHERPROOF COVER & WEATHER RESISTANT RECEPTACLE TR TAMPER RESISTANT S SURGE PROTECTED IG ISOLATED GROUND FILLED CENTER INDICATES HOSPITAL GRADE
	RECEPTACLE - DOUBLE DUPLEX GFI RECEPTACLE - DOUBLE DUPLEX - SAME INDICATORS AS SHOWN FOR DUPLEX RECEPTACLE
	RECEPTACLE - 1/2 SWITCHED, 1/2 CONTINUOUS POWER RECEPTACLE - DOUBLE DUPLEX - 1/2 SWITCHED, 1/2 CONTINUOUS POWER
	RECEPTACLE - 208V R RANGE - NEMA 14-50R D DRYER - NEMA 14-30R W WELDER - NEMA 14-50R * NEMA CONFIGURATION AS NOTED
	208V RECEPTACLE IN RECESSED FLOORBOX
	DUPLEX RECEPTACLE/GFI IN RECESSED FLOORBOX
	DOUBLE DUPLEX RECEPTACLE/GFI IN RECESSED FLOORBOX
J	J-BOX - BOX INDICATES FLOOR MOUNTING -4"X4"X2-1/8" DEEP UNLESS OTHERWISE NOTED
PP	POWER POLE
T	THERMOSTAT/TEMPERATURE SENSOR BY MC OR TC, J-BOX AND CONDUIT TO CEILING BY EC
CO	CARBON MONOXIDE DETECTOR BY MC, J-BOX & CONDUIT TO CEILING BY EC
$M	MANUAL MOTOR DISCONNECT/STARTER SWITCH
	EMERGENCY PUSHBUTTON
R	RELAY
PC PCH	PHOTOCELL, PHOTOCELL WALL MOUNTED
	SPECIAL PURPOSE CONNECTION - BOX INDICATES FLOOR MOUNTING - WORK AS NOTED
	ELECTRIC MOTOR CONNECTION
	COMBINATION STARTER/DISCONNECT SWITCH
	DISCONNECT SWITCH
	CONTACTOR
	CIRCUIT BREAKER
VFD	VARIABLE FREQUENCY DRIVE
	CONTROL PANEL LRP LIGHTING RELAY PANEL TCP TEMPERATURE CONTROL PANEL GAP GENERATOR ANNUNCIATOR PANEL PACPPA CONTROL PANEL MGA MED GAS ALARM PANEL
TC	TIME CLOCK
	EXISTING PANELBOARD, SURFACE MOUNTED
	EXISTING PANELBOARD, FLUSH MOUNTED
	PANELBOARD, SURFACE MOUNTED
	PANELBOARD, FLUSH MOUNTED
	ELECTRIC METER, BUILDING MOUNTED
	TRANSFORMER, INTERIOR
	TRANSFORMER, EXTERIOR

INTERIOR BOX MOUNTING HEIGHTS



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Professional Engineer

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Signature: _____

Typed or Printed Name: Tyler Victorino

Date: 12/15/2023 License Number: 56794

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK COUNTY — ERSKINE, MN

ELECTRICAL LEGENDS

PROJECT NUMBER: 22-RF-027

DESIGNED: LDF	DRAWN: LDF	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL178E4	DRAWING NO: 3R-MN-1176-178		SHEET 57 OF 64

E1

LIGHTING FIXTURE SCHEDULE

NOTES:
1) POLE: SSS 25' 4G DM19AS DDBXD

ABBREVIATIONS:
AFF – ABOVE FINISHED FLOOR
BOF – BOTTOM OF FIXTURE
COF – CENTER OF FIXTURE OF JUNCTION BOX.
TOF – TOP OF FIXTURE
AFG – ABOVE FINISH GRADE

TYPE	Count	FIXTURE		CATALOG NUMBER	FIXTURE					LIGHT SOURCE		NOTES
		DESCRIPTION	MANUFACTURER		MOUNTING LOCATION	MOUNTING TYPE	MOUNTING HEIGHT	VOLTAGE	VA	LAMP TYPE	LUMENS	
A1	6	2'X2' LED VOLUMETRIC TROFFER	LITHONIA	2BLT2 33L ADP EZ1 LP840	CEILING	LAY-IN	–	120 V	27.00	LED	3385 lm	
D1	4	6" LED DOWNLIGHT	LITHONIA	LDN4 40/10 L04AR LSS MVOLT EZ1	CEILING	RECESSED	–	120 V	11.00	LED	1045 lm	
F1	4	8' LED STRIP LIGHT	LITHONIA	CLX L96 6000LM SEF FDL MVOLT EZ1 40K 80CRI WH ZACVH M100	CEILING	SUSPENDED	8'-0" AFF	120 V	38.00	LED	5535 lm	
F1E	1	8' LED STRIP LIGHT WITH EM BATTERY	LITHONIA	CLX L96 6000LM SEF FDL MVOLT EZ1 40K 80CRI WH E10WLCP ZACVH M100	CEILING	SUSPENDED	8'-0" AFF	120 V	38.00	LED	5535 lm	
F2	10	8' LED STRIP LIGHT	LITHONIA	CLX L96 14000LM SEF FDL MVOLT EZ1 40K 80CRI WH ZACVH M100	CEILING	SUSPENDED	15'-0" AFF	120 V	95.00	LED	13342 lm	
F2E	2	8' LED STRIP LIGHT WITH EM BATTERY	LITHONIA	CLX L96 14000LM SEF FDL MVOLT EZ1 40K 80CRI PS1050 SPD WH ZACVH M100	CEILING	SUSPENDED	15'-0" AFF	120 V	95.00	LED	13342 lm	
S1	3	LED POLE MOUNTED AREA LIGHT	LITHONIA	DSX1 LED P5 40K T3M MVOLT SPA DDBXD	SITE	POLE	25'-0" AFG	120 V	138.00	LED	15377 lm	1
W1	2	EXTERIOR LED WALL PACK	LITHONIA	WDGE2 LED P4 40K 80CRI VW MVOL DDBXD	WALL	SURFACE	15'-0" COF	120 V	35.00	LED	4526 lm	
W1E	3	EXTERIOR LED WALL PACK WITH EM BATTERY	LITHONIA	WDGE2 LED P4 40K 80CRI VW MVOLT E10WH DDBXD	WALL	SURFACE	15'-0" COF	120 V	35.00	LED	4526 lm	
X1	3	LED EMERGENCY EGRESS FIXTURE W/EXIT SIGN	LITHONIA	LHQM LED G SD	WALL	SURFACE	8'-0" COF	120 V	4.00	LED	0 lm	

PANEL: MDP

LOCATION:
MOUNTING TYPE: SURFACE
MANUFACTURER: SEE SPECIFICATIONS
MODEL TYPE: DISTRIBUTION PANELBOARD
AMPS: 1200 A
VOLTAGE: 120/208 Wye
PHASES: 3
WIRES: 4
MAIN TYPE: MCB
MINIMUM AIC RATING: SEE ONE-LINE DIAGRAM
FED FROM: UTILITY
ENCLOSURE: NEMA 3
NOTES:

CIRCUIT DESCRIPTION	Wire Size	CKT NO	POLE	BKR AMP	A	B	C
M	3-#500, 1-#500, 1-#3	1	3	400	14893	17454	21780
MAU-1	3-#500, 1-#500, 1-#3	2	3	400	33333	33333	33333
MTS	3-#500, 1-#500, 1-#3	3	3	400	20460	19100	19100
BOILER B-2	3-#3/0, 1-#3/0, 1-#6	4	3	200	15000	15000	15000
SPACE	--	5	3	--	--	--	--
SPACE	--	6	3	--	--	--	--
SPACE	--	7	3	--	--	--	--
SPACE	--	8	3	--	--	--	--
SPACE	--	9	3	--	--	--	--
SOLAR PROVISION	--	10	3	150	0	0	0
				TOTAL PHASE VA:	83686.7	84887.7	89213.7
				TOTAL PHASE AMPS:	697.4	708.9	745

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
ELECTRIC HEAT	92380	100.00%	92380		
EQUIPMENT	26112	100.00%	26112	TOTAL CONNECTED LOAD:	257788
LIGHTING	2137	125.00%	2671	TOTAL CONNECTED AMPS:	716 A
MOTORS	10039	100.00%	10039		
Motor	100000	125.00%	125000	TOTAL EST. DEMAND:	283262
RECEPTACLES	10120	99.41%	10060	TOTAL EST. DEMAND AMPS:	786 A
WELDERS	17000	100.00%	17000		

NOTES:

PANEL: M

LOCATION: MEZZANINE 201
MOUNTING TYPE: SURFACE
MANUFACTURER: SEE SPECIFICATIONS
MODEL TYPE: PANELBOARD
AMPS: 400 A
VOLTAGE: 120/208 Wye
PHASES: 3
WIRES: 4
TYPE OF MAIN: MLO
MINIUM AIC RATING: SEE ONE-LINE DIAGRAM
FED FROM: MDP
ENCLOSURE: NEMA 1
NOTES:

LOAD NAME	EQPM NO	CKT NO	CKT BKR	POLE	WIRE SIZE	A	B	C	WIRE SIZE	POLE	CKT BKR	CKT NO	EQPM NO	LOAD NAME
EXTERIOR LTG		1	20 A	1	1-#12, 1-#12, 1-#12	175 200			1-#12, 1-#12, 1-#12	1	20 A	2		OH DOOR
CORD REEL		3	20 A	1	1-#12, 1-#12, 1-#12	180 294			1-#12, 1-#12, 1-#12	1	20 A	4		MEP, OFFICE, RR LTG
CORD REEL		5	20 A	1	1-#12, 1-#12, 1-#12	180 309			1-#12, 1-#12, 1-#14	1	15 A	6		P-1 MEP 103
P-2 MEP 103		7	15 A	1	1-#12, 1-#12, 1-#14	309 500			1-#12, 1-#12, 1-#12	1	20 A	8		TEMP CONTROL PANEL
EXTERIOR RECEPTS		9	20 A	1	1-#12, 1-#12, 1-#12	360 667			1-#12, 1-#12, 1-#12	1	20 A	10		EF-1
HVLS FAN CONTROL PANEL		11	20 A	1	1-#12, 1-#12, 1-#12	500 700			1-#12, 1-#12, 1-#12	1	20 A	12		EHC-1 MEZZ 201
MEZZANINE RECEPTS		13	20 A	1	1-#12, 1-#12, 1-#12	720 864			1-#12, 1-#12, 1-#12	1	20 A	14		GF-1 MEP 103
ELECTRIC HEAT VEHICLE...		15	20 A	1	1-#12, 1-#12, 1-#12	840 720			1-#12, 1-#12, 1-#12	1	20 A	16		RECEPTS OFFICE 101
SPARE	--	17	20 A	1	--	0 960			1-#12, 1-#12, 1-#14	1	15 A	18		ERV-1 MEP 103
EUH-1 MEP 103		19	20 A	1	1-#12, 1-#12, 1-#12	1000 1200			1-#12, 1-#12, 1-#12	1	20 A	20		FRIDGE OFFICE 101 (GFCI)
WASHER RR 102 (GFCI)		21	20 A	1	1-#12, 1-#12, 1-#12	1000 180			1-#12, 1-#12, 1-#12	1	20 A	22		CORD REEL
EF-2		23	20 A	1	1-#12, 1-#12, 1-#12	1008 1254			1-#10, 1-#10, 1-#10	1	20 A	24		SHOP, MEZZANINE LITG
CORD REEL		25	20 A	1	1-#12, 1-#12, 1-#12	180 200			1-#12, 1-#12, 1-#12	1	20 A	26		OH DOOR
HVLS-1		27	20 A	2	2-#12, 1-#12, 1-#12	794 829			2-#12, 1-#12, 1-#12	2	20 A	28		MOTORS
--	--	29	--	--	--	-- 794	829		--	--	--	30	--	--
SERVICE 100 RECEPTS		31	20 A	1	1-#12, 1-#12, 1-#12	360 360			1-#12, 1-#12, 1-#12	1	20 A	32		EXTERIOR RECEPTS
SHP-1		33	20 A	2	2-#12, 1-#12, 1-#12	832 2400			2-#10, 1-#10, 1-#10	2	30 A	34		DRYER RR 102 (GFI)
--	--	35	--	--	--	-- 832	2400		--	--	--	36	--	--
P-3 MEP 103		37	15 A	1	1-#12, 1-#12, 1-#14	506 540			1-#12, 1-#12, 1-#12	1	20 A	38		AC RECEPTS OFFICE 101
EXTERIOR POLE LTG		39	20 A	1	1-#10, 1-#10, 1-#10	414 4250			2-#4, 1-#4, 1-#10	2	60 A	40		WELDER SERVICE 100
AIR COMPRESSOR		41	20 A	3	3-#12, 1-#12	1729 4250			--	--	--	42	--	--
--	--	43	--	--	--	1729 360			1-#12, 1-#12, 1-#12	1	20 A	44		SERVICE 100 RECEPTS
--	--	45	--	--	--	1729 200			1-#12, 1-#12, 1-#12	1	20 A	46		OH DOOR
OH DOOR		47	20 A	1	1-#12, 1-#12, 1-#12	200 506			1-#12, 1-#12, 1-#14	1	15 A	48		P-4 MEP 103
EXTERIOR RECEPT		49	20 A	1	1-#12, 1-#12, 1-#12	180 360			1-#12, 1-#12, 1-#12	1	20 A	50		EXTERIOR RECEPTS
EXTERIOR RECEPTS		51	20 A	1	1-#12, 1-#12, 1-#12	360 540			1-#12, 1-#12, 1-#12	1	20 A	52		SERVICE 100 RECEPTS
SERVICE 100 RECEPTS		53	20 A	1	1-#12, 1-#12, 1-#12	360 4250			2-#6, 1-#6, 1-#10	2	60 A	54		WELDER SERVICE 100
MEP 103, RR 102 RECEPTS		55	20 A	1	1-#12, 1-#12, 1-#12	540 4250			--	--	--	56	--	--
P-5 MEP 103		57	15 A	1	1-#12, 1-#12, 1-#14	506 360			1-#12, 1-#12, 1-#12	1	20 A	58		RECEPTACLE ICE MAKER
RECEPTACLES WORKBENCH		59	20 A	1	1-#12, 1-#12, 1-#12	360 360			1-#12, 1-#12, 1-#12	1	20 A	60		RECEPTACLE IT CABINET
RECEPTACLES WORKBENCH		61	20 A	1	1-#12, 1-#12, 1-#12	360 0			--	1	20 A	62	--	SPARE
SPARE	--	63	20 A	1	--	0 0			--	1	20 A	64	--	SPARE
SPARE	--	65	20 A	1	--	0 0			--	1	20 A	66	--	SPARE
SPARE	--	67	20 A	1	--	0 0			--	1	20 A	68	--	SPARE
SPARE	--	69	20 A	1	--	0 0			--	1	20 A	70	--	SPARE
SPARE	--	71	20 A	1	--	0 0			--	1	20 A	72	--	SPARE
						14893.3	17454.3	21780.3	TOTAL CONNECTED PHASE VA					
						124.1	148.7	184.8	TOTAL CONNECTED PHASE AMPS					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
ELECTRIC HEAT	1540	100.00%	1540	TOTAL CONNECTED LOAD:	54128
EQUIPMENT	13812	100.00%	13812	TOTAL CONNECTED AMPS:	150.2
LIGHTING	2137	125.00%	2671		
MOTORS	7862	100.00%	7862	TOTAL EST. DEMAND:	55016.5
Motor	1657	125.00%	2071	TOTAL EST. DEMAND AMPS:	152.7
RECEPTACLES	10120	99.41%	10060		
WELDERS	17000	100.00%	17000		

NOTES: (GFCI) DENOTES GFCI TYPE CIRCUIT BREAKER TO BE INSTALLED IN PANEL. MATCH PANEL MANUFACTURER AND AIC RATINGS.

CONTROL EQUIPMENT SCHEDULE

NOTES:
1)
2)
3)

Type Mark	ITEMS BY OTHERS DESCRIPTION	VOLTAGE	PHASE	FLA	KVA	HP	MOCP	Panel	Circuit Number	NOTES
AC-1	AIR COMPRESSOR	208 V	3	14 A	5.19	5	20	M	41,43,45	
B-1	BOILER	208 V	3	125 A	45.00	–	300	EM	1,3,5	
B-2	BOILER	208 V	3	125 A	45.00	–	300	MDP	4	
DWH-1	DOMESTIC WATER HEATER	208 V	3	34 A	12.30	–	60	EM	7,9,11	
EF-1	EXHAUST FAN	120 V	1	6 A	0.67	1/4	20	M	10	
EF-2	EXHAUST FAN	120 V	1	8 A	1.01	1	20	M	23	
EHC-1	ELECTRIC HEATING COIL	120 V	1	6 A	0.70	–	20	M	12	
ERV-1	ENERGY RECOVERY VENTILATOR	120 V	1	8 A	0.96	1/3	20	M	18	
EUH-1	UNIT HEATER	120 V	1	8 A	1.00	1/3	20	M	19	
GF-1	GLYCOL FEED	120 V	1	7 A	0.86	1/3	20	M	14	
GUH-1	GAS-FIRED UNIT HEATER	120 V	1	7 A	0.84	1/4	20	EM	2	
GUH-2	GAS-FIRED UNIT HEATER	120 V	1	7 A	0.84	1/4	20	M	15	
HVLS-1	HIGH VOLUME LOW SPEED FAN	208 V	1	8 A	1.59	3/4	20	M	27,29	
MAU-1	MAKE-UP AIR UNIT	208 V	3	278 A	100.00	3	400	MDP	2	
P-1	PUMPS	120 V	1	3 A	0.31	1/12	20	M	6	
P-2	PUMPS	120 V	1	3 A	0.31	1/12	20	M	7	
P-3	PUMPS	120 V	1	4 A	0.51	1/6	20	M	37	
P-4	PUMPS	120 V	1	4 A	0.51	1/6	20	M	48	
P-5	PUMPS	120 V	1	4 A	0.51	1/6	20	M	57	
SHP-1	SPLIT SYSTEM	208 V	1	8 A	1.66	–	20	M	33,35	

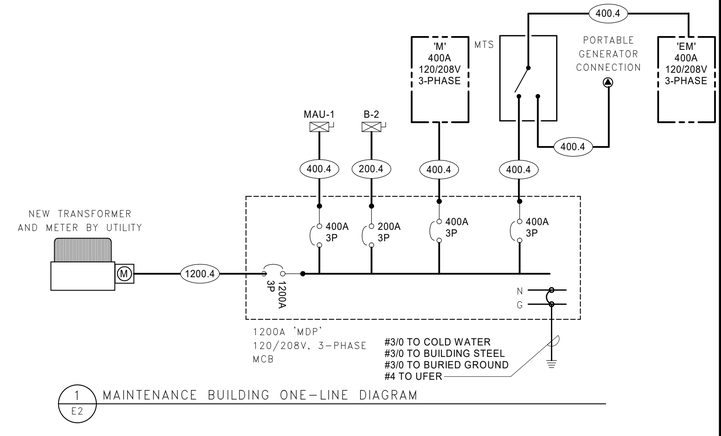
PANEL: EM

LOCATION: MEZZANINE 201
MOUNTING TYPE: SURFACE
MANUFACTURER: SEE SPECIFICATIONS
MODEL TYPE: PANELBOARD
AMPS: 400 A
VOLTAGE: 120/208 Wye
PHASES: 3
WIRES: 4
TYPE OF MAIN: MCB
MINIUM AIC RATING: SEE ONE-LINE DIAGRAM
FED FROM: MTS
ENCLOSURE: NEMA 1
NOTES:

LOAD NAME	EQPM NO	CKT NO	CKT BKR	POLE	WIRE SIZE	A	B	WIRE SIZE	POLE	CKT BKR	CKT NO	EQPM NO	LOAD NAME
BOILER B-1		1	200 A	3	3-#3/0, 1-#3/0, 1-#6	15000 840		1-#12, 1-#12, 1-#12	1	20 A	2		GUH-1, GUH-2
--	--	3	--	--	--	--	15000 --	--	1	0 A	4	--	SPACE
--	--	5	--	--	--	15000 --	--	--	1	0 A	6	--	SPACE
DWH-1		7	60 A	3	3-#4, 1-#4, 1-#10	--	4100 --	--	1	0 A	8	--	SPACE
--	--	9	--	--	--	4100 --	--	--	1	0 A	10	--	SPACE
--	--	11	--	--	--	--	4100 --	--	1	0 A	12	--	SPACE
SEPTIC TANK PUMP		13	20 A	1	1-#12, 1-#12, 1-#12	520 --		--	1	0 A	14	--	SPACE
SPARE	--	15	20 A	1	--	--	0 --	--	1	0 A	16	--	SPACE
SPARE	--	17	20 A	1	--	0 --		--	1	0 A	18	--	SPACE
SPARE	--	19	20 A	1	--	--	0 --	--	1	0 A	20	--	SPACE
SPARE	--	21	20 A	1	--	0 --		--	1	0 A	22	--	SPACE
SPACE	--	23	0 A	1	--	--	-- --	--	1	0 A	24	--	SPACE
SPACE	--	25	0 A	1	--	-- --		--	1	0 A	26	--	SPACE
SPACE	--	27	0 A	1	--	--	-- --	--	1	0 A	28	--	SPACE
SPACE	--	29	0 A	1	--	-- --		--	1	0 A	30	--	SPACE
						20460	19100	TOTAL CONNECTED PHASE VA					
						170.5	159.2	TOTAL CONNECTED PHASE AMPS					

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
ELECTRIC HEAT	45840	100.00%	45840	TOTAL CONNECTED LOAD:	58660
EQUIPMENT	12300	100.00%	12300	TOTAL CONNECTED AMPS:	162.8
MOTORS	520	100.00%	520		
				TOTAL EST. DEMAND:	58660
				TOTAL EST. DEMAND AMPS:	162.8

NOTES:



1 / E2 MAINTENANCE BUILDING ONE-LINE DIAGRAM

FEEDER SCHEDULE

FEEDER ID	FROM	TO	Wire Size	Conduit Size	Avail. AIC
400.4	MDP	MAU-1	3-#500, 1-#500, 1-#3	4"	12,854 A
400.4	MDP	MTS	3-#500, 1-#500, 1-#3	4"	15,490 A
400.4	MDP	M	3-#500, 1-#500, 1-#3	4"	15,765 A
200.4	MDP	BOILER B-2	3-#3/0, 1-#3/0, 1-#6	2"	12,854 A
400.4	MTS	EM	3-#500, 1-#500, 1-#3	4"	13,307 A
400.4	MTS	GENERATOR CONNECTION	3-#2000, 1-#2000, 1-#3	4"	
1200.4	UTILITY	MDP	4 runs of 3-#350, 1-#350, 1-#3/0	3"	18,530 A

VERIFY SCALE

THIS BAR IS ONE INCH ON ORIGINAL DRAWING

0" —— 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

Professional Engineer
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature:
Typed or Printed Name: Tyler Victorino
Date: 12/15/2023 License Number: 56794

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

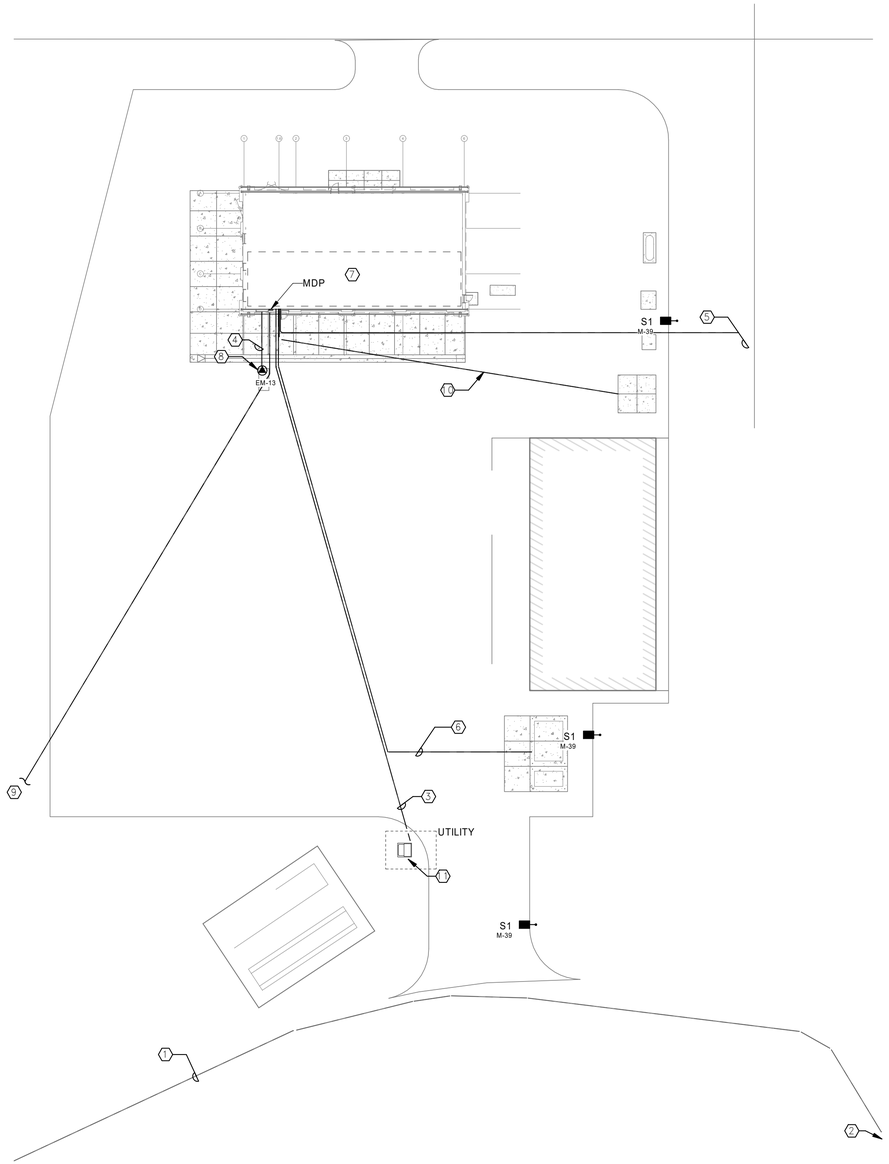
POLK COUNTY — ERSKINE, MN

ONE-LINE DIAGRAM & SCHEDULES

PROJECT NUMBER: 22-RF-027

DESIGNED: LDF	DRAWN: LDF	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL179E4	DRAWING NO: 3R-MN-1176-179		SHEET 58 OF 64

E2



1 E3 ELECTRICAL SITE PLAN

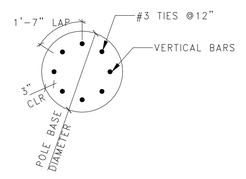
GENERAL NOTES

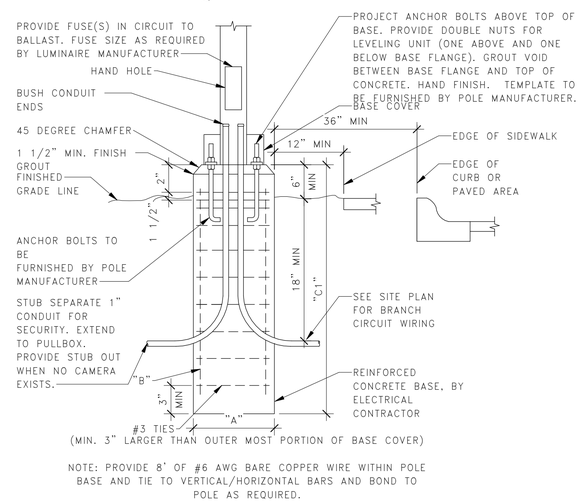
A. CONTRACTOR SHALL COORDINATE WITH AN UNDERGROUND LOCATING SERVICE PRIOR TO COMMENCING WORK. COORDINATE WITH OTHER SITE DISCIPLINES.
B. ROUTE CONDUITS IN COMMON TRENCH WHERE POSSIBLE.
C. SEE ARCHITECTURAL AND CIVIL DRAWINGS FOR ADDITIONAL INFORMATION.
D. SITE LIGHTING AND UTILITY EQUIPMENT LOCATIONS SHOWN ARE APPROXIMATE. COORDINATE EXACT LOCATIONS WITH CIVIL DRAWINGS, PROPERTY LINES AND UTILITY COMPANIES PRIOR TO ROUGH-IN.
E. PROVIDE PULL-LINES IN ALL EMPTY CONDUITS.

(#) SHEET NOTES

1. EXISTING BURIED FEEDER SERVING OTHER BUILDINGS ON SITE.
2. EXISTING UTILITY TRANSFORMER/METER LOCATION, SHOWN FOR REFERNCE.
3. NEW BURIED FEEDER TO SERVE NEW MAINTENANCE BUILDING.
4. PROVIDE CONNECTION TO DOSING CHAMBER CONTROL PANEL, SEE CIVIL PLANS FOR ADDITIONAL INFORMATION.
5. EXISTING FIBER OPTIC LINE ON SITE, EXTEND TO NEW BUILDING, COORDINATE WITH PROVIDER.
6. PROVIDE FEEDER FROM PANEL 'M' IN MEP ROOM TO FUEL STORAGE LOCATION.
7. SPACE ON SOUTH FACE OF ROOF FOR ADD/ALT PV SYSTEM. AREA CAN SUPPORT 39kW SYSTEM.
8. PROVIDE CONNECTION TO SEPTIC TANK PUMP. COORDINATE FINAL LOCATION AND CONNECTION REQUIREMENTS WITH HARDWARE PROVIDER PRIOR TO ROUGH-IN.
9. PROVIDE POWER FROM NEW MAINTENANCE BUILDING TO NEW PUMP AT WELL LOCATION. COORDINATE WITH CIVIL PLANS FOR EXACT LOCATION OF WELL. PUMP SIZE TO BE FIELD COORDINATED, EC TO PROVIDE APPROPRIATE CONNECTION BASED ON HARDWARE BEING PROVIDED BY OTHERS.
10. PROVIDE CONNECTION FROM THE SERVICE SHOP BUILDING TO FUTURE THE HAZMAT BUILDING. COORDINATE WITH OWNER AND ELECTRICAL CONTRACTOR FOR FINAL INSTALLATION.
11. COORDINATE EXACT TRANSFORMER PAD AND UNDERGROUND VAULT REQUIREMENTS WITH WILD RICE ELECTRIC.

POLE HEIGHT	POLE BASE DIAMETER "A"	VERTICAL BARS "B"	DEPTH BELOW GRADE RESTRAINED "C"	DEPTH BELOW GRADE UNRESTRAINED "C1"
20' OR LESS	"20"	5-#5	4'-6"	6'-0"
30' OR LESS	"24"	6-#6	5'-6"	7'-0"
40' OR LESS	"30"	8-#6	6'-6"	9'-0"





NOTE: PROVIDE 8' OF #6 AWG BARE COPPER WIRE WITHIN POLE BASE AND TIE TO VERTICAL/HORIZONTAL BARS AND BOND TO POLE AS REQUIRED.

UNRESTRAINED AT BASE

NO RIGID SURFACE AT GROUNDLINE

VERIFY SCALE

THIS BAR IS ONE INCH ON ORIGINAL DRAWING

0" —— 1"

ADJUST SCALES ACCORDINGLY, IF NOT ONE INCH ON THIS SHEET

Professional Engineer

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature: _____

Typed or Printed Name: Tyler Victorino

Date: 12/15/2023 License Number: 56794

REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

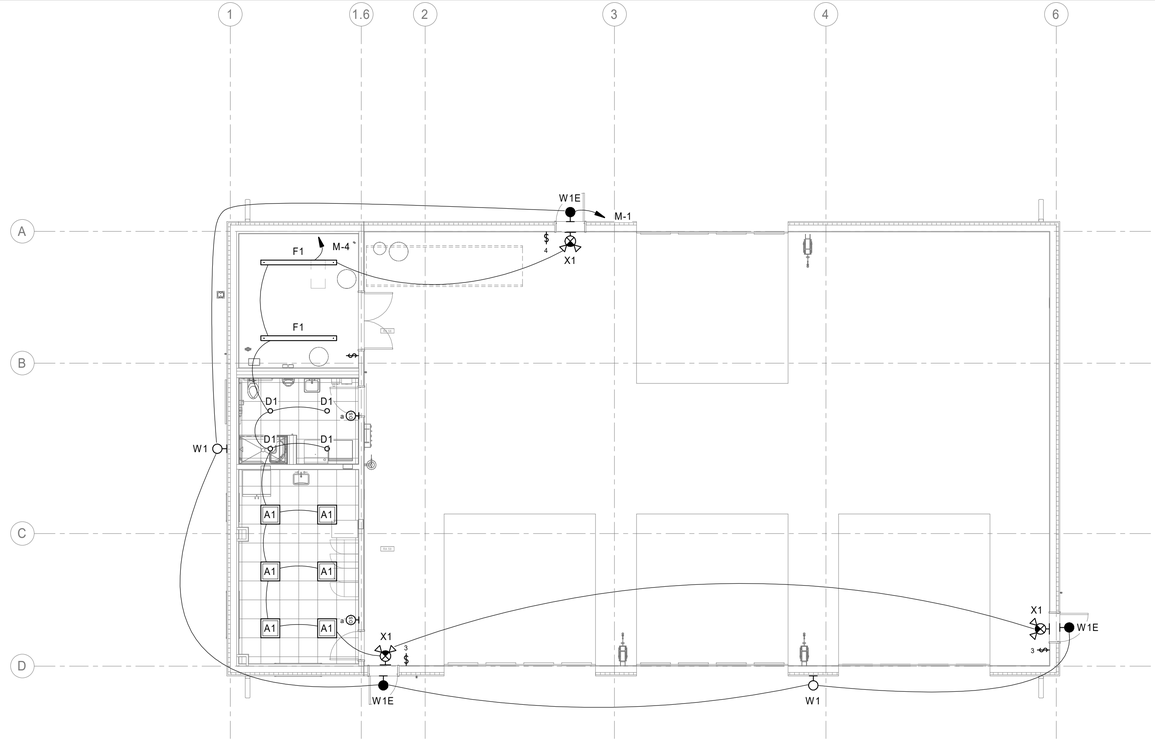
POLK COUNTY — ERSKINE, MN

SITE PLAN

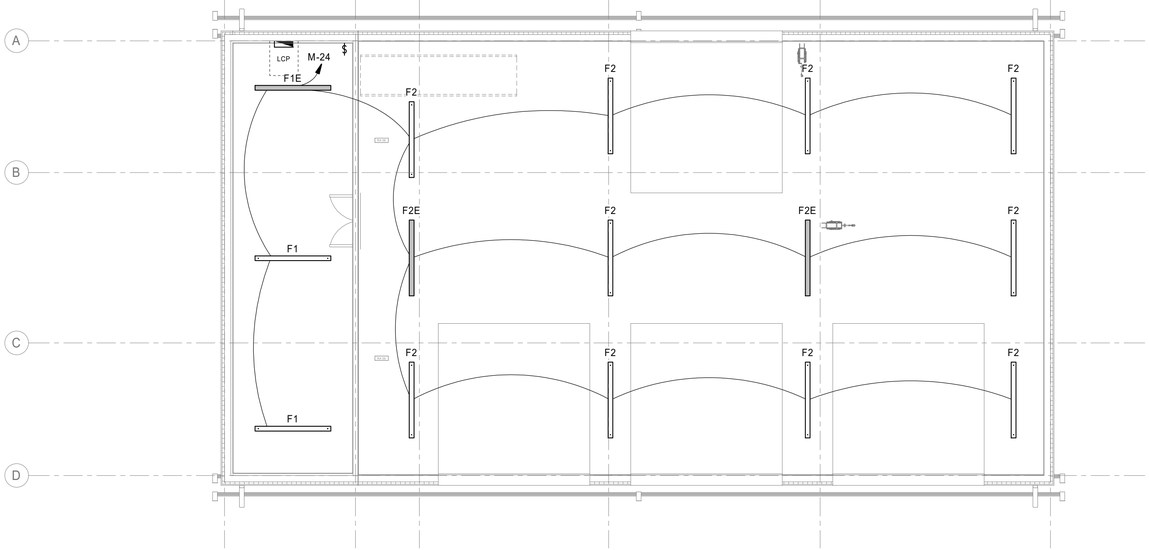
PROJECT NUMBER: 22-RF-027

E3

DESIGNED: LDF	DRAWN: LDF	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL180E0	DRAWING NO: 3R-MN-1176-180		SHEET 59 OF 64



1 E4 MAINTENANCE BUILDING LIGHTING PLAN



2 E4 MAINTENANCE BUILDING MEZZANINE LIGHTING PLAN

GENERAL NOTES

A. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE: ELECTRICAL CONTRACTOR SHALL COORDINATE ALL ELECTRICAL EQUIPMENT AND DEVICE LOCATIONS WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DIVISIONS PRIOR TO ROUGH-IN. REFER TO AND COORDINATE WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL WORK THAT IS REQUIRED BY THE ELECTRICAL CONTRACTOR.
B. ALL CONDUIT AND JUNCTION BOXES IN FINISHED AREAS ARE TO BE CONCEALED IN WALLS, FUR OUTS, AND CEILINGS. ANY USE OF SURFACE MOUNTED RACEWAY IN FINISHED AREAS MUST BE APPROVED BY THE ARCHITECT. WHERE APPROVED, UTILIZE WIREMOLD OR APPROVED EQUAL SURFACE MOUNTED RACEWAYS PAINTED TO MATCH SURROUNDING WALLS.
C. CONNECT ALL EMERGENCY BATTERY PACKS TO UNSWITCHED LEG OF RESEPCTIVE AREA LIGHTING CIRCUIT. WHERE LIGHTING CIRCUITS ARE INDICATED FOR AUTOMATIC CONTROL BY RELAY PANEL, ROUTE SEPARATE CONDUCTOR DIRECTLY TO CIRCUIT BREAKER TO PROVIDE UNSWITCHED CIRCUIT.
D. LIGHTING CONTROLS ARE SHOWN ON LEVEL BELOW.

LIGHTING CONTROL EQUIPMENT SCHEDULE

GENERAL NOTES:
A. LOW VOLTAGE WIRING NOT DEPICTED ON PLAN DIAGRAMS. REFER TO MANUFACTURERS CONNECTION DIAGRAMS FOR LOW VOLTAGE REQUIREMENTS.
B. ALL LOW-VOLTAGE CABLING AND CONTROLLERS SHALL BE PLENUM RATED.
C. CONTRACTORS WORK TO INCLUDE ALL LABOR, MATERIALS, AND EQUIPMENT REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM.
D. FIELD VERIFY EXACT LOCATION OF EACH SENSOR. LOCATE PER MANUFACTURER'S RECOMMENDATIONS. ULTRASONIC SENSORS SHALL BE INSTALLED A MINIMUM OF 5FT FROM ANY HVAC SUPPLY OR RETURN AIR DIFFUSER.
E. ALL CONTROLS SHALL BE FULLY ADJUSTED. PROGRAMING TRAINING SHOULD BE PROVIDED BY FACTORY TRAINED PERSONNEL. ELECTRICAL CONTRACTOR TO PROVIDE TRAINING TO OWNER/MAINTENANCE STAFF FOR PROGRAMMING OF ALL LIGHTING CONTROLS IN PROJECT.
F. ELECTRICAL CONTRACTOR TO PROVIDE FOLLOW UP AT 6 MONTHS AND 1 YEAR TO ADJUST LIGHTING AND LIGHTING CONTROLS AND PROVIDE ADDITIONAL TRAINING TO OWNER/MAINTENANCE STAFF IF REQUESTED.

STANDARD SEQUENCE OF OPERATIONS:
1) COORDINATE ON/OFF TIMES WITH GOVERNMENT.
2) AUTO-ON/OFF. TIME DELAY SET AT 10 MINUTES.
3) AUTO-ON/OFF. TIME DELAY SET AT 20 MINUTES.

DEVICE TYPE	SUBSCRIPT	MANUFACTURER	CATALOG NUMBER	VOLTAGE	LOCATION	NOTES
LCP	–	ACUITY CONTROLS	ARP ITENCO8 FSPR MVOLT SC SM DTC ARPA PC		WALL	
OS	a	ACUITY CONTROLS	WSXA PDT D WH	120 V	WALL	NOTE 2

Professional Engineer
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Signature: _____
Typed or Printed Name: Tyler Victorino
Date: 12/15/2023 License Number: 56794

VERIFY SCALE
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REV.	DATE	DESCRIPTION	BY

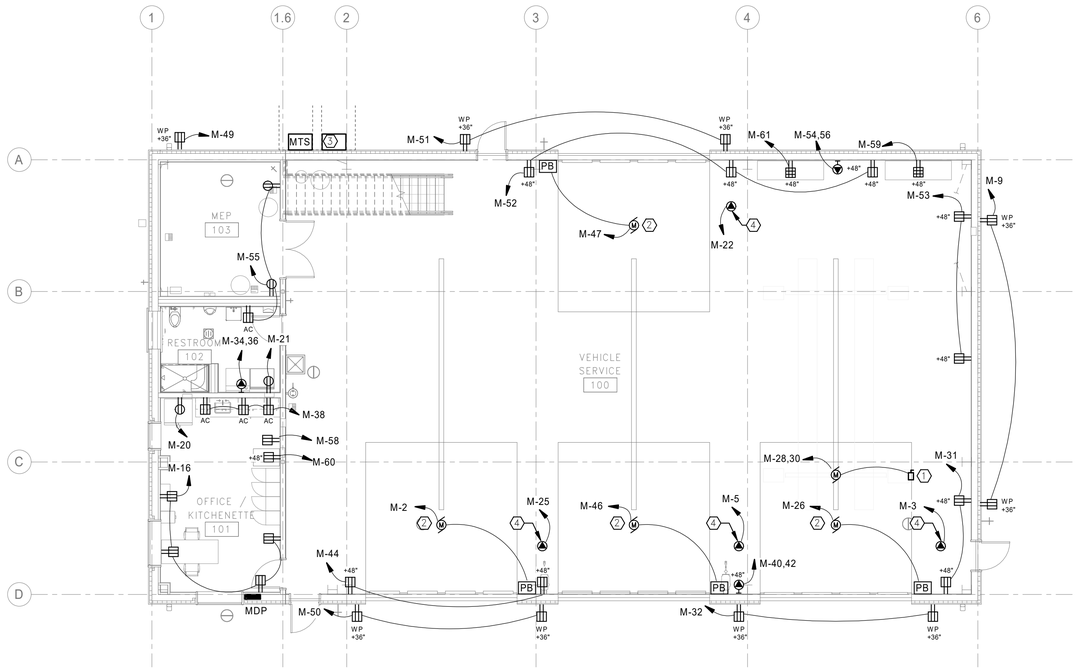
RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP
POLK COUNTY — ERSKINE, MN

LIGHTING PLAN

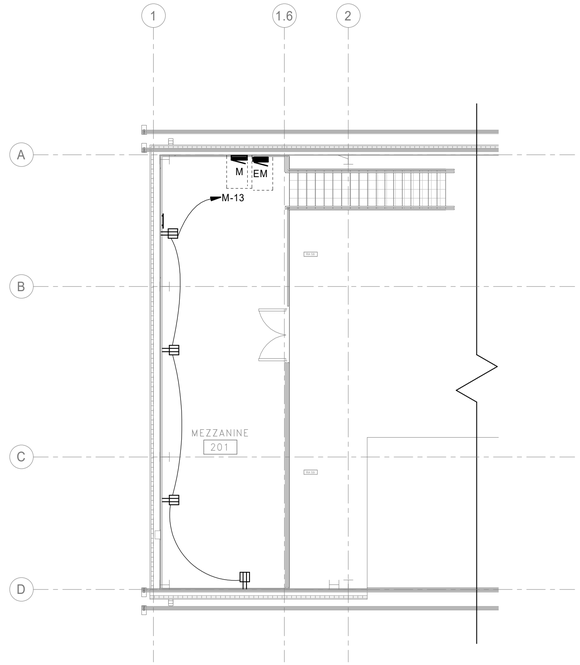
PROJECT NUMBER: 22-RF-027

DESIGNED: LDF	DRAWN: LDF	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL181E0	DRAWING NO: 3R-MN-1176-181		SHEET 60 OF 64

E4



2 E5 ADMINISTRATION BUILDING POWER PLAN



1 E5 MAINTENANCE BUILDING MEZZANINE POWER PLAN

GENERAL NOTES

A. REFER TO ARCHITECTURAL ELEVATIONS FOR OUTLET HEIGHTS WHERE THE SPECIFIC OUTLET HEIGHT IS NOT INDICATED ON THIS SHEET. REFER TO THE ELECTRICAL LEGEND FOR THE DEFAULT OUTLET HEIGHT WHEN NOT INDICATED ON ELEVATIONS OR ON THIS SHEET.
B. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL ELECTRICAL EQUIPMENT AND DEVICE LOCATIONS WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DIVISIONS PRIOR TO ROUGH-IN. REFER TO AND COORDINATE WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL WORK THAT IS REQUIRED BY THE CONTRACTOR.
C. ALL CONDUIT AND JUNCTION BOXES ARE TO BE CONCEALED IN WALLS, FUR OUTS, AND ACCESSIBLE CEILINGS. USE OF SURFACE MOUNTED RACEWAYS MUST BE APPROVED BY THE ARCHITECT FOR EACH LOCATION. WHERE APPROVED, UTILIZE WIREMOLD OR APPROVED EQUAL SURFACE MOUNTED RACEWAYS PAINTED TO MATCH SURROUNDING WALLS.
D. ALL MULTI-WIRE BRANCH CIRCUITS SHALL BE PROVIDED WITH SEPARATE NEUTRAL CONDUCTORS. LABEL NEUTRAL CONDUCTORS WITH RESPECTIVE CIRCUIT AT ALL PULL BOXES, JUNCTION BOXES, TERMINATIONS, ETC.
E. LABEL ALL COVER PLATES WITH PANEL AND CIRCUIT NUMBER ON FACE OF PLATE, SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
F. SEAL ALL PENETRATIONS OF RATED WALLS PER SPECIFICATION SECTION 260500. SEE ARCHITECTURAL DRAWINGS FOR WALL RATINGS.
G. THERMOSTATS, HUMIDISTAT PROVIDED AND INSTALLED BY MECHANICAL. ELECTRICAL TO PROVIDE J-BOX AT +44" AND 1/2" CONDUIT TO ACCESSIBLE CEILING OR STRUCTURE FOR DEVICE WIRING.

(#) SHEET NOTES

1. PROVIDE CONNECTION TO 4-POST LIFT, PROVIDE WITH LOCAL DISCONNECT FOR LOCK OUT-TAG OUT.
2. PROVIDE CONNECTION TO OVERHEAD DOOR AND CONTROLLER. COORDINATE LOCATION WITH DOOR INSTALLER PRIOR TO ROUGH-IN.
3. PORTABLE GENERATOR CONNECTION POINT. PROVIDE PSI POWER CONTROLS GTBWM-400-208-240-3-FEMALE-3R-A, OR EQUIVALENT.
4. PROVIDE REEL: REELCRAFT EXTENSION CORD REEL GROUNDING CONNECTOR, NEMA 5-20R, GROUNDING PLUG, NEMA 5-20P, RED #L 4545 123 3A-RP OR EQUIVALENT.

Professional Engineer
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REV.	DATE	DESCRIPTION	BY

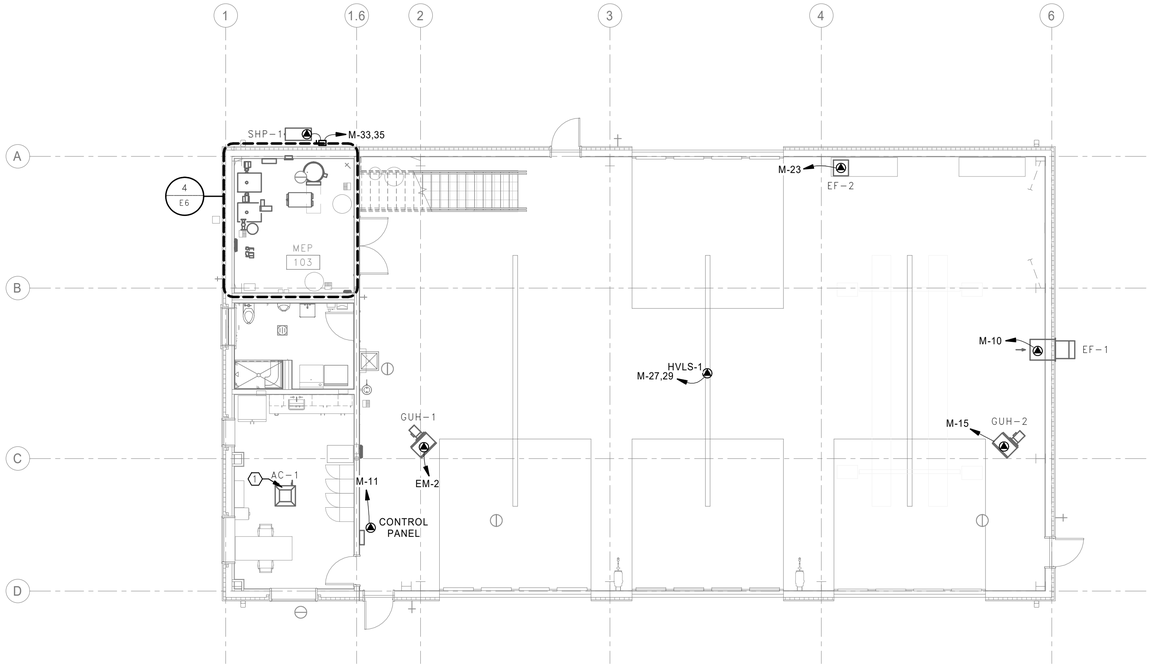
RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP
POLK COUNTY — ERSKINE, MN

POWER PLAN

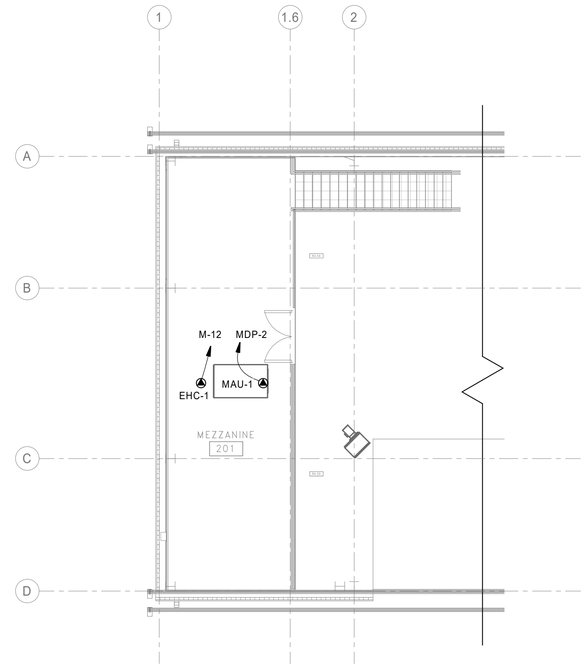
PROJECT NUMBER: 22-RF-027

DESIGNED: LDF	DRAWN: LDF	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL182E0	DRAWING NO: 3R-MN-1176-182		SHEET 61 OF 64

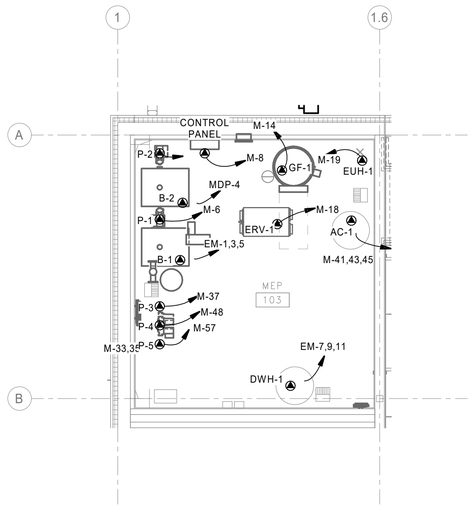
E5



1 E6 ADMINISTRATION BUILDING MECHANICAL POWER PLAN



2 E6 MAINTENANCE BUILDING MEZZANINE MECHANICAL POWER PLAN



4 E6 MAINTENANCE BUILDING ENLARGED MEP ROOM

GENERAL NOTES

A. REFER TO ARCHITECTURAL ELEVATIONS FOR OUTLET HEIGHTS WHERE THE SPECIFIC OUTLET HEIGHT IS NOT INDICATED ON THIS SHEET. REFER TO THE ELECTRICAL LEGEND FOR THE DEFAULT OUTLET HEIGHT WHEN NOT INDICATED ON ELEVATIONS OR ON THIS SHEET.
B. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL ELECTRICAL EQUIPMENT AND DEVICE LOCATIONS WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DIVISIONS PRIOR TO ROUGH-IN. REFER TO AND COORDINATE WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL WORK THAT IS REQUIRED BY THE CONTRACTOR.
C. ALL CONDUIT AND JUNCTION BOXES ARE TO BE CONCEALED IN WALLS, FUR OUTS, AND ACCESSIBLE CEILINGS. USE OF SURFACE MOUNTED RACEWAYS MUST BE APPROVED BY THE ARCHITECT FOR EACH LOCATION. WHERE APPROVED, UTILIZE WIREMOLD OR APPROVED EQUAL SURFACE MOUNTED RACEWAYS PAINTED TO MATCH SURROUNDING WALLS.
D. ALL MULTI-WIRE BRANCH CIRCUITS SHALL BE PROVIDED WITH SEPARATE NEUTRAL CONDUCTORS. LABEL NEUTRAL CONDUCTORS WITH RESPECTIVE CIRCUIT AT ALL PULL BOXES, JUNCTION BOXES, TERMINATIONS, ETC.
E. LABEL ALL COVER PLATES WITH PANEL AND CIRCUIT NUMBER ON FACE OF PLATE, SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
F. SEAL ALL PENETRATIONS OF RATED WALLS PER SPECIFICATION SECTION 260500. SEE ARCHITECTURAL DRAWINGS FOR WALL RATINGS.
G. THERMOSTATS, HUMIDISTAT PROVIDED AND INSTALLED BY MECHANICAL. ELECTRICAL TO PROVIDE J-BOX AT +44" AND 1/2" CONDUIT TO ACCESSIBLE CEILING OR STRUCTURE FOR DEVICE WIRING.

(#) SHEET NOTES

1. INDOOR UNIT AC-1 POWERED FROM OUTDOOR UNIT SHP-1. EC TO PROVIDE 3/4"C BETWEEN UNITS AND ANY REQUIRED CONNECTIONS.

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Date: 12/15/2023 License Number: 56794

REV.	DATE	DESCRIPTION	BY

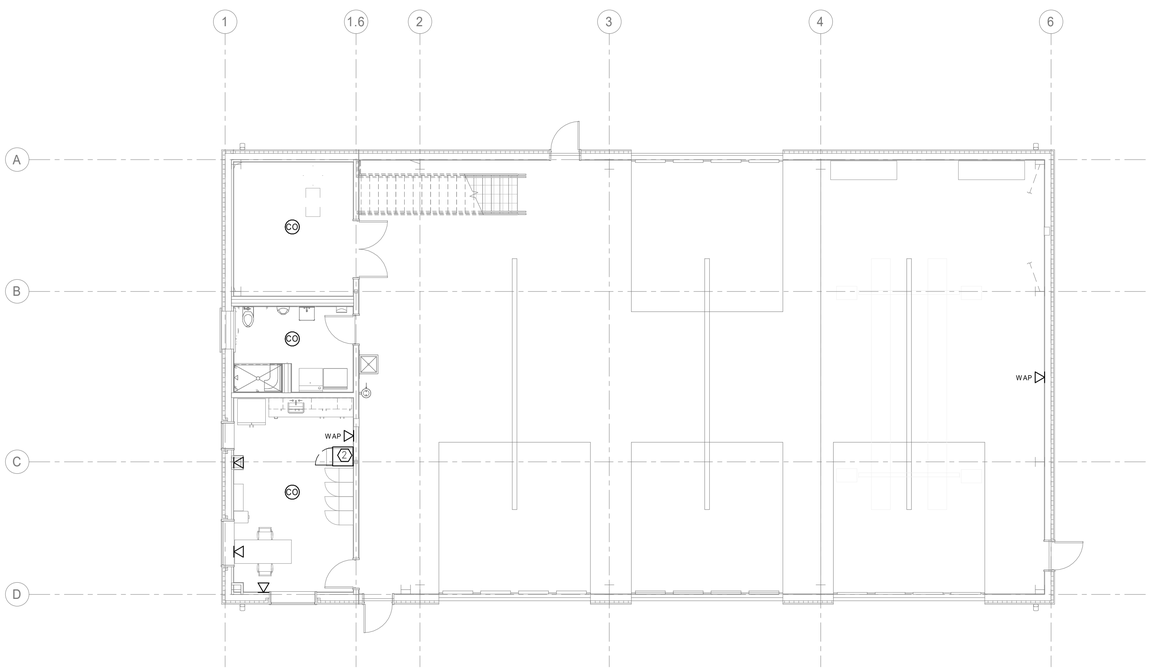
RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP
POLK COUNTY — ERSKINE, MN

MECHANICAL POWER PLAN

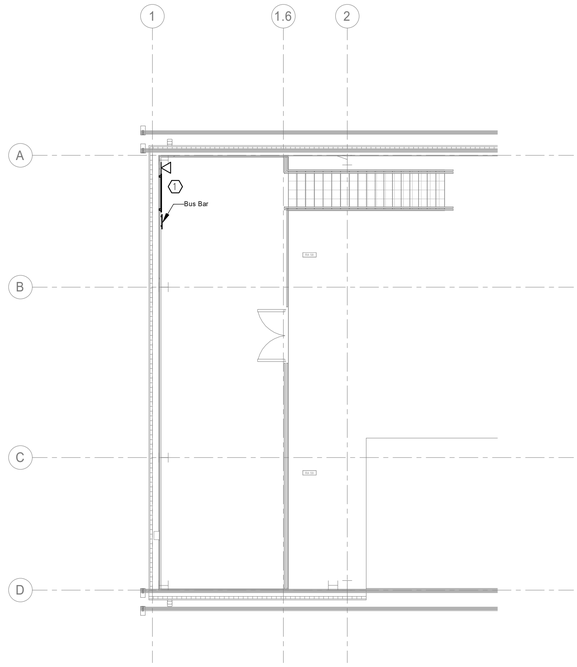
PROJECT NUMBER: 22-RF-027

E6

DESIGNED: LDF | DRAWN: LDF | DATE: 1.12.2024 | CHECKED: TDF
CADD:RDL183E0 | DRAWING NO: 3R-MN-1176-183 | SHEET 62 OF 64



2 MAINTENANCE BUILDING SYSTEMS PLAN
E7



3 MAINTENANCE BUILDING MEZZANINE SYSTEMS PLAN
E7

GENERAL NOTES

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B. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL ELECTRICAL EQUIPMENT AND DEVICE LOCATIONS WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DIVISIONS PRIOR TO ROUGH-IN. REFER TO AND COORDINATE WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL WORK THAT IS REQUIRED BY THE CONTRACTOR.
C. ALL CONDUIT AND JUNCTION BOXES ARE TO BE CONCEALED IN WALLS, FUR OUTS, AND ACCESSIBLE CEILINGS. USE OF SURFACE MOUNTED RACEWAYS MUST BE APPROVED BY THE ARCHITECT FOR EACH LOCATION. WHERE APPROVED, UTILIZE WIREMOLD OR APPROVED EQUAL SURFACE MOUNTED RACEWAYS PAINTED TO MATCH SURROUNDING WALLS.
D. LABEL ALL COVER PLATES WITH PATCH PANEL IDENTIFICATION NUMBER ON FACE OF PLATE, SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
E. SEAL ALL PENETRATIONS OF RATED WALLS PER SPECIFICATION SECTION 260500. SEE ARCHITECTURAL DRAWINGS FOR WALL RATINGS.
F. ALL DATA/TELEPHONE JACKS SHALL HAVE A 4"SQ., 2-1/8" DEEP BOX, 1-GANG MUDRING WITH 1" CONDUIT STUBBED TO ACCESSIBLE CEILING. ALL CONDUITS SHALL HAVE INSULATED THROAT BUSHINGS.
G. ALL DATA AND TELEPHONE CABLES SHALL BE CAT6.
H. E.C. TO PROVIDE, INSTALL, TERMINATE AND TEST ALL DATA AND TELEPHONE CABLES.

(#) SHEET NOTES

1. TELEPHONE TERMINAL BOARD 'TTB' WITH GROUND BUS BAR. PROVIDE #6CU GROUND FROM BUS BAR TO BUILDING GROUND BAR. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. PROVIDE IT CABINET WITH UPS AND PATCH PANEL ABOVE ICE MAKER. PROVIDE TRIPPLITE 15U WALL MOUNTED SERVER RACK BY EATON. PROVIDE CAT6A SNAGLESS SLIM ETHERNET CABLE, BLUE-2-FT BY EATON. PROVIDE APC SMART UPS, 1000VA RACK MOUNTED 2U UP SMT1000RM2UC BY APC. PROVIDE TRIPP LITE RACK ENCLOSURE TOOLLESS FIXED MOUNT SHELF 2URM, SRSHELF2PTM BY FROM CDW.

Professional Engineer
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REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

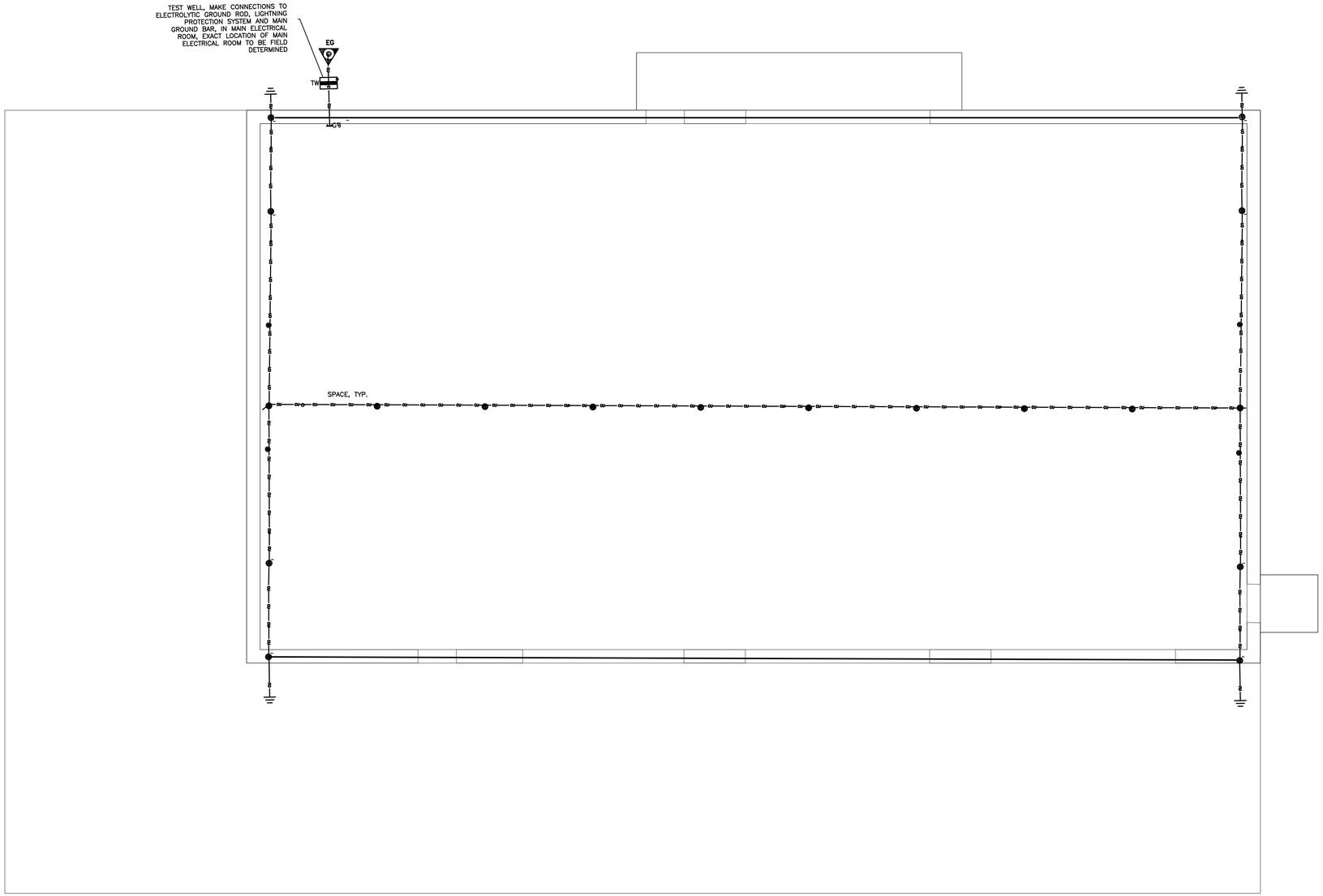
POLK COUNTY — ERSKINE, MN

SPECIAL SYSTEMS PLAN

PROJECT NUMBER: 22-RF-027

DESIGNED: LDF	DRAWN: LDF	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL184E0	DRAWING NO: 3R-MN-1176-184		SHEET 63 OF 64

E7



1 E8 LIGHTNING PROTECTION PLAN

GENERAL CONSTRUCTION NOTES

1. THIS DRAWING IS INTENDED FOR USE AS A CONSTRUCTION DOCUMENT. FIELD VERIFY ACTUAL CONDITIONS PRIOR TO CONSTRUCTION. CONTACT VFC, TO CLARIFY ANY DISCREPANCIES.

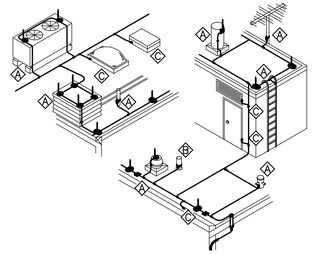
GENERAL BONDING NOTES

A. TYPICAL BODIES OF CONDUCTANCE AS NOTED BELOW. USE FULL SIZE CONDUCTOR AND APPROPRIATE FITTING SHOWN FOR CONNECTION.

B. (PLUMBING STACK) REQUIRES BONDING WITH MAIN SIZE CABLE ONLY IF WITHIN 6'-0" (1,828mm) OF LIGHTNING PROTECTION SYSTEM.

C. TYPICAL BODIES OF INDUCTANCE AS NOTED BELOW. USE SECONDARY SIZE (SMALLER) CONDUCTOR AND APPROPRIATE FITTING SHOWN FOR CONNECTION.

D. BONDING CONNECTIONS AND FITTINGS SHOWN ARE TYPICAL EXAMPLES. MAKE ALL CONNECTIONS REQUIRED TO MEET CODES AS NOTED BELOW. ADJUST FITTING TYPE AS REQUIRED TO SUIT FIELD CONDITIONS.



LEGEND

- AIR TERMINAL
- MECHANICAL CONNECTION
- MISC. BONDING
- GB — GROUND BAR
- CLASS I COPPER MAIN CONDUCTOR
- C — COPPER CLAD GROUND ROD WITH EXOTHERMIC WELD CONNECTION
- EG — ELECTROLYTIC GROUND ROD
- TW — XB36FTTW, TEST WELL WITH GROUND BAR

GENERAL INSTALLATION NOTES

1. LOCATE AIR TERMINALS AS SHOWN. TAKE CARE TO ENSURE THAT ALL POINTS ARE WITHIN 2'-0" (609mm) OF OUTSIDE BUILDING EDGE, OUTSIDE CORNERS, RIDGE ENDS, AND THAT MAX SPACING DOES NOT EXCEED 20'-0" (6,096mm), AND THAT MIN PROJECTION ABOVE OBJECT PROTECTED IS 10" (254mm). POINTS PROJECTING 24" (609mm) MAY BE SPACE @ 25'-0" (7,520mm) MAX.
2. MAINTAIN HORIZONTAL OR DOWNWARD COURSING OF MAIN CONDUCTOR. ENSURE THAT ALL BENDS HAVE AT LEAST AN 8 (203mm) RADIUS AND DO NOT EXCEED 90 DEGREES.
3. ATTACH ALL EXPOSED ROOF, DOWN LEAD AND BONDING CABLES AT 3'-0" (914mm) ON CENTER MAX. VERIFY COMPATIBILITY OF ADHESIVE ON MEMBRANE ROOF APPLICATIO PRIOR TO INSTALLATION.
4. GROUND ROD ELECTRODES SHALL BE INSTALLED AS SHOWN, BUT IN NO INSTANCE SHALL THEY BE LESS THAN 1'-0" (304mm) BELOW GRADE AND 2'-0" (609mm) FROM FOUNDATION WALL. DRIVEN RODS SHALL PENETRATE THE EAR AT LEAST 10'-0" (3,048mm).
5. BOND TO WATER SERVICE AND OTHER PIPING SYSTEMS AS SHOWN AND AS REQUIRED BY CODE.
6. MAIN SIZE LIGHTNING CONDUCTOR BONDED TO MAIN GROUND BUS FIELD VERIFY LOCATION 1 1/4" CONDUIT FOR ACCESS, INSTALLED BY OTHERS. INTERCONNECT LIGHTNING PROTECTION GROUND TO TELEPHONE AND OTHER BUILDING GROUND SYSTEMS LOCATION FIELD DETERMINED OR AS REQUIRED BY CODE.
7. LB'S AND SIMILAR CONDUIT BODIES MAY NOT BE USED IN TH INSTALLATION OF DOWNLEAD CONDUITS, AS THEY DO NOT ADHERE TO THE REQUIRED 8" (203mm) MINIMUM BEND RADIUS.
8. SYSTEM SHALL BE INSTALLED AS SHOWN TO ENSURE PROPEP CODE COMPLIANCE AND SYSTEM CERTIFICATION. ANY MAJOR VARIANCE SHALL BE RESUBMITTED FOR APPROVAL.
9. ALL MATERIALS TO BE UNDERWRITER'S LABORATORIES APPROVED WITH APPROPRIATE UL96 MARKINGS.
10. FINAL SYSTEM INSPECTION AND QUALITY CONTROL
    - A) THE CONTRACTOR SHALL FURNISH AN LPI-IP CERTIFICATE OR A UL CERTIFICATE UPON COMPLETIO OF THE INSTALLATION.
    - B) LPI CERTIFICATION IF REQUIRED, REQUIRES SIGNATURE BY A REPRESENTATIVE OF THE OWNER AT MULTIPLE STAGES OF INSTALLATION & BY THEIR THIRD PARTY FIELD STAFF. UL CERTIFICATION IF REQUIRED, REQUIRES INSPECTION BY THEIR THIRD-PARTY FIELD STAFF AFTER COMPLETION OF THE INSTALLATION.
    - C) AS-BUILT DRAWINGS SHALL BE COMPLETED AND STAMPED BY AN LPI CERTIFIED MASTER DESIGNER - INSTALLER OF LIGHTNING PROTECTION SYSTEMS.
    - D) FINAL INSPECTION REPORT - A FINAL INSPECTION AN INSPECTION REPORT SHALL BE COMPLETED BASED O ANSI/TIA/EIA 607, NEC, NFPA 780, AND UL96A INDUSTRY STANDARDS AS APPLICABLE. THE SCOPE O THE INSPECTION AND REPORT SHALL INCLUDE;
      - a. TEST AND EVALUATION OF THE GROUNDING SYSTE RECORD FINAL SYSTEMS TO GROUND RESISTANC LEVEL.
      - b. EVALUATION AND TESTING OF THE INTERNAL BONDING AND GROUNDING SYSTEMS.
      - c. EVALUATION AND TESTING OF EQUIPMENT GROUNDING.
      - d. EVALUATION OF AC SURGE SUPPRESSION INSTALLATION.
      - e. EVALUATION OF TELCO SURGE SUPPRESSION INSTALLATION.
      - f. COPY OF THE LPI-IP OR UL LIGHTNING PROTECTION CERTIFICATION.
      - g. FINAL AS-BUILT REVIEW AND SUBMISSION.
    - E) REPORT SHALL INCLUDE DETAILED REPORTING AND TEST RESULTS WITH CORRESPONDING PHOTOS OF EAC EVALUATION CATEGORY.

Professional Engineer

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Signature: _____

Typed or Printed Name: Tyler Victorino

Date: 12/15/2023 License Number: 56794

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REV.	DATE	DESCRIPTION	BY

RYDELL NATIONAL WILDLIFE REFUGE
MAINTENANCE SHOP

POLK COUNTY — ERSKINE, MN

LIGHTNING PROTECTION PLAN

PROJECT NUMBER: 22-RF-027

DESIGNED: LDF	DRAWN: LDF	DATE: 1.12.2024	CHECKED: TDF
CADD:RDL185E0	DRAWING NO: 3R-MN-1176-185		SHEET 64 OF 64

E8