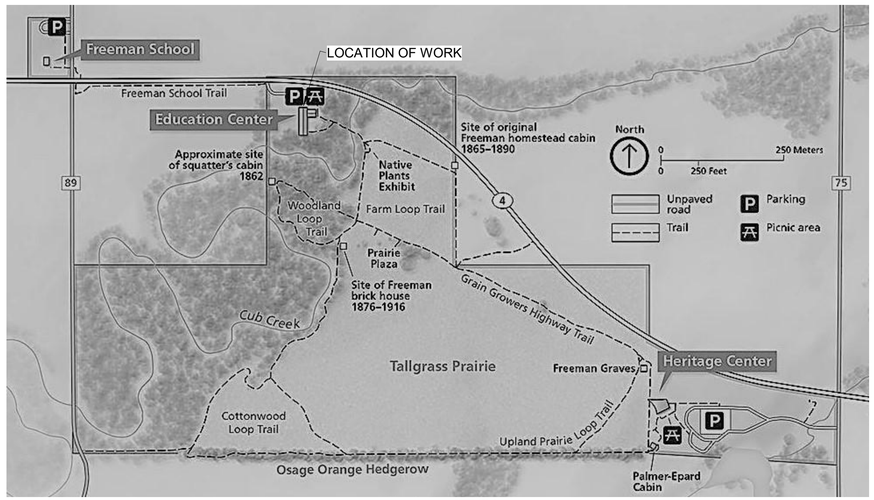
Home Education Center Fire Suppression

Homestead National Historic Park
8523 NE-4
Beatrice, NE 68310

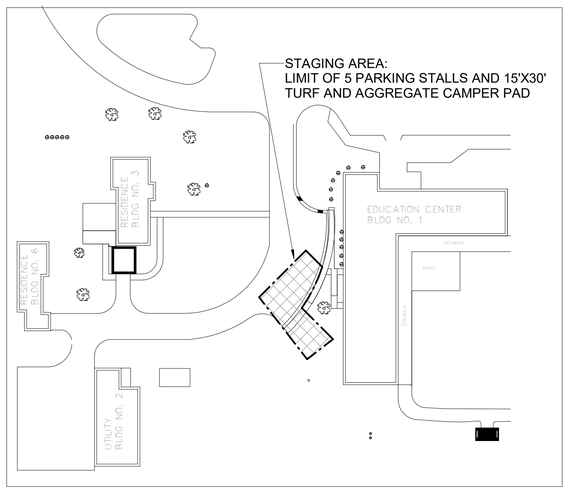
PROFESSIONAL MECHANICAL ENGINEER
JEFFREY E. KULHANEK
E-11823
12/15/22
STATE OF NEBRASKA

I, JEFFERY E. KULHANEK
AM THE COORDINATING PROFESSIONAL ON:
National Park Service
Home Education Center Fire Suppression

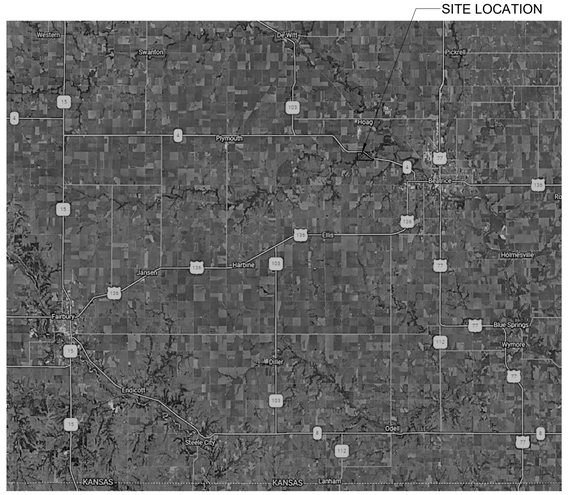
CONSTRUCTION DRAWINGS
12/15/2022



2 PARK MAP
NOT TO SCALE



3 STAGING MAP
NOT TO SCALE



1 VICINITY MAP
NOT TO SCALE

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NATIONAL PARK SERVICE
Department of the Interior

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12/15/2022
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TITLE OF SHEET
COVER SHEET
Home Education Center Fire Suppression
Homestead National Historic Park
8523 NE-4
Beatrice, NE 68310

ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **0**
DRAWING NO. 368 / 80056
PMIS **207662**
SHEET **1** OF **31**

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GENERAL NOTES:

A. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH IN THE NEBRASKA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (2017 EDITION), CITY OF BEATRICE REQUIREMENTS DEPARTMENT OF HEALTH AND HUMAN SERVICES REQUIREMENTS..

B. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING SURFACE AND UNDERGROUND FACILITIES DURING ALL PHASES OF WORK. UNDERGROUND FACILITIES SHOWN ON THE DRAWINGS ARE FOR THE CONTRACTOR'S GUIDANCE ONLY. THE LOCATIONS OF ALL UNDERGROUND UTILITY FACILITIES ARE APPROXIMATE OR MAY NOT BE INDICATED IN THESE PLANS. UNDERGROUND FACILITIES, WHETHER INDICATED OR NOT, SHALL BE LOCATED AND FLAGGED BY THE UTILITIES AT THE REQUEST OF THE CONTRACTOR. THE CONTRACTOR SHALL CALL FOR THE UTILITY COMPANIES TO MARK OR FLAG THE LOCATION OF THEIR FACILITIES IN THE FIELD (1-800-331-5666 OR 811) 48 HOURS PRIOR TO DIGGING. CALL ALL APPLICABLE UTILITY COMPANIES. THE CONTRACTOR SHALL REPAIR, AT HIS EXPENSE, ANY DAMAGES TO EXISTING FACILITIES CAUSED DIRECTLY OR INDIRECTLY BY HIS OPERATIONS. IN ADDITION, THE CONTRACTOR SHALL NOTE THAT THERE MAY BE EXISTING UNDERGROUND FACILITIES THAT ARE NOT SHOWN ON THE PLANS. IT IS, THEREFORE, A REQUIREMENT OF THIS CONTRACT THAT THE CONTRACTOR FULLY INVESTIGATE ALL AREAS IN WHICH EXCAVATIONS WILL BE PERFORMED AND TAKE ALL REASONABLE MEASURES NECESSARY TO LOCATE ANY FACILITIES WHICH MAY NOT BE SHOWN ON THE PLANS.

C. BEFORE PROCEEDING, THE CONTRACTOR SHALL SATISFY HIMSELF THAT A CONFLICT DOES NOT EXIST AND THAT THE UNDERGROUND WORK CAN BE PERFORMED AS SHOWN ON THE PLANS. IF, IN THE OPINION OF THE CONTRACTOR, A CONFLICT DOES EXIST, HE SHALL IMMEDIATELY NOTIFY THE CONTRACTING OFFICER WHO WILL MAKE THE FINAL DETERMINATION FOR RESOLVING THE CONFLICT. THE CONTRACTOR WILL RECEIVE NO ADDITIONAL COMPENSATION FOR ANY DELAYS OR WORK RESULTING FROM A CONFLICT WHICH WAS NOT THOROUGHLY INVESTIGATED PRIOR TO PROCEEDING WITH HIS WORK.

D. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT ALL EXISTING UTILITIES, PAVEMENT AND OTHER IMPROVEMENTS NOT SCHEDULED FOR REMOVAL OR OUTSIDE THE CONSTRUCTION LIMITS. ANY DAMAGE TO EXISTING UTILITIES AND/OR PAVED STREETS CAUSED BY CONSTRUCTION OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

E. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS. THE CONTRACTOR SHALL PAY ALL PERMIT FEES, DUMP FEES AND OTHER ASSOCIATED FEES REQUIRED TO SUCCESSFULLY COMPLETE THE PROJECT AT NO ADDITIONAL COST TO THE OWNER.

F. THE CONTRACTOR SHALL SATISFACTORILY CLEAN THE AREA OF ALL RUBBISH, EXCESS MATERIAL, MUD AND DEBRIS AND ALL PARTS OF THE WORK AREA SHALL BE LEFT IN A NEAT AND PRESENTABLE CONDITION. ALL DISTURBED AREAS SHALL BE RESTORED TO A LEVEL AND SMOOTH SURFACE PRIOR TO ACCEPTANCE OF THE WORK. DEBRIS, ETC. SHALL BE DISPOSED OF AT AN APPROVED FACILITY IN A LEGAL MANNER.

G. THE CONTRACTOR SHALL PROPERLY DISPOSE OF ALL UNSUITABLE MATERIALS AND DEBRIS ENCOUNTERED IN/OR GENERATED BY THE REMOVAL OPERATIONS, INCLUDING CONCRETE, ASPHALT, OIL MAT, BRICK, ROCK, PIPES, ETC. NO UNSUITABLE MATERIAL, SUCH AS DETERMINED BY THE OWNER'S REPRESENTATIVE, SHALL BE USED FOR BACKFILLING OR EMBANKMENT CONSTRUCTION. THE COST FOR DISPOSAL OF THE UNSUITABLE MATERIAL SHALL BE SUBSIDIARY TO THE PROJECT.

H. PROVIDE POSITIVE DRAINAGE AT ALL TIMES WITHIN THE CONSTRUCTION AREAS. DO NOT ALLOW WATER TO POND IN EXCAVATED AREAS. REMOVE WATER FROM EXCAVATION AT THE EARLIEST MOMENT.

I. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR EROSION CONTROL. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING STREETS OPEN TO TRAFFIC AND THEY SHALL BE KEPT CLEAN AND FREE OF SILT AND MUD AT ALL TIMES. ALL DISTURBED AREAS SHALL BE RESTORED WITH A TURF TYPE FESCUE MIX AND SOW PER SEED PROVIDER'S SPECIFICATIONS.

J. THE CONTRACTOR SHALL FURNISH AND MAINTAIN ALL NECESSARY BARRICADES, WARNING SIGNS, LIGHTS, FLASHERS, AND FLAG PERSONS AS REQUIRED BY THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES", TO PROVIDE FOR THE SAFETY OF WORKERS AND THE PUBLIC AT LARGE. TEMPORARY FENCING SHALL BE INSTALLED AROUND ANY OPEN AREAS OF THE SITE. THE COST OF TRAFFIC CONTROL DEVICES AND TEMPORARY FENCING SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.

K. CONTRACTOR SHALL PROVIDE THE NAME AND PHONE NUMBER OF THEIR REPRESENTATIVE TO BE CONTACTED (AS NECESSARY) DURING WORKING AND NON-WORKING HOURS.

L. A QUALIFIED SUPERINTENDENT, WHO IS ACCEPTABLE TO THE OWNER, SHALL BE PRESENT ON THE PROJECT SITE DURING CONSTRUCTION AND GIVE SUPERVISION TO THE WORK UNTIL ITS COMPLETION. THE SUPERINTENDENT SHALL HAVE FULL AUTHORITY TO ACT IN BEHALF OF THE CONTRACTOR, AND ALL DIRECTIONS GIVEN TO THE SUPERINTENDENT SHALL BE CONSIDERED GIVEN TO THE CONTRACTOR.

M. THE CONTRACTOR SHALL NOT ENCROACH ON PRIVATE PROPERTY OUTSIDE THE WORK AREAS.

N. ALL CONSTRUCTION ACTIVITIES, MATERIALS AND EQUIPMENT SHALL BE KEPT WITHIN THE PROPERTY LIMITS SHOWN ON THE PLANS.

GENERAL GRADING NOTES:

A. CONTRACTING OFFICER SHALL BE PRESENT TO OVERSEE TOPSOIL STRIPPING, OVEREXCAVATION, AND STRUCTURAL FILL PLACEMENT.

B. THE CONTRACTOR MUST COMPLY WITH ALL NOISE AND DUST CONTROL ORDINANCES OF THE LOCAL REGULATORY AGENCY.

C. THE CONTRACTOR IS RESPONSIBLE TO ENSURE ALL EXCAVATIONS ARE MADE IN ACCORDANCE WITH CURRENT OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) CONSTRUCTION STANDARDS. DETERMINATION OF ACTUAL OSHA SOIL TYPE IN THE FIELD IS THE RESPONSIBILITY OF THE CONTRACTOR. IN ADDITION, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO BE FAMILIAR WITH OSHA STANDARDS AND REGULATIONS PERTAINING TO ALL ASPECTS OF THE WORK INCLUDING ENTERING CONFINED SPACES.

D. PROVIDE POSITIVE DRAINAGE AT ALL TIMES WITHIN THE CONSTRUCTION AREA. NO PONDING OF WATER SHALL BE ALLOWED OUTSIDE OF SPECIFICALLY DESIGNATED AREAS FOR EROSION CONTROL OR PROPOSED PONDS. MAINTAIN ALL EXISTING DRAINAGE PATTERNS UNTIL FINAL PLAN DRAINAGE PATTERNS ARE ESTABLISHED.

E. WHEN RUBBLE OR DEBRIS IS ENCOUNTERED, IT SHALL BE OVEREXCAVATED AND REMOVED, AND LAWFULLY DISPOSED OF OFF SITE. THE OVEREXCAVATED AREAS SHALL BE FILLED WITH STRUCTURAL FILL. A REPRESENTATIVE OF THE OWNER SHALL DETERMINE THE LIMITS OF REMOVAL.

F OVEREXCAVATION REQUIREMENTS SHALL BE AS FOLLOWS:

BUILDING AREA: BENEATH BUILDING AREA AND TO A DISTANCE 5 FEET BEYOND OUTER WALLS AND COVERED STORAGE AREA, REMOVE ALL EXITING FILL SOIL. REMOVE ALL NATURAL SOILS TO A MINIMUM DEPTH OF 3 FEET BELOW BOTTOM OF FLOOR SLAB AND GRANULAR BASE. REPLACE WITH STRUCTURAL FILL PER REQUIRMENT BELOW.

G. STRUCTURAL FILL AND SUBGRADE REQUIREMENTS SHALL BE AS FOLLOWS:

BUILDING AREA: THE UPPER 12 INCHES OF THE SUBGRADE SHALL BE COMPACTED TO A MINIMUM OF 98% OF THE MAXIMUM DRY UNIT WEIGHT AT A WATER CONTENT BETWEEN -3 AND +3 PERCENT OF OPTIMUM DETERMINED BY ASTM D698-12(2021), STANDARD PROCTOR. FILL PLACED BELOW THIS LEVEL SHALL BE COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY UNIT WEIGHT DETERMINED BY ASTM D698-12(2021), STANDARD PROCTOR AT A PROPER WATER CONTENT.

UTILITY TRENCHES: THE UPPER 12 INCHES BELOW PAVEMENT OR UPPER 6" BELOW SIDEWALK SHALL BE COMPACTED TO A MINIMUM OF 98% OF THE MAXIMUM DRY UNIT WEIGHT AT A WATER CONTENT BETWEEN -3 AND +3 PERCENT OF OPTIMUM DETERMINED BY ASTM D698-12(2021), STANDARD PROCTOR. FILL PLACED BELOW THIS LEVEL SHALL BE COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY UNIT WEIGHT DETERMINED BY ASTM D698-12E1, STANDARD PROCTOR AT A PROPER WATER CONTENT.

H PROPOSED FILL AND BACKFILL MATERIAL SHALL BE EVALUATED AND APPROVED BY THE CONTRACTING OFFICER PRIOR TO USE ON THE SITE. PROPOSED FILL AND BACKFILL MATERIAL SHALL BE SUBMITTED TO A REPRESENTATIVE OF THE OWNER AT LEAST 3 DAYS PRIOR TO PLACEMENT.

I. ALL FILL SHALL BE PLACED IN NEARLY LEVEL LIFTS OF A LOOSE DEPTH NOT GREATER THAN 8 INCHES WITH EACH LIFT PROPERLY COMPACTED BEFORE PLACEMENT OF THE SUBSEQUENT LIFT OF SOIL ABOVE.

J. BACKFILL COMPACTION SHALL BE TESTED ONCE PER LIFT PER EVERY 2,000 SQUARE FEET OR LESS OF AREA BY CONTRACTOR PROCURED THIRD PARTY.

GENERAL UTILITY NOTES:

A. ALL EXISTING UTILITIES SHOWN ARE FROM PUBLIC RECORDS AND ARE FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING EXACT LOCATION AND DEPTH PRIOR TO CONSTRUCTION.

B. CONTRACTOR SHALL NOTIFY APPROPRIATE UTILITY COMPANIES TO COORDINATE CONNECTIONS AND RELOCATIONS. ALL CONNECTION COST, CONNECTION FEES, OR RELOCATION FEES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

C. COORDINATE LOCATION AND DEPTHS OF ALL SERVICE LINES WITH BUILDING MECHANICAL PLANS.

D. THE CONTRACTOR SHALL PROVIDE, PLACE AND MAINTAIN FENCING ALONG OPEN TRENCH AREAS TO ASSURE PROTECTION OF THE GENERAL PUBLIC AND TO SECURE ALL AREAS WITHIN THE CONSTRUCTION ZONE. THE FENCING SHALL BE A MINIMUM OF 48 INCHES IN HEIGHT. IT SHALL BE PLACED AND SECURED IN SUCH A MANNER TO GUARD AGAINST THE CREATION OF ENTRY POINTS AROUND OR THROUGH BY PERSONS AWARE OF SITE CONDITIONS OR DANGERS. THE FENCING MAY BE OF WIRE/LATH CONSTRUCTION OR SYNTHETIC FABRIC (SIMILAR TO SNOW FENCING) PROVIDED IT IS FREE OR BREAKS OR BREACHES. THE FENCING SHALL BE SECURED TO STEEL POSTS SET AT A MAXIMUM SPACING OF 8 FEET.

E. UTILITY TRENCHES SHALL BE KEPT FREE OF WATER AT ALL TIMES.

F. ALL WATER LINE VALVES, FITTINGS, AND WATER LINE DISINFECTION SHALL CONFORM TO THE CITY OF BEATRICE AND NEBRASKA DEPARTMENT OF HEALTH AND HUMAN SERVICES (DHHS) REQUIREMENTS.

G. NEW WATER MAINS AND DOMESTIC WATER LINES SHALL BE AWWA C900 CLASS 150 PVC PIPE AND FITTINGS. CONTRACTOR IS RESPONSIBLE FOR ALL TESTING, FLUSHING, DISINFECTING, ETC. AS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION.

H. ALL NEW WATER MAINS AND DOMESTIC AND FIRE PROTECTION LINES SHALL BE INSTALLED WITH DETECTABLE WARNING TAPE. WARNING TAPE SHALL BE PLACED 2' ABOVE THE CENTER OF THE WATER PIPE. WARNING TAPE SHALL BE A MINIMUM OF 4" WIDE WITH "WATER" OR OTHER APPROVED LETTERING.

I. ALL WATER LINE SHALL HAVE 5' MINIMUM COVER.

GENERAL REMOVAL NOTES:

A. STORM WATER POLLUTION PREVENTION PLAN BEST MANAGEMENT PRACTICES SHALL BE IMPLEMENTED PRIOR TO ANY REMOVALS OR GRADING.

B. ALL DEBRIS RESULTING FROM CONSTRUCTION OPERATIONS SHALL BE HAULED OFF-SITE AND DISPOSED OF LAWFULLY.

100% CD

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12/15/2022 DATE

TITLE OF SHEET
SITE SPECIFICATIONS & GENERAL NOTES
EDUCATION CENTER FIRE SERVICE
HOMESTEAD NATIONAL MONUMENT OF AMERICA
8523 NE-4
BEATRICE, NE 68310

ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **C 00**
DRAWING NO. 368 / 80056
PMIS / PKG. NO. **207662**
SHEET **2** OF **31**

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REFERENCED CONSTRUCTION NOTES(X):

1. SEE FIRE PROTECTION PLANS FOR CONTINUATION AND CONNECTION TO BUILDING AND EXISTING WATER LINE. CONTRACTOR SHALL REMOVE ALL NECESSARY TREES IN ORDER TO CONSTRUCT PROPOSED ADDITION. VERIFY REMOVAL PRIOR TO ANY CONSTRUCTION.
2. CONSTRUCT 4" WATER SERVICE LINE. CONTRACTOR SHALL FIELD LOCATE ALL EXISTING UTILITIES PRIOR TO THE CONSTRUCTION OF THE WATER LINE.
3. CONSTRUCT 12" WATER SERVICE LINE. CONTRACTOR SHALL FIELD LOCATE ALL EXISTING UTILITIES PRIOR TO THE CONSTRUCTION OF THE WATER LINE.
4. CAUTION! UNDERGROUND ELECTRICAL LINE. REROUTE PROPOSED WATER MAIN AS NECESSARY.
5. CAUTION! UNDERGROUND SECURITY FIRE INTRUSION LINE. REROUTE PROPOSED WATER MAIN AS NECESSARY.
6. CAUTION! UNDERGROUND FIBER OPTIC LINE. REROUTE PROPOSED WATER MAIN AS NECESSARY.
7. CAUTION! UNDERGROUND STORM SEWER LINE. REROUTE PROPOSED WATER MAIN AS NECESSARY.
8. CAUTION! UNDERGROUND WATER LINE. REROUTE PROPOSED WATER MAIN AS NECESSARY.
9. CONSTRUCT 4-WAY CONNECTION WITH VALVE AND VALVE BOX TO EXISTING WATER MAIN. CONTRACTOR SHALL FIELD LOCATE ALL EXISTING UTILITIES PRIOR TO THE CONSTRUCTION OF THE WATER LINE.
10. CONSTRUCT 12" BEND AND THRUST BLOCK, SEE 1/C201.
11. CONSTRUCT TEE CONNECTION WITH VALVE AND VALVE BOX TO EXISTING WATER MAIN. CONTRACTOR SHALL FIELD LOCATE ALL EXISTING UTILITIES PRIOR TO THE CONSTRUCTION OF THE WATER LINE.
12. CONSTRUCT 4" BEND AND THRUST BLOCK, SEE 1/C201.
13. SEE STRUCTURAL AND ARCHITECTURAL FOR STOOP LOCATION AND DETAILS. SEE SHEETS A101/S201.
14. CONSTRUCT TEE CONNECTION WITH VALVE AND VALVE BOX TO EXISTING WATER MAIN. CONTRACTOR SHALL FIELD LOCATE ALL EXISTING UTILITIES PRIOR TO THE CONSTRUCTION OF THE WATER LINE.

LEGEND

- W — PROPOSED WATER LINE
- FO — EXISTING FIBER OPTIC LINE
- SS — EXISTING SANITARY SEWER LINE
- X — EXISTING FENCE
- E — EXISTING ELECTRICAL LINE
- TC — EXISTING TRAFFIC COUNTER LINE
- ST — EXISTING STORM SEWER LINE
- IR — EXISTING IRRIGATION LINE
- W — EXISTING WATER LINE
- SEC — EXISTING SECURITY FIRE INTRUSION LINE
- HP — EXISTING HEAT PUMP LINE
- T — EXISTING HEAT PUMP LINE

NORTH

20 0 20

1 Inch = 20 ft.

NOTE: CONTRACTOR SHALL REMOVE AND REPLACE EXISTING IRRIGATION SYSTEM, SHRUBS AND RIVER ROCK AS NECESSARY TO CONSTRUCT PROPOSED WATER LINE. EXISTING IRRIGATION SYSTEM SHALL BE FIELD LOCATED PRIOR TO CONSTRUCTION OF WATER LINE. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ALL DAMAGE TO EXISTING SYSTEM AND SHALL TEST SYSTEM AS TO HAVE ALL SPLICES HOLD PRESSURE WITHOUT LEAK PRIOR TO ACCEPTANCE FROM CONTRACTING OFFICER.

NOTE: CONTRACTOR SHALL REMOVE AND REPLACE EXISTING IRRIGATION SYSTEM, SHRUBS AND RIVER ROCK AS NECESSARY TO CONSTRUCT PROPOSED WATER LINE. EXISTING IRRIGATION SYSTEM SHALL BE FIELD LOCATED PRIOR TO CONSTRUCTION OF WATER LINE. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ALL DAMAGE TO EXISTING SYSTEM AND SHALL TEST SYSTEM AS TO HAVE ALL SPLICES HOLD PRESSURE WITHOUT LEAK PRIOR TO ACCEPTANCE FROM CONTRACTING OFFICER.

PROPOSED ADDITION

20,000 GAL. RESERVOIR

EDUCATION CENTER BLDG NO. 1

RESIDENCE BLDG NO. 3

RESIDENCE BLDG NO. 6

UTILITY BLDG NO. 2

ABANDON EXISTING SYSTEM IN PLACE

ABANDONED DRAIN FIELD

ABANDONED WELL

EXISTING LIFT STATION

CABIN

NEW LIFT STATION AND SEPTIC TANKS

SEE SHEET 3 FOR LAYOUT

INSTALL PARALLEL PRESSURE LINES AT LEAST 4 FEET APART

ENCASE FORCE MAINS IN 8-INCH PVC, WITHIN 4 FEET OF DRAIN PIPE, USING CENTERING SPACERS AND FILL CAVITY WITH FOAM INSULATION

3-INCH PVC FORCE MAIN 160 PSI, SDR 26 (TYP.) 4' MINIMUM BURY DEPTH

CUB CREEK

1260

100% CD

MANOR O. MARTINEZ E-19128 12/15/2022 STATE OF NEBRASKA PROFESSIONAL CIVIL ENGINEER

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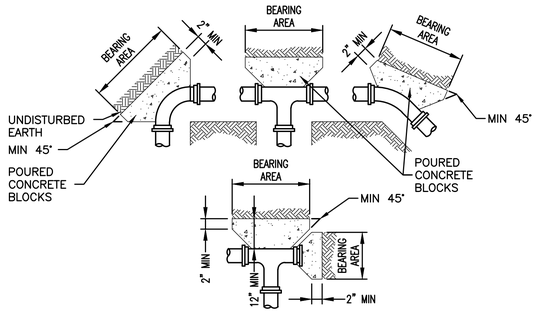
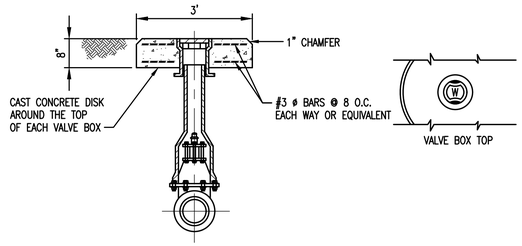


1 TYPICAL THRUST BLOCKING
NO SCALE

NOTES:

1. PLACE 4 ML. POLYETHYLENE BETWEEN CONCRETE AND FITTING (CONCRETE SHALL NOT INTERFERE WITH JOINT.)
2. MINIMUM CONCRETE THICKNESS SHALL BE 12 INCHES.
3. THE HORIZONTAL DIMENSION OF THE BEARING AREA SHALL BE BETWEEN 0.8 AND 1.25 TIMES THE VERTICAL DIMENSION.
4. THRUST BLOCK ORIENTATION SHALL BE SUCH THAT THE CENTER OF THE FITTING CORRESPONDS WITH THE CENTER OF THE THRUST BLOCK.
5. THE MINIMUM ALLOWABLE ANGLE (EITHER VERTICAL OR HORIZONTAL) SHALL BE 45 DEGREES.
6. CONCRETE SHALL PROVIDE MIN. COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.
7. ASSUMED SOIL BEARING CAPACITY EQUALS 1000 PSF.
8. THRUST BLOCK DESIGN PRESSURE EQUALS 100 PSI WITH SAFETY FACTOR OF 1.5.

BEARING AREA OF BLOCK IN SQ. FT.					
FITTING SIZES (IN)	TEE & END	90° BEND	45° BEND	22½° BEND	11¼° BEND
6	3.75	5.50	3.00	1.50	0.75
8	6.50	9.25	6.00	2.50	1.25
10	9.75	13.75	7.50	4.00	2.00
12	13.75	19.50	10.50	5.50	2.75
16	24.00	33.75	18.25	9.50	4.75



2 VALVE BOX SETTING
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100% CD

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SHEET 4 OF 31

SYMBOL LEGEND

PLAN VIEW

- SHEAR WALL
- MASONRY-VENEER
- MASONRY-CMU
- STUD WALL

SECTION / ELEVATION VIEW

- CONCRETE
- FLEXIBLE INSULATION
- GRAVEL
- GROUT
- EARTH / COMPACTED
- PLYWOOD
- EARTH / NONCOMPACTED
- WOOD (FINISH)
- RIGID INSULATION
- MASONRY-CMU FACE
- JOINT FILLER
- MASONRY-CMU
- STEEL
- MASONRY-VENEER
- GYPSUM

REFERENCE LEGEND

WALL TYPE — X — LETTER INDICATES PARTITION OR WALL TYPE

TOILET ACCESSORY — TA-X — TOILET ACCESSORY NUMBER

EQUIPMENT NUMBER — XXXX — EQUIPMENT NUMBER

WINDOW DESIGNATION — 000 — WINDOW DESIGNATION

DOOR NUMBER — 101 — DOOR NUMBER

CASEWORK TAG — WIDTH / DEPTH / HEIGHT — CABINET DESIGN SERIES MODEL

ROOM NUMBER — ROOM NAME — 101 — 150 SF — ROOM NAME DESIGNATION; ROOM NUMBER DESIGNATION; ROOM AREA DESIGNATION

REFERENCE DEMOLITION NOTE — DX — DEMOLITION DESIGNATION

REFERENCE NOTE — X — REFERENCE DESIGNATION

ROOM / FRAMING ELEVATION — 1 / 1 XX-XX 1 / 1 — ELEVATION LETTER; DIRECTION OF VIEW; SHEET NUMBER

EXTERIOR ELEVATION — 1 / 1 XX-XX 1 / 1 — DIRECTION OF VIEW; ELEVATION LETTER; SHEET NUMBER

PLAN DETAIL — X / XX-XX — DETAIL NUMBER; SHEET NUMBER

SECTION/ DETAIL — SIM / X / XX-XX — SECTION/DETAIL NUMBER; SHEET NUMBER; INDICATES DIRECTION OF VIEW

NEW COLUMN — X — LETTER INDICATES NEW COLUMN LINE

EXISTING COLUMN — X — LETTER INDICATES EXISTING COLUMN LINE

MATCHLINE — AREA A / AREA B

LEVEL — NAME / ELEVATION — LEVEL CALLOUT DESIGNATION; ELEVATION DESIGNATION

TITLE MARKER — 1 / VIEW NAME / SCALE: 1/8" = 1'-0" — GRAPHIC AREA FOR DRAWING DETAIL NUMBER; TITLE; SCALE OF THE DRAWING

NORTH ARROW — NORTH; PLAN NORTH; TRUE NORTH

ABBREVIATIONS

A	COMPRESSED AIR
A/C	AIR CONDITIONING
AB	ANCHOR BOLT
ABS	ACRYLONITRILE BUTAD STYRENE
AC	ALTERNATING CURRENT
ACI	AMERICAN CONCRETE INSTITUTE
ACSR	ALUMINUM CONDUCTOR STEEL REINFORCED
ACST	ACOUSTIC
AD	ACCESS DOOR
AD	AREA DRAIN
ADMIN	ADMIN ADMINISTRATION (IVE)
AFF	ABOVE FINISH FLOOR
AFFF	AQUEOUS FILM FORMING FOAM
AGG	AGGREGATE
AHU	AIR HANDLING UNIT
AI	AREA INLET
AIC	AMPS INTERRUPTING CAPACITY (SYM RMS)
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AL	ACTIVE LEAF
AL	ALUMINUM
ALT	ALTERNATE
AMP	AMPERE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AP	ACCESS PANEL
APC	ACOUSTICAL PANEL CEILING
APD	AIR PRESSURE DROP
APPD	APPROVED
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL OR ARCHITECT
ARI	AMERICAN REFRIGERATION INSTITUTE
ASB	ASBESTOS
ASPH	ASPHALT
AUTO	AUTOMATIC
AV	ACID VENT
AVG	AVERAGE
AW	ACID WASTE
AWC	ACOUSTICAL WALL COVERING
AWG	AMERICAN WIRE GAUGE
L	ANGLE
BATT	BATT INSULATION
BB	BULLETIN BOARD
BBO	BOILER BLOW OFF
BC	BOOKCASE
BD	BOARD
BDY	BOUNDARY
BEJ	BRICK EXPANSION JOINT
BF(2)	BIFOLD (DOUBLE)
BIT	BITUMINOUS
BKR	BREAKER
BL	BUILDING LINE
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM
BM	BENCH MARK
BO	BOTTOM OF
BOT	BOTTOM
BRCG	BRACING
BRDG	BRIDGING
BRG	BEARING
BRK	BRICK
BRKT	BRACKET
BS	BOTH SIDES
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
BUR	BUILT-UP ROOFING
BW	BOTH WAYS
C	CENTER
C OR CND	CONDUIT (ELECTRICAL SHEETS)
C TO C	CENTER TO CENTER
CAB	CABINET
CAP	CAPACITY
CB	CATCH BASIN (OR CIRCUIT BREAKER)
CBU	CEMENTITIOUS BACKER UNIT
CC	CENTER TO CENTER
CCT	CIRCUIT
CD	CONDENSATE DRAIN
CE	COVER ELEVATION
CEM	CEMENT
CF	CUBIC FEET
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CHIM	CHIMNEY
CI	CAST IRON
CI	CURB INLET
CIP	CAST IN PLACE
CIR	CIRCULAR
CJ	CONTROL JOINT
CKT	CIRCUIT
CL	CENTER LINE
CL WG	CLEAR WIRE GLASS
CLG	CEILING
CLKG	CAULKING
CLO	CLOSET
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CNTR	COUNTER
CO	CLEAN OUT
CO2	CARBON DIOXIDE
COL	COLUMN
COM	COMMON
COMB	COMBINATION
COMB	COMBUSTION
COMP	COMPRESSIBLE
COMPR	COMPRESSOR
CONC	CONCRETE
CONF	CONFERENCE
CONN	CONNECTION
CONSTR	CONSTRUCTION
CONSTR JT	CONSTRUCTION JOINT
CONT	CONTINUOUS (CONTINUATION)
CONTR	CONTRACTOR
COR	CORNER
CORR	CORRIDOR
COV	COVERED
CPL	CEMENT PLASTER
CPS	CYCLES PER SECOND (HERTZ)
CPT	CARPET
CR	CONDENSER WATER RETURN
CRES	CORROSIVE RESISTANT STEEL
CRG	CARRIAGE
CRSE	COURSE
CS	CONDENSER WATER SUPPLY
CS	COUNTER SINK
CSMT	CASEMENT
CT	CERAMIC TILE
CT	CURRENT TRANSFORMER
CTL	CARPET TILE
CU	CONDENSING UNIT
CU YD	CUBIC YARDS
CUH	CABINET UNIT HEATER
CV	CEILING VENT
CW	COLD WATER
CWR	CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY
CYL	CYLINDER
D	DEPTH (DEEP)
D	DIFFUSER
d	PENNY (as in nail - 10d)
DAM	DRESSED AND MATCHED
DA	DOUBLE ACTING
DB	DRY BULB
dB	DECIBEL
DBL	DOUBLE
DC	DIRECT CURRENT
DCJ	DOWELED CONTROL JOINT
DCJT	DUMMY CONTROL JOINT
DCL	DOOR CLOSER
DCW	DOMESTIC COLD WATER
DEG	DEGREE
DEMO	DEMOLITION
DEPR	DEPRESSION
DEPT	DEPARTMENT
DET	DETAIL
DF	DRINKING FOUNTAIN
DH	DOUBLE HUNG
DHW	DOMESTIC HOT WATER
DI	DEIONIZED WATER
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DISC	DISCONNECT
DIST	DISTRIBUTION
DL	DEAD LOAD
DMPR	DAMPER
DN	DOWN
DP	DAMP PROOFING
DPT	DEW POINT
DR	DOOR
DRN	DRAIN
DS	DOWN SPOUT
DV	DENTAL VACUUM
DWG	DRAWING
DWR	DRAWER
DWLS	DOWELS
DX	DIRECT EXPANSION
E	EAST
EA	EACH
EA	EXHAUST AIR
EDH	ELECTRIC DUCT HEATER
EER	ENERGY EFFICIENCY RATIO
EJ	EXPANSION JOINT
EL OR ELEV	ELEVATION - GRADE OR BUILDING
ELEC	ELECTRIC OR ELECTRICAL
ELEV	ELEVATOR
ENCL	ENCLOSURE
ENT	ENTERING
ENT	ENTRANCE
EQ	EQUAL
EQUIP	EQUIPMENT
ES	EACH SIDE
EST	ESTIMATE
EVAP	EVAPORATOR
EW	EACH WAY
EWC	ELECTRIC WATER COOLER
EXC	EXCAVATE
EXD	EXIT DEVICE
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPOSED
EXPL	EXPLOSION
EXPN	EXPANSION
EXT	EXTERIOR
F	FAHRENHEIT
F	FIRE
F	FLUSH or FRAME
FA	FRESH AIR
FCG	FACING
FD	FLOOR DRAIN
FDN	FOUNDATION
FE	FIRE EXTINGUISHER
FEB	FIRE EXTINGUISHER BRACKET
FEC	FIRE EXTINGUISHER CABINET
FG	FULL GLASS
FH	FIRE HYDRANT
FHC	FIRE HOSE CABINET
FIG	FIGURE
FIN	FINISH
FIX	FIXTURE
FL or FLR	FLOOR
FLASH	FLASHING
FLEX	FLEXIBLE
FLG	FLANGE
FLG	FLOORING
FLUOR	FLUORESCENT
FP	FIRE PROTECTION
FPM	FEET PER MINUTE
FPRF	FIRE PROOF
FR	FRAME
FR	FIRE RATED
FRG	FURRING
FS	FAR SIDE
FS	FLOOR SINK
FS	FULL SIZE
FT	FEET (FOOT)
FTG	FOOTING
FV	FIELD VERIFY
FWC	FABRIC WALL COVERING
G	GLASS or GLASS TYPE
G	GRILLE
G	NATURAL GAS
GA	GAGE OR GAUGE
GAL	GALLON
GALV	GALVANIZED
GEN	GENERAL
GFE	GOVERNMENT FURNISHED EQUIPMENT
GFE/CI	GOVERNMENT FURNISHED EQUIPMENT/CONTRACTOR INSTALLED
GFI	GROUND FAULT INTERRUPTER
GI	GALVANIZED IRON
GL	GLASS
GND	GROUND
GOVT	GOVERNMENT
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	GRADE
GRS	GALVANIZED RIGID STEEL CONDUIT
GRTG	GRATING
GSU	GLAZED STRUCTURAL UNITS
GWB	GYPSUM WALLBOARD
GWT	GLAZED WALL TILE
GYP	GYPSUM
H or HT	HEIGHT (HIGH)
HB	HOSE BIBB
HBD	HARDBOARD
HC	HANDICAPPED
HD	HEAD
HDPE	HIGH DENSITY POLYETHYLENE
HDR	HEADER
HDW	HARDWARE
HG	HALF GLASS
HIP	HIGH PRESSURE
HM	HOLLOW METAL
HORIZ	HORIZONTAL(LY)
HP	HORSE POWER
HPS	HIGH PRESURE STEAM
HPT	HIGH POINT
HR	HOUR
HS	HIGH STRENGTH
HSGYP	HIGH STRENGTH GYPSUM PLASTER
HTG	HEATING
HTR	HEATER
HW	HEAD WALL
HW	HOT WATER
HWH	HOT WATER HEATER
HWR	HOT WATER RETURN (HEATING)
HWS	HOT WATER SUPPLY (HEATING)
HYD	HYDRAULIC
I or FE	IRON
IC	INTERCOM
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IES	ILLUMINATING ENGINEERING SOCIETY
IG	INSULATED GLASS
IN	INCH
INSUL	INSULATION
INT	INTERIOR
INV	INVERT OR INVERTER
IP	IRON PIPE
ISF	INSIDE FACE
JB	JUNCTION BOX
JBOX	JUNCTION BOX
JC	JANITOR CLOSET
JCT	JUNCTION
JST	JOIST
JT	JOINT
K	KEY
KCP	KEENE'S CEMENT PLASTER
KIP or K	KILOPOUND (1000 LBS)
KIT	KITCHEN
KL	KEY LOCK
KP	KICK PLATE
KV	KILOVOLTS
KVA	KILOVOLT AMPERES
KW	KILOWATT
LAB	LABORATORY
LAU	LAUNDRY
LAV	LAVATORY
LBR	LUMBER
LBS	POUNDS
LD	LOAD
LDG	LOADING
LE	LEFT END
LG	LENGTH (LONG)
LIN	LINEAR
LIS	LAWN IRRIGATION SYSTEM
LL	LIVE LOAD
LLBB	LONG LEG BACK TO BACK
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LNTL	LINTEL
LP	LOW POINT
LPG	LIQUIFIED PETROLEUM GAS
LPS	LOW PRESSURE STEAM
LR	LIVING ROOM
LS	LAWN SPRINKLER
LT	LIGHT
LT WT	LIGHT WEIGHT
LTG	LIGHTING
LVT	LUXURY VINYL TILE
M	MIDDLE
M	THOUSAND
M & B	MATCHED AND BEADED
MA	MAKE-UP AIR
MACH	MACHINE
MAS	MASONRY
MAT or MATL	MATERIAL
MAX	MAXIMUM
MB	MACHINE BOLT
MBH	1000 BTUH
MC	MEDICINE CABINET
MC	MISCELLANEOUS CHANNELS
MECH	MECHANICAL
MER	MECHANICAL EQUIPMENT ROOM
MET	METAL
MFG	MANUFACTURING
MFR	MANUFACTURER
MH	MANHOLE
MICRO	MICROWAVE
MIN	MINIMUM
MISC	MISCELLANEOUS
ML	METAL LATH
MLDG	MOULDING
MO	MASONRY OPENING
MONO	MONOLITHIC
MT	METAL THRESHOLD
MTD	MOUNTED
N	NORTH
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NO	NUMBER
NR	NOT REQUIRED
NS	NEAR SIDE
NTS	NOT TO SCALE
NV	NARROW VISION
OA	OUTSIDE AIR
OB WG	OBSCURE WIRE GLASS
OBGL	OBSCURE GLASS
OBSC	OBSCURE
OC	ON CENTER(S)
OCEW	ON CENTER EACH WAY
OD	OUTSIDE DIAMETER
OFF	OFFICE
OH	OVERHEAD
OPNG	OPENING
OPP	OPPOSITE
OPS	OPERATIONS
OS & Y	OUTSIDE SCREW & YOKE
OSF	OUTSIDE FACE
OV	OVERFLOW VALVE
OX	OXYGEN
OZ	OUNCE
P	PAINT
PA	PUBLIC ADDRESS
PBS	PUSH BUTTON STATION
PC	PIECE
PC	POINT OF CURVATURE
PC	PRECAST
PCC	PORTLAND CEMENT CONCRETE
PCT	PORCELAIN CERAMIC TILE
PD	PRESSURE DROP
PE	POLYETHYLENE
PEN	PENETRATION
PERF	PERFORATED
PH	PHASE
PHAR	PHARMACY
PI	POINT OF INTERSECTION
PIV	POST INDICATING VALVE
PL or P	PLATE
PLAM	PLASTIC LAMINATE
PLAS	PLASTER
PLATF	PLATFORM
PLBG	PLUMBING
PLG	PILING
PLWD	PLYWOOD
PNL	PANEL
POL	POLISH(ED)
PORC	PORCELAIN
PPM	PARTS PER MILLION
PR	PAIR
PREFAB	PREFABRICATED
PREFIN	PREFINISHED
PRESS	PRESSURE
PROJ	PROJECT
PRV	PRESSURE REGULATING VALVE
PS	PRESSED STEEL
PSFT	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT
PT	POINT OF TANGENCY
PTD	PAINTED
PTN	PARTITION
PVC	POLYVINYL-CHLORIDE
PVMT	PAVEMENT
PW	PASS WINDOW
1/4 RD	QUARTER ROUND
QT	QUARRY TILE
QT	QUART
QTRS	QUARTERS
QTY	QUANTITY
QTZ	QUARTZ
R	REGISTER
R	RISER
RA	RETURN AIR
RAD OR R	RADIUS
RB	RESILIENT BASE
RC	REMOTE CONTROL
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
RE	RIGHT END
REC	RECEIVER
RECP	RECEPTACLE
RECR	RECREATION
RECT	RECTIFIER
REF	REFERENCE
REFR	REFRIGERANT
REFR	REFRIGERATOR
REG	REGISTER
REINF	REINFORCEMENT
REM	REMOVE(ABLE)
REQD	REQUIRED
RESIL	RESILIENT
REV	REVISIONS
RFG	ROOFING
RH	RELATIVE HUMIDITY
RL	REFRIGERANT LIQUID
RM	ROOM
RND	ROUND
RO	ROUGH OPENING
RPM	REVOLUTIONS PER MINUTE
RT	RUBBER TILE
RTU	ROOF TOP UNIT
RUB	RUBBER
S	SOUTH
SA	SUPPLY AIR
SAN	SANITARY
SB	SECURITY BARS
SB	SPLASH BLOCK
SCH	SCHEDULE
SCHED	SCHEDULE
SCR	SCREW
SCT	STRUCTURAL CLAY TILE
SCUT	SCUTTLE
SCW	SOFT COLD WATER
SD	STORM DRAIN
SD	SUBDRAIN
SDI	STEEL DECK INSTITUTE
SECT	SECTION
SECY	SECRETARY
SEQ	SEQUENCE
SF	SQUARE FOOT (FEET)
SFU	STRUCTURAL FACING UNIT
SHLD	SHOULDER
SHT	SHEET
SHTG	SHEATHING
SHW	SOFT HOT WATER
SHV	SHELF OR SHELVES
SIM	SIMILAR
SJI	STEEL JOIST INSTITUTE
SL	SLIDING
SL	SNOW LOAD
SLBB	SHORT LEG BACK TO BACK
SM	SPRINKLER MAIN
SNGL	SINGLE
SOV	SHUT OFF VALVE
SPA	SPACE(ING)
SPEC	SPECIFICATIONS
SPF	SOUNDPROOF
SPH	SPACE HEATER
SPKR	SPEAKER
SPL	SPECIAL
SQ	SQUARE
SS	SANITARY SEWER
SS	SOLID SURFACE
SS	STAINLESS STEEL
SSMR	STANDING SEAM METAL ROOFING
STA	STATION
STAIR	STAIRWAY
STC	SOUND TRANSMISSION COEFFICIENT
STD	STANDARD
STGR	STRINGER
STIFF	STIFFENER
STIRR	STIRRUPS
STL	STEEL
STN	STONE
STOR	STORAGE
STR	STRUCTURAL
SUB FL	SUB FLOOR
SUCT	SUCTION
SUSP	SUSPENDED
SVF	SHEET VINYL FLOORING
SW	SWITCH
SWBD	SWITCH BOARD
SYM	SYMMETRICAL
T	TREAD
T or TLT	TOILET
TAN	TANGENT
TBD	TACK BOARD
TE	TOP ELEVATION
TEL	TELEPHONE
TEMP	TEMPERATURE
TER	TERRAZZO
TERM	TERMINAL
TGL	TOGGLE
TH	THRESHOLD
THK	THICK
THRD	THREAD
TO	TOP OF
TOB	TOP OF BEAM
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOJ	TOP OF JOIST
TOPO	TOPOGRAPHIC
TOS	TOP OF STEEL
TOW	TOP OF WALL
TRANS	TRANSVERSE
TSTAT	THERMOSTAT
TV	TELEVISION
TW	TEMPERED WATER
TWR	TEMPERED WATER RETURN
TYP	TYPICAL
U/C	UNDER CABINET
UC	UNIT COOLER
UG	UNDERGROUND
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES
UNEX	UNEXCAVATED
UNFIN	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SYSTEM
UR	URINAL
UT	UTILITY
UV	UNIT VENTILATOR
V	VISION
V	VOLT
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VCP	VITRIFIED CLAY PIPE
VCT	VINYL COMPOSITION TILE
VD	VAULT DOOR
VEL	VELOCITY
VENT	VENTILATOR(ION)
VERT	VERTICAL
VEST	VESTIBULE
VFD	VARIABLE FREQUENCY DRIVE
VOL	VOLUME
VPC	VERTICAL POINT OF CURVATURE
VPI	VERTICAL POINT OF INTERSECTION
VPT	VERTICAL POINT OF TANGENCY
VS	VENT STACK
VT	VINYL-TILE
VTR	VENT THRU ROOF
VWC	VINYL WALL COVERING
W	WEST
W	WIDE (WIDTH)
W	WIRE
W/	WITH
W/O	WITHOUT
WB	WET BULB
WC	WATER CLOSET
WC	WATER COLUMN
WD	WASTE DRAIN
WD	WOOD
WD BLKG	WOOD BLOCKING
WD DR	WOOD DOOR
WDW	WINDOW
WF	WIDE FLANGE
WG	WIRE GLASS
WH	WALL HYDRANT
WHT	WHITE
WI	WROUGHT IRON
WKSH	WORK SHOP
WL	WIND LOAD
WNSCT	WAINSCOT
WP	WEATHER PROOF
WP	WORK POINT
WPF	WATER PROOF
WPFG	WATER PROOFING
WRB	WARDROBE
WS	WASTE STACK
WT	WEIGHT
WWF	WELDED WIRE FABRIC
WWM	WOVEN WIRE MESH
XFMR	TRANSFORMER
YD	YARD or YARD DRAIN

REF. NOTES (X)

PROJECT ARCHITECTURAL REFERENCED NOTES

1. STRUCTURAL STOOP, SEE STR.
2. PREFINISHED MET DOWNSPOUT
3. 6" METAL GUTTER WITH 4"X6" METAL DOWNSPOUTS
4. OUTLINE OF ROOF ABOVE
5. OUTLINE OF BUILDING BELOW
6. 36" X 36" ROOF HATCH WITH CRICKETS AS REQUIRED ON THE HIGH SIDE OF OPENING- ROOF HATCH TO OPEN FULLY TO ALLOW REMOVAL OF TURBINE FIRE PUMP. COORDINATE ROOF HATCH LOCATION WITH EQUIPMENT.
7. PRECAST CONC. SPLASHBLOCK
8. CONC CURB - SEE STR
9. MECH ROOF PENETRATION - COORDINATION LOCATION WITH FIRE PROTECTION SHEETS AND EQUIPMENT

GENERAL NOTES

A. EXISTING CONDITIONS ARE BASED ON DRAWINGS PROVIDED BY THE OWNER AND LIMITED FIELD VERIFICATION. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND NOTIFY THE CONTRACTING OFFICER OF ANY DISCREPANCIES OR VARIATIONS FROM THOSE SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL ADJUST TO ACTUAL FIELD CONDITIONS AT NO ADDITIONAL EXPENSE TO THE OWNER.

B. ALL CONTRACTORS ARE RESPONSIBLE FOR REVIEWING ENTIRE SET OF DOCUMENTS TO DETERMINE THEIR FULL SCOPE OF WORK.

C. CONTRACTOR SHALL TAKE ALL MEASUREMENTS FOR WORK AND BE RESPONSIBLE FOR SAME. CONTRACTOR SHALL ADJUST FOR ACTUAL FIELD CONDITIONS. COORDINATE THE WORK AND SHOP DRAWINGS WITH ALL OTHER TRADES AFFECTED.

D. SCREENED HALF-TONE LINES INDICATE EXISTING CONSTRUCTION TO REMAIN. FULL-TONE LINES INDICATE NEW OR RELOCATED CONSTRUCTION.

E. BUILDING ELEVATION XXX.X' ON THE SITE PLAN EQUALS ELEVATION 100'-0" ON THE ARCHITECTURAL PLANS.

F. DIMENSIONS ARE TYPICALLY TO FINISH FACE OF MASONRY, CONCRETE, GYPSUM WALL BOARD, AND METAL FRAMES; OR CENTER LINE OF COLUMN OR BEAMS, UNLESS NOTED OTHERWISE.

G. ALL ANGLES ON THE FLOOR PLANS ARE 45 OR 90 DEGREES UNLESS OTHERWISE INDICATED.

H. SEE SHEET A101 FOR DOOR AND ROOM FINISH SCHEDULES.

I. SEE SHEET A101 FOR PARTITION TYPES AND NOTES.

APPLICABLE CODE NOTES:

CODE SUMMARY

APPLICABLE CODES		
BUILDING :	2021 IBC	
ACCESSIBILITY :	2010 ADA	
ENERGY :	2021 IECC	
OCCUPANCY GROUP :	U	
TYPE OF CONSTRUCTION :	VB	
FIRE RESISTANCE OF STRUCTURAL ELEMENTS	**RATING (HOURS)**	**DESIGN NUMBER**
EXTERIOR WALLS		
LOAD BEARING WALLS	0	-
NON-LOAD BEARING WALLS	0	-
FIRE SEPARATION ASSEMBLIES		
EXITS	0	-
FLOOR CONSTRUCTION	0	-
ROOF CONSTRUCTION	0	-
FIRE WALLS	NA	-

BUILDING STATISTICS

AREA (GROSS SQUARE FOOTAGE) :

OFFICE	184 SF
TOTAL	**184 SF**

NUMBER OF STORIES : 1

ARCHITECTURAL SHEET LIST

ARCHITECT — RYAN J. LANGEMEIER — A-2616 — 12-15-2022 — STATE OF NEBRASKA

NATIONAL PARK SERVICE — Department of the Interior

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REVISED	
DATE	INITIAL

PREPARED: SMW — DESIGNED
SMW — DRAWN
RJL — CHECKED
12/15/2022 — DATE

TITLE OF SHEET
ARCHITECTURAL INFO SHEET
EDUCATION CENTER FIRE SERVICE
HOMESTEAD NATIONAL MONUMENT OF AMERICA
8523 NE-4
BEATRICE, NE 68310

ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **A 00**
DRAWING NO. 368 / 80056
PMIS **207662**
SHEET **5** OF **31**

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SECTION 071326 - SELF ADHERING WATERPROOFING MEMBRANE

PART 1 - GENERAL
1.01 SECTION INCLUDES
A. Surface preparation.
B. Application of rolled, self-adhering waterproofing membrane system.
1.02 SUBMITTALS
A Submit manufacturer's product data and application instructions.

PART 2 - PRODUCTS
2.01 MANUFACTURER
A. WR. MEADOWS, Inc., HYPERLINK "http://www.wrmeadows.com" www.wrmeadows.com.
B. Or equal as approved by Contracting Officer or Architect.
2.02 MATERIALS
A. Rolled, Self-Adhering Waterproofing Membrane: Polymeric waterproofing membrane protected by release paper on cross-laminated polyethylene carrier film with exposed polymeric membrane strips on both sides protected by pull-off release strips.
1. Performance Based Specification: Waterproofing membrane shall have the following characteristics:
a. Compliance: AREMA Specification Chapter 29 - Waterproofing.
b. Thickness:
1) Carrier Film: 4 mils.
2) Polymeric Membrane: 56 mils.
c. Tensile Strength, ASTM D412, Die C:
1) Carrier Film: 5,900 psi minimum.
2) Polymeric Membrane: 460 psi minimum.
d. Elongation, ASTM D412, Die C: Polymeric Membrane: 971 % minimum.
e. Peel Adhesion, ASTM D903: 11.8 lbf/in.
f. Lap Adhesion, ASTM D1876: 8.62 lbf/in.
g. Water Vapor Permeability, ASTM E96, Method B: 0.036 perms.
h. Water Absorption, ASTM D570: 0.1 percent, 72 hours maximum.
i. Resistance to Hydrostatic Head: Equivalent to 230.9 feet of water.
j. Puncture Resistance, ASTM E154: 48.2 lbf .
k. Exposure to Fungi, Soil Test: Pass, 16 weeks.
l. Color:
1) Carrier Film: White.
2) Polymeric Membrane: Black.
2.03 ACCESSORIES
A. Surface Conditioner:
1. Temperatures Above 40ºF (4ºC): Mel-Prime Water Base Primer.
2. Temperatures Above 0ºF (-18ºC): Mel-Prime VOC Compliant Solvent Base Primer or Standard Solvent Base Primer.
B. Pointing Mastic: POINTING MASTIC.
C. Corner Tape: DETAIL STRIP.

PART 3 - EXECUTION
3.01 EXAMINATION
A. Examine surfaces to receive self-adhering membrane. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.
3.02 SURFACE PREPARATION
A. Protect adjacent surfaces not designated to receive waterproofing.
B. Seal all terminations with pointing mastic.
C. Per manufactures recommendations
3.03 APPLICATION
A. Horizontal Application
1. Apply waterproofing membrane system in accordance with manufacturer's instructions.
B. Vertical Application
1. Apply waterproofing membrane system in accordance with manufacturer's instructions.
3.04 PROTECTION
A. Protect membrane on vertical and horizontal applications with immediate application of waterproofing protection course, rolled matrix drainage board.
B. Backfill immediately using care to avoid damaging waterproofing membrane system.

END OF SECTION

SECTION 072100 - THERMAL INSULATION

PART 1 - GERNERAL
1.1 SUMMARY
A. Section Includes:
1. Extruded polystyrene foam-plastic board.
2. Glass-fiber blanket.
1.2 ACTION SUBMITTALS
A. Product Data: For each type of product.

PART 2 - PRODUCTS
2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD
A. Extruded Polystyrene Board, Type IV (foundation insulation): ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. DiversiFoam Products.
b. Dow Chemical Company (The).
c. Owens Corning.
2.2 GLASS-FIBER BLANKET
A. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. CertainTeed Corporation.
b. Johns Manville; a Berkshire Hathaway company.
c. Knauf Insulation.
d. Owens Corning.
2.3 ACCESSORIES
A. Insulation for Miscellaneous Voids:
1. Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.
B. Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.
C. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
D. vapor retarder sheet: Polyethylene sheeting complying with ASTM D4397, clear colored.
1. Thickness: 10 mil, 0.010 inch, nominal.
2. Seam and Perimeter Tape: Polyethylene self-adhering type, mesh reinforced, 2 inches wide; compatible with sheet material

PART 3 - EXECUTION
3.1 INSTALLATION, GENERAL
A. Comply with insulation manufacturer's written instructions applicable to products and applications.
B. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
3.2 INSTALLATION OF FOUNDATION WALL INSULATION
A. Butt panels together for tight fit.
B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors.
C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.
3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION
A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For wood-framed wall cavities where cavity heights exceed 2438 mm (96 inches), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

END OF SECTION

SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL
1.1 SUMMARY
A. Section Includes:
1. Vapor-permeable, fluid-applied air barriers.
1.2 ACTION SUBMITTALS
A. Product Data: For each type of product.
1.3 QUALITY ASSURANCE
A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

PART 2 - PRODUCTS
2.1 PERFORMANCE REQUIREMENTS
A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
2.2 MEDIUM-BUILD AIR BARRIERS, VAPOR PERMEABLE
A. Medium-Build, Vapor-Permeable Air Barrier: Synthetic polymer material with an installed dry film thickness, according to manufacturer's written instructions, of 17 to 30 mils over smooth, void-free substrates.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. 3M Industrial Adhesives and Tapes Division.
b. DuPont Protection Solutions: E. I. du Pont de Nemours and Company.
c. Sto Corp.
d. W. R. Meadows, Inc.
2. Physical and Performance Properties:
a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178 and ASTM E 2357.
b. Vapor Permeance: Minimum 10 perms; ASTM E 96/E 96M, Desiccant Method, Procedure A.
c. Ultimate Elongation: Minimum 250 percent; ASTM D 412, Die C.
d. Adhesion to Substrate: Minimum 16 lbf/sq. in. when tested according to ASTM D 4541.
e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly if applicable.
f. UV Resistance: Can be exposed to sunlight for 180 days according to manufacturer's written instructions.
2.3 ACCESSORY MATERIALS
A. Requirement: Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

PART 3 - EXECUTION
3.1 SURFACE PREPARATION
A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
C. Remove fins, ridges and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.
D. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
E. Bridge isolation joints, expansion joints, and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.
3.2 INSTALLATION
A. Install materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
C. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
D. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.
E. Medium-Build Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply an increased thickness of air-barrier material in full contact around protrusions such as masonry ties.
1. Vapor-Permeable, Medium-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements, applied in one or more equal coats. Apply additional material as needed to achieve void- and pinhole-free surface, but do not exceed thickness on which required vapor permeability is based.
F. Do not cover air barrier until it has been tested and inspected by testing agency.
G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.
3.3 CLEANING AND PROTECTION
A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
B. Remove masking materials after installation.

END OF SECTION

SECTION 073110 - SHINGLES

PART 1 - GENERAL
1.1 SECTION INCLUDES
A. Multi-Width Synthetic shake shingles, underlayment, flashings, fasteners, and accessories
1.2 RELATED SECTIONS
A. Section 076200 - Flashing and Sheet Metal
1.3 REFERENCES
A. American Society for Testing and Materials (ASTM)
1. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
2. ASTM E 108 (UL 790) - Standard Test Methods for Fire Tests of Roof Coverings
B. Underwriters Laboratories (UL)
1. ASTM E 108 (UL 790) - Standard Test Methods for Fire Tests of Roof Coverings
C. International Code Council (ICC): ES Acceptance Criteria AC07 Section 4.9
1.4 PERFORMANCE REQUIREMENTS
A. Shake roof system to consist of manufactured synthetic shakes attached to structural substrate to form weather tight roof envelope with no measurable water penetration
B. Shakes shall be manufactured with variations in size, textured faces and edges, and no less than ¾" thickness to provide a realistic installed appearance
C. Shakes shall be manufactured with no variation in color
D. Method of attachments shall be designed to adequately resist wind uplift for roof configuration and project location
1.5 SUBMITTALS
A. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Shingles, underlayment, flashings, fasteners, and accessories indicating composition, properties, and dimensions. Provide data showing compliance with specified requirements
2. Preparation instructions and recommendations
3. Storage and handling requirements and recommendations
4. Installation methods
B. Shop Drawings: Drawings illustrating shingle layout, method of attachment, flashings, trim, conditions at eaves, intersections with adjacent materials, and other installation details
C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and surface textures
D. Verification Samples: For each finish product specified, two samples, representing actual product, color, and texture
1.6 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturer of synthetic shingles
B. Installer Qualifications: Company specializing in installing shingle roof systems with 5 years minimum experience
1.7 DELIVERY, STORAGE, AND HANDLING
A. Ship in bundles of shingles. Bundles shall be assembled such that sorting at job site is not required
B. Deliver shingles to site in manufacturer's unopened, labeled bundles. Promptly verify quantities and condition. Immediately remove damaged products from site
C. Store products in protected environment, clear of ground, moisture, UV, and protected from traffic and construction activities. Store shingles on edge no more than 2 pallets high, do not store flat. Do not store on site for prolonged period unless weather and UV protected
D. Store synthetic shake products at temperature between 40- and 120-degrees F
E. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction
1.8 PROJECT CONDITIONS
A. Anticipate and observe environmental conditions (temperature, humidity, and moisture) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits
1.9 WARRANTY
A. Warranty Requirements:
1. Manufacturer's 50 years warranty for manufacturing defects that results in leaks under normal weather and use conditions
2. Installer's 2 years total roof system warranty including underlayment, flashings, trim, and other roof components against water penetration

PART 2 - PRODUCTS
2.1 MANUFACTURERS
A. Acceptable Manufacturer: CeDUR manufactured by Colorado Roofing Products, LLC, which is located at: 3590 Himalaya Road, Aurora, CO 80011; Toll Free Tel: (844) 974-9196; Tel: (720) 974-9200; Fax: (720) 974-3193; Email: Info@CeDUR.com, Web: www.cedur.com
B. Substitutions: Not permitted
2.2 SYNTHETIC SHAKE SHINGLES
A. Lightweight, synthetic shakes with the appearance, color, texture, and thickness of natural wood shakes
1. Product: Multi-Width Shake as manufactured by CeDUR
2. Material: Engineered polymer formulated from 100 percent virgin polyurethanes to ensure high quality and consistency of raw materials. Use of recycled materials is not acceptable
3. Attributes:
a. Fire resistance: Class A (without the use of Class A rated underlayment's) tested in accordance with ASTM E 108/UL 790
b.Impact resistance: Class 4 to withstand two drops of 2 inches diameter, 1.2 pounds steel ball dropped from 20 feet tested in accordance with UL 2218
c. Freeze-thaw resistance: No crazing, cracking, or other deleterious surface changes after one-month exposure with temperature cycled from -40 to +180 degrees F in 22 hours tested in accordance with International Code Council (ICC) – ES Acceptance Criteria AC07 Section 4.9
d. Accelerated weathering: Little change after 2,500 hours exposure to ultraviolet (UV) radiation, elevated temperature, moisture, and thermal shock tested in accordance with International Code Council (ICC) – ES Acceptance Criteria AC07 Section 4.9
e. Installed weight:
1. At 9 inches exposure: 188 pounds per square
2. At 10 inches exposure: 170 pounds per square
3. Profile: Solid polyurethane product manufactured in a rectangular shape with exposed to view upper surface and edges textured to resemble natural wood shake
4. Size: Shake
a. Thickness: Varies from 1/8 inch at top to ¾ inch at bottom
b.Length: 23.75 inches
c. Variable widths: 5, 7, and 12 inches to create appearance of random sized natural wood shake
5. Starter Shingle: Provide 15 inches long by 15 inches wide
6. Markings: Form shingles with markings on upper surface to indicate nailing locations along with manufacturers quality markings
7. Color: Provide shingles in single color comparable to natural wood shakes, no color stabilizers allowed providing a natural aging process. Verify color with COR.
8. Shake Pattern: Provide shakes factory blended single color and widths to create installed appearance designated as follows
a. Walden by CeDUR
2.3 ACCESSORIES
A. Underlayment: Architecturally specified underlayment that meets ASTM D226 requirement.
B. Waterproof Sheet Membrane: Cold applied, self-adhering waterproof membrane composed of polyethylene film coated one side with rubberized asphalt adhesive
1. Thickness: 40 mils
2. Low temperature flexibility: Unaffected at minus 32 degrees F
3. Minimum tensile strength: 250 psi
4. Minimum elongation: 250 percent
C. Flashing: Fabricate from sheet to profiles and dimensions indicated on Drawings and approved shop drawings and in accordance with general requirements specified in Section 07 60 00 – Flashing and Sheet Metal
1. Material: No less than 26 gauge galvanized steel
2. Linear components: Form in longest possible lengths with 8 feet as minimum
3. Counter Flashings: Extend 5 inches minimum up vertical surfaces and 5 inches minimum under shingles
4. Valley flashings: 24 inches minimum width and extending 11 inches minimum from valley center line
5. Fabricate eave flashings with bottom edge formed outward ¼ inch and hemmed to form drip
D. Fasteners: 3/8-inch ring shank flat head nails 1-3/4 inches long
1. Material: Stainless steel
2. Material: Hot-dipped galvanized

PART 3 - EXECUTION
3.1 EXAMINATION
A. Do not begin installation until substrates have been properly prepared
B. If substrate preparation is the responsibility of another installer, notify COR of unsatisfactory preparation before proceeding
3.2 PREPERATION
A. Coordinate installation with provision of gutters and downspouts specified in Section 07 60 00 -Flashing and Sheet Metal
B. Inspect roof framing and plywood or OSB substrate. Verify roof is complete, rigid, braced, and deck members are securely fastened. Ensure proper ventilation has been provided for roof space. Do not proceed with roofing until deficiencies are addressed
C. Verify roof deck is clean, dry, and ready to receive synthetic shake shingles
D. Remove dirt, loose fasteners, and other protrusions from roof surface
3.3 INSTALLATION GENERAL
A. Install self-adhered waterproof sheet membrane on the eaves. Cover the waterproof sheet membrane and the remaining portions of the roof as scheduled with the approved underlayment(s). Then install waterproof sheet membrane in valleys, along walls and around projections terminating on top of underlayment
3.4 UNDERLAYMENT INSTALLATION
A. Stripping Ply: A full sheet of self-adhered waterproof sheet membrane is required in all valleys. At least 18 inches (457 mm) shall be required on all gable ends, against walls, and around projections
1. In areas where the average daily temperature in January is 25 degrees F (-4 degrees C) or lower or where ice buildup is possible, install self-adhered waterproof sheet membrane from the bottom edge extending two feet (610 mm) above the exterior wall line on all eaves
B. Install waterproof sheet membrane over full roof area. Apply waterproof sheet membrane in fair weather at temperatures of 40 degrees F (4 degrees C) or higher. Adhere and attach as recommended by manufacturer of waterproof sheet membrane
1. Start underlayment installation at lower edge of roof. Install perpendicular to roof slope with 4 inches (102 mm) minimum side laps and 6 inches (152 mm) minimum end laps. Extend underlayment 4 inches (102 mm) minimum up vertical wall intersections
2. Do not leave underlayment membrane exposed for lengthy period of time. Exercise care not to puncture or tear underlayment barrier with subsequent roofing operations
3.5 FLASHING INSTALLATION
A. Install overhanging drip edge on eaves and gable ends and metal flashings at valleys, ridges, hips, roof curbs, penetrations, and intersections with vertical surfaces in accordance with Section 07 60 00 -Flashing and Sheet Metal
B. Weather lap joints 2 inches minimum and seal with sealant as specified in Section 07 91 26 -Joint Fillers
C. Secure in place with clips, nails, or other fasteners
3.6 INSTALLATION – GENERAL
A. Install synthetic shakes in accordance with manufacturer's instructions and approved shop drawings
B. Accurately layout shingles. Ensure that edges are parallel and perpendicular to roof eaves
C. Cutting: Layout work to avoid cutting shingles.
1. At gables and vertical intersections, vary combination of shingle widths and spacing of shingles to avoid cutting
2. If cutting is required, place shingle such that cut edge is not exposed
3. Use circular saw or straight edge and utility knife if cuts are necessary
3.7 SHAKE SHINGLE INSTALLATION
A. Install shingles in a rack or pyramid style from factory assembled bundles
B. Exposure: Install shingles in staggered pattern with 9 inches exposure and bottom edges of adjacent shingles staggered 1 inch (25 mm)
C. Spacing: Provide 1/4 - 3/8-inch gap between shingles to allow for expansion and contraction
D. Stagger shingle joints in one course 1-1/2 inches minimum from joints in course below
E. Eaves: Install row of starter shingles at eaves as base layer. Project eave shingles approximately 1 inch, 1/8 inch past overhanging drip edge, or as required to allow water to drain into gutter or off eave as indicated or required
F. Gables: Project shingles approximately 3/4 inch beyond gable rakes or 1/8 inch past overhanging drip edge
G. Ridges and Hips: After field shingle installation is complete, install preformed 5-inch CeDUR Hip/Ridge
1. Ridges: Use 5" CeDUR preformed Hip/Ridge shakes with 10" exposure. Start ridge shingles at leeward end. Face shingle laps away from prevailing wind
2. Hips: Use 5" CeDUR preformed Hip/Ridge shakes with 10" exposure. Start hip course at eave
H. Fastening: Attach each shingle to wood deck with 2 or 3 nails depending on shake size using hammer or pneumatic nail gun.
1. Place nails at locations indicated on shingles
2. Ensure good penetration but do not overdrive nail. Do not nail at angle. Ensure head is flush with shingle surface to avoid creating craters
3. At valleys do not nail shingles within 5 inches of valley center line
J. Snow Guards: Install snow guards in areas where snow fall is possible
3.8 FIELD QUALITY CONTROL
A. Inspect units as they are installed. Do not install cracked, broken, twisted, curled, or otherwise damaged units
B. As work progresses, exercise care not to scratch or mar installed units. Units damaged during installation shall be immediately removed and discarded
C. After approximately 200 units have been installed, inspect roof from ground. Verify proper layout and appearance. Repeat inspection every 200 shingles
D. Visually inspect complete installation to ensure that it is weather tight
3.9 CLEANING AND PROTECTION
A. Remove excess materials and debris from finished surfaces and adjacent roof areas
B. Do not allow work force on completed roof
C. Protect installed products until completion of project
D. Touch-up, repair or replace damaged products before Substantial Completion

END OF SECTION

SECTION 074293 - METAL SOFFIT PANELS

PART 1 - GENERAL
1.1 SUMMARY
A. Section includes metal soffit panels.
1.2 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
C. Samples: For each type of metal panel indicated.
1.3 INFORMATIONAL SUBMITTALS
A. Product test reports.
B. Warranties: Samples of special warranties.
1.4 CLOSEOUT SUBMITTALS
A. Maintenance data.
1.5 WARRANTY
A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

PART 2 - PRODUCTS
2.1 PERFORMANCE REQUIREMENTS
A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
1. Wind Loads: As indicated on Drawings.
2. Deflection Limits: For wind loads, no greater than **1/240** of the span.
B. Air Infiltration: Air leakage of not more than [0.3 L/s per sq. m (0.06 cfm/sq. ft.)] when tested according to ASTM E 283 at the following test-pressure difference:
1. Test-Pressure Difference: [75 Pa (1.57 lbf/sq. ft.)] [300 Pa (6.24 lbf/sq. ft.)].
C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
1. Test-Pressure Difference: [137 Pa (2.86 lbf/sq. ft.)] [300 Pa (6.24 lbf/sq. ft.)].
D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): [67 deg C (120 deg F), 100 deg C (180 deg F).

PART 3 - EXECUTION
3.1 PREPARATION
A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.
1. Soffit Framing: Clip furring channels to supports as required to comply with requirements for assemblies indicated.
3.2 METAL PANEL INSTALLATION
A. Metal Soffit Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
1. Apply panels and associated items true to line for neat and weathertight enclosure.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
C. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
3.3 CLEANING
A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION

SECTION 074643.13 - ENGINEERED WOOD SIDING

PART 1 - GENERAL
1.1 SUMMARY
A. Section Includes:
1. Engineered wood siding.
a. Lap siding.
2. Accessories.
B. Related Requirements:
1. Section 072726 "Fluid-Applied Membrane Air Barriers" for vapor-retarding and vapor-permeable fluid-applied air barriers.
1.2 DEFINITIONS
A. Treated Engineered Wood: Engineered wood products manufactured for exterior use treated with manufacturer's proprietary process to resist fungal decay and termite damage.
1.3 COORDINATION
A. Coordinate engineered wood siding installation with flashings, trim, and construction of other adjoining work to ensure proper sequencing, construction progress, and to provide a leakproof, secure, and noncorrosive installation.
1.4 PREINSTALLATION MEETINGS
A. Preinstallation Conference: Conduct conference at Homestead National Monument of America, 8523 NE-4, Beatrice, Ne 68310.
1.5 INFORMATIONAL SUBMITTALS
A. Qualification Data: For engineered wood siding Installer.
B. Product Certificates: For each type of engineered wood siding.
C. Research/Evaluation Reports: For each type of engineereed wood siding required, from ICC-ES.
D. Sample Warranty: For special warranty.
1.6 CLOSEOUT SUBMITTALS
A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.
1.7 MAINTENANCE MATERIAL SUBMITTALS
A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Furnish full lengths of engineered wood siding including related accessories, in a quantity equal to 2 percent of amount installed.
1.8 QUALITY ASSURANCE
A. Installer Qualifications: Installers trained by siding manufacturer.
B. Panel to comply with HUD-UM-40c - HUD Building Product Standards and Certification Program for Plywood and Other Performance Rated Wood-Based Structural-Use Panels.

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SECTION 074643.13 - ENGINEERED WOOD SIDING - CONTINUED

1.9 DELIVERY, STORAGE, AND HANDLING
A. Deliver components and other manufactured items so as not to be damaged or deformed. Package components for protection during transportation and handling with manufacturer's name and identification of products.
B. Unload, store, and erect components in a manner to prevent bending, warping, twisting, and surface damage. Maintain slip sheet until piece is being prepared for installation.
C. Store components on flat surfaces clear of the ground. Store under roof or covered with suitable weathertight and ventilated covering, and in accordance with manufacturers' written instructions.
1.10 WARRANTY
A. Manufacturer's Trim and Siding Limited Warranty: Manufacturer agrees to repair or replace components of engineered wood siding against substrate damage within specified warranty period.
1. Substrate damage is defined as deterioration, buckling, and overlay issues caused by manufacturing defects or termite damage.
2. Hail damage is defined as a crack or chip in the surface overlay, or product substrate dents exceeding 3/8 inch in length or diameter and is caused by hail.
3. Limited Warranty Period: 50 years from date of installation and written to Owner on date of Substantial Completion.
B. Manufacturer's Trim and Siding Prefinish Limited Warranty: Manufacturer agrees to repair or replace components of prefinished engineered wood siding against finish and substrate damage within specified warranty period.
1. Substrate damage is defined as deterioration, buckling, or overlay issues caused by manufacturing defects or termite damage.
2. Hail damage is defined as cracks or chips in the surface overlay or dent in the substrate of the product that exceeds 3/8 inch in length or diameter, and is caused by hail.
3. Finish damage is defined as, under normal conditions and use, discoloring due to chalking, peeling, blisters, cracks; erosion to the extent of exposing the substrate; or yellowing or color fade change from light exposure not to exceed 5 Delta E CMC (2:1).
4. Limited Warranty Period for Substrate: 50 years from date of installation and communicated to Owner on date of Final Completion.
5. Limited Warranty Period for Finish: 15 years from date of installation and communicated to Owner on date of Final Completion.
C. Manufacturer's Accessories and Non-Standard Applications Limited Warranty: Manufacturer agrees to repair or replace components of manufacturer's accessories and when used in approved non-standard applications against substrate and finish damage within specified warranty period.
1. Substrate damage is defined as deterioration, buckling, or overlay issues caused by manufacturing defects or termite damage.
2. Hail damage is defined as cracks or chips in the surface overlay or dent in the substrate of the product that exceeds 3/8 inch (10 mm) in length or diameter, and is caused by hail.
3. Finish damage is defined as, under normal conditions and use, discoloring due to chalking, peeling, blisters, cracks; erosion to the extent of exposing the substrate; or yellowing or color fade change from light exposure not to exceed 5 Delta E CMC (2:1).
4. Limited Warranty Period for Substrate and Finish: 10 years from date of installation and communicated to Owner on date of Final Completion.

PART 2 - PRODUCTS
2.1 MANUFACTURERS
A. Source Limitations: Obtain products, including related accessories, from single source from single manufacturer.
2.2 ENGINEERED WOOD SIDING
A. Basis-of-Design Product: Subject to compliance with requirements, provide Louisiana-Pacific Corporation; LP SmartSide Trim & Siding and ExpertFinish Trim & Siding or comparable product by one of the following:
1. Allura.
2. James Hardie.
B. Treated Engineered Wood Lap Siding: Exterior-grade, resin-saturated, paper overlay laminated to EPA-registered zinc-borate-treated engineered wood siding. Exposed edges sealed for moisture resistance. Manufacturer's acrylic finish.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Louisiana-Pacific Corporation; LP SmartSide Lap Siding and ExpertFinish Lap & Siding, 76 Series or comparable product.
2. Thickness: 0.354 inch total thickness.
3. Width: 5.84 inches.
4. Length: 12 ft.
5. Color: As selected by COR from manufacturer's full range, Match existing adjacent building.
6. Texture: As selected by COR.
2.3 ACCESSORIES
A. Fasteners: Hot-dipped galvanized nails, with 0.092-inch diameter shank, in length required to penetrate [wood structural panels and]structural framing a minimum of 1-1/2 inches, as recommended in writing by composite siding system manufacturer suitable for and compatible with system materials. Larger diameter fasteners may be required depending on wind pressure, wind speed, and wind exposure category limitations for structures in product approvals PR-N124 or ESR-1301.
B. Sealant: ASTM C920, minimum Class 25 sealant.
C. Water-Resistive Barrier: ASTM D226 or other approved water-resistive barrier.
D. Air Barrier: ASTM E1677.
1. Seam Tape: Air barrier manufacturer's standard product.
E. Non-Compressible Drainable Housewrap:
1. Non-compressible type with a minimum 40-mil drainage gap not reduced by force of fastening during siding installation.
2. Drainable housewrap type that removes bulk water by creating a minimum 40-mil drainage gap (air gap) at individual measurement points between housewrap and back of siding.
F. Flashing:
1. Provide flashing at window and door heads and where indicated on Drawings. Refer to Division 07 for sheet metal flashing.
2. Material: Aluminum.
a. Finish: High-performance organic finish.

PART 3 - EXECUTION
3.1 EXAMINATION
A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, engineered wood siding system supports, and other conditions affecting performance of the Work.
1. Examine wall framing to verify that support members and anchorage have been installed within alignment tolerances required by engineered wood siding manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by engineered wood siding manufacturer.
a. Verify that air and moisture barrier has been installed over sheathing substrate to prevent air infiltration and water penetration.
B. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 PREPARATION
A. Clean substrates of projections and substances detrimental to application.
3.3 INSTALLATION
A. General: Install engineered wood siding in accordance with manufacturer's written instructions in orientation, sizes, and locations indicated. Anchor engineered wood siding and other components of the Work securely in place.
1. Shim or otherwise plumb substrates receiving engineered wood siding system.
2. Flash engineered wood siding at perimeter of all openings.
3. Locate and space fastenings in uniform vertical and horizontal alignment.
4. Seal engineered wood substrates exposed to weather to prevent moisture intrusion and water buildup.
a. Seal around penetrations.
b. Seal each exposed cut of siding and trim. It is not recommended to field spray-applied coatings on cuts.
c. Seal each butt joint from weather by covering with joint moldings, sealant, or factory prefinished ends.
5. Install flashing and trim as engineered wood siding work proceeds.
6. Align bottoms of engineered wood siding.
7. Provide weathertight escutcheons for pipe- and conduit-penetrating engineered wood siding system.
B. Metal Protection: Where dissimilar metal flashings contact each other or corrosive substrates, protect against galvanic action as recommended in writing by siding manufacturer.
C. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
D. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to achieve waterproof performance.
E. Replace engineered wood siding components that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL
1.1 SUMMARY
A. Section Includes:
1. Formed sheet metal fabrications.
1.2 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Shop Drawings: For sheet metal flashing and trim.
1. Include plans, elevations, sections, and attachment details.
2. Distinguish between shop- and field-assembled work.
3. Include identification of finish for each item.
4. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.
1.3 WARRANTY
A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
1. Finish Warranty Period: 20 years from date of Substantial Completion.
PART 2 - PRODUCTS
2.1 PERFORMANCE REQUIREMENTS
A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
B. Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
2.2 SHEET METALS
A. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, Z275G90 coating designation; prepainted by coil-coating process to comply with ASTM A 755/A 755M.
1. Exposed Coil-Coated Finish:
a. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.
2. Color: As selected by COR from manufacturer's full range.
B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

SECTION 076200 - SHEET METAL FLASHING AND TRIM - CONTINUED

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
C. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
2.3 FABRICATION, GENERAL
A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
1. Obtain field measurements for accurate fit before shop fabrication.
2. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
3. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
B. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
C. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
D. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
E. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.
2.4 SHEET METAL FABRICATIONS
A. Edge Flashing: Fabricate in minimum 96-inch- long, but not exceeding 12-foot- long sections. Furnish with 6-inch- wide, joint cover plates. Shop fabricate interior and exterior corners.
1. Fabricate from the Following Materials:
a. Galvanized Steel: 0.028 inch thick.
B. Counterflashing and Flashing Receivers: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch thick.

PART 3 - EXECUTION
3.1 INSTALLATION, GENERAL
A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
B. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.
3.2 FLASHING INSTALLATION
A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
B. Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.

END OF SECTION

SECTION 077233 - ROOF HATCHES

PART 1 - GENERAL
1.01 RELATED DOCUMENTS
A. All of the Contract Documents, including General and Supplementary Conditions and Division 01 General Requirements, apply to the work of this Section.
1.02 SCOPE
A. Section Includes: Furnishing and installing factory fabricated roof hatches.
1.03 SUBMITTALS
A. General: Submit in accordance with Division 01 specifications.
B. Product Data: Submit manufacturer’s product literature and installation instructions, use limitations and recommendations.
C. Samples: Manufacturer to provide, upon request, sized to represent material adequately.
D. Technical Support: Contact the engineering group of manufacturer as stated in 2.01A.
E. Subcontractor’s approval by Manufacturer: Submit document stating manufacturer’s acceptance of subcontractor.
F. Warranty: Submit a sample of manufacturer’s warranty.
G. Substitutions: To be accepted as an equal, a product substitution must have demonstrated documented field trials. Contractor guarantees that proposed substitution shall meet the performance and quality standards of this specification.
1.04 QUALITY ASSURANCE
A. Manufacturer Qualifications: Roof Access Hatch must be manufactured by a company with a minimum of 5 years’ experience in the production and sales of Roof Access Hatches.
B. Installer Qualifications: A firm having at least 3 years’ experience in installing Roof Access Hatches.
C. Materials: For each type of material required to complete the work of this section, provide primary materials which are the products of a single manufacturer.
D. Pre-Application Conference (As needed): A pre-application conference shall be held to establish procedures and to review conditions, installation procedures and coordination with other related work. Meeting agenda shall include review of the special details.
E. Manufacturer’s Representative: Arrange to have trained representative of the manufacturer on site periodically to review installation procedures.
1.05 DELIVERY, STORAGE, HANDLING
A. Store products per manufacturer's instructions in unopened packaging until ready for installation.
B. Store products under cover and elevated above grade.
1.06 PROJECT CONDITIONS
A. Work should be performed only when existing and forecasted weather conditions are within the limits established by the manufacturer.
B. Verify that other trades with related work are complete before installing roof hatch(es).
C. Mounting surfaces shall be straight and secure; substrates shall be of proper width.
D. Observe all appropriate OSHA safety guidelines for this work.
E. Waste Disposal: This material is not defined as hazardous by the Resource Conservation and Recovery Act. It is the product users’ responsibility to determine at the time of disposal. Dispose of in accordance with all federal, state and local regulations.
1.07 WARRANTY
A. All goods sold to be free from defects in workmanship, but limits liability to five years from date of shipment and expressly to the replacement of goods not complying with this warranty; or, at our election, a credit to original purchaser for the original purchase price paid less 1/60th of the price for each month elapsed from the original invoice date to the date of claim against this warranty.
B. Electric motors, special finishes and any other optional special components required shall be warranted separately by the manufacturers of those products.

PART 2 - PRODUCTS
2.01 MANUFACTURER
A. Provide Milcor™ Roof Access Hatches as manufactured by:
Milcor™ Company
B. Approved equivalent manufacturer.
2.02 ROOF ACCESS HATCH
A. Milcor™ TP-3X3, Single Leaf: Gas Spring.
B. Size: Width 3’0” x Length 3’0”. Length denotes hinge side.
C. Curb: One-piece curb and frame with integral cap flashing, 4-1/2” wide mounting flanges with pre-drilled holes, interior and exterior thermal breaks to minimize heat transfer and resist condensation.
1. Material: Aluminum, 11 gauge, .090 inch thick.
2. Finish: Mill finish.
3. Insulation: Foil faced single layer 3 inch rigid polyisocyanurate and 5/16” condensation liner. (R-value = 24.5)
4. Height: 12 inches.
5. Gasket: Custom designed EPDM Rubber gasket
D. Metal Cover: Flush, insulated, hollow metal construction, interior and exterior thermal breaks to minimize heat transfer and resist condensation.
1. Material: Aluminum, outer cover, 11 gauge, .090 inch thick; liner, 11 gauge, .090 inches thick.
2. Finish: Mill finish.
6. Insulation: Foil faced single layer 3 inch rigid polyisocyanurate and 5/16” condensation liner. (R-value = 24.5).
3. Load Carrying Capacity: Capable of supporting 70 psf. live load.
4. Gasket: Extruded EPDM rubber gasket adhered to cover, continuous around cover perimeter.
E. Operating Hardware
1. Material/Finish: Steel, zinc coated and chrome plate sealed, unless otherwise indicated or required by manufacturer.
2. Lifting Mechanisms: Heavy-duty gas spring assists opening upon release of latch. Covers open to 70 degrees.
3. Hinges: Plated Steel Pintle Hinges.
4. Hold-Open: Automatic locking hold-open arm with red vinyl coated handle for manual release.
5. Latch: Inside latching device, with inside and outside handles and inside padlock hasp, automatically engages upon closing.

PART 3 - EXECUTION
3.01 INSPECTION
A. Verify that Milcor™ Roof Access Hatch installation will not disrupt other trades. Verify that the substrate is dry, clean, and free of foreign matter. Report and correct any defects prior to any installation.
B. Verify by comparing packing slip and box label that product is per specification.
3.02 SURFACE PREPARATION
A. Refer to manufacturer’s product literature for surface preparation requirements. Surfaces should be structurally sound, free of voids, spalls, loose aggregate and sharp ridges. Remove dust, dirt, debris or any other foreign materials.
3.03 INSTALLATION
A. Submit product design drawings for review and approval to the COR/Specifier before fabrication.
B. Installer shall check as-built conditions and verify the manufacturer’s roof hatch details for accuracy to fit the applications prior to fabrication. The installer shall comply with the roof hatch manufacturer’s installation instructions.
C. The installer shall furnish mechanical fasteners consistent with the roof requirements.
3.04 CLEANING AND PROTECTION
A. Product requires no spill or leak containment. Dispose of damaged material in accordance with all governmental regulations.
B. Protect completed work from subsequent construction activities as recommended by manufacturer.

END OF SECTION

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

PART 2 - PRODUCTS
2.01 MANUFACTURERS
A. Nonsag Sealants:
1. Dow: www.dow.com/#sle.
2. Pecora Corporation: www.pecora.com/#sle.
3. Sika Corporation: www.usa.sika.com/#sle.
4. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
2.02 JOINT SEALANT APPLICATIONS
A. Scope:
1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to:
a. Joints between door, window, and other frames and adjacent construction.
b. Joints between different exposed materials.
2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
a. Joints between door, window, and other frames and adjacent construction.
2.03 NONSAG JOINT SEALANTS
A. Nonstaining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus [____] percent, minimum.
2. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
B. Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
C. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus [____] percent, minimum.
2.04 ACCESSORIES
A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

PART 3 - EXECUTION
1.01 EXAMINATION
A. Verify that joints are ready to receive work.
B. Verify that backing materials are compatible with sealants.
C. Verify that backer rods are of the correct size.
1.02 INSTALLATION
A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

END OF SECTION

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL
1.1 SUMMARY
A. Exterior insulated hollow metal doors.
1.2 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.
C. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

PART 2 - PRODUCTS
2.1 MANUFACTURERS
A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Amweld International, LLC.
2. Ceco Door Products; an Assa Abloy Group company.
3. Curries Company; an Assa Abloy Group company.
4. Republic Doors and Frames.
5. Steelcraft; an Ingersoll-Rand company.
2.2 EXTERIOR HOLLOW-METAL DOORS AND FRAMES
A. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3. .
1. Physical Performance: Level A according to SDI A250.4.
2. Doors:
a. Type: As indicated in the Door and Frame Schedule.
b. Thickness: 1-3/4 inches.
c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
d. Edge Construction: Model 2, Seamless.
e. Core: Manufacturer's standard material; insulation material where required at exterior wall locations.
3. Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than R=10 when tested according to ASTM C 1363.
4. Frames:
a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
b. Construction: Full profile welded.
c. Profile: Match existing frame profiles at borrowed lite framing and doors.
5. Exposed Finish: Prime.
2.3 FABRICATION
A. Hollow-Metal Doors:
1. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
B. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers.
a. Drill stop in strike jamb to receive three door silencers.
C. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
D. Provide an 1/8 inch integral kerf formed into the frame to receive a gasket composed of a cellular modified foam core clad in emobssed, non vinyl, paint resistant liner which is UV stablized. Gasket is to be provided as a part of this Section. Do not install until frame has been painted.
2.4 STEEL FINISHES
A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: SDI A250.10.

PART 3 - EXECUTION
3.1 INSTALLATION
A. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
b. Remove temporary braces necessary for installation only after frames have been properly set and secured.
c. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
2. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
B. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors:
a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
c. At Bottom of Door: 3/4 inch plus or minus 1/32 inch.
d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.

END OF SECTION

ARCHITECT
[illegible]
RYAN J.
LANGEMEIER
A-2615
12-15-2022
STATE OF NEBRASKA

SECTION 087100 - DOOR HARDWARE
1.1 SUMMARY
A. Section includes:
1. Mechanical door hardware for the following:
a. Swinging doors.
1.2 SUBMITTALS
A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
1.3 QUALITY ASSURANCE
A. Source Limitations: Obtain each type of door hardware from a single manufacturer.
B. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
C. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf .
2. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
3. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.
1.4 WARRANTY
A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Three years from date of Final Completion, unless otherwise indicated.
a. Manual Closers: 10 years from date of Final Completion.
PART 2 - PRODUCTS
2.1 SCHEDULED DOOR HARDWARE
A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" to comply with requirements in this Section.
1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
B. Coordinate all Keying requirements w/ owner. Provide a Master Key System.

PART 3 - EXECUTION
3.1 EXAMINATION
A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, wall and floor construction, and other conditions affecting performance.
B. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 PREPARATION
A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
3.3 INSTALLATION
A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
3.4 LIST OF MANUFACTURERS

	SPECIFIED	APPROVED
HINGES	MCKINNEY	NO SUB
CONTINUOUS HINGES	PEMKO	MCKINNEY
LOCKS, EXIT DEVICES	CORBIN RUSSWIN	SARGENT
CLOSERS	NORTON	SARGENT
PLATES, STOPS, PULLS	ROCKWOOD	TRIMCO
THRESHOLDS, SEALS	PEMKO	NATIONAL GUARD
ELECTRIC STRIKES	HES	NO SUB
POWER SUPPLIES, SWITCHES	SECURITRON	NO SUB

3.5 HARDWARE SCHEDULE
HARDWARE SET NO. 1
(DOOR NO. 100)

4 Each Hinges, T4A3386 4.5 x 4.5 NRP, US32D
1 Each Storeroom Lockset, CL3357 NZD, 626
1 Each Closer, CPS7500, 689
1 Set Perimeter Seal, By Section 081113
1 Each Threshold, 2005AT
1 Each Drip Cap, 346C
1 Each Sweep, 315N

END OF SECTION

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL
1.1 SUMMARY
A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
1. Steel and iron.
1.2 ACTION SUBMITTALS
A. Product Data: For each type of product. Include preparation requirements and application instructions.
B. Samples: For each type of paint system and each color and gloss of topcoat.

PART 2 - PRODUCTS
2.1 MANUFACTURERS
A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Behr Process Corporation.
2. Benjamin Moore & Co.
3. Diamond Vogel Paints.
4. Dulux (formerly ICI Paints); a brand of AkzoNobel.
5. Glidden Professional.
6. Kelly-Moore Paint Company Inc.
7. Kwal Paint; Comex Group.
8. PPG Architectural Coatings.
9. Sherwin-Williams Company (The).
10. Valspar Corporation - Architectural (Pro).
2.2 PAINT, GENERAL
A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
B. Material Compatibility:
1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
C. Colors: As selected by Architect from manufacturer's full range - match color(s) of adjacent building.

PART 3 - EXECUTION
3.1 EXAMINATION
A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
C. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.
3.2 PREPARATION
A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
3.3 APPLICATION
A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
3.4 CLEANING AND PROTECTION
A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.
3.5 EXTERIOR PAINTING SCHEDULE
A. Steel and Iron Substrates:
1. Quick-Dry Enamel System MPI EXT 5.1A:
a. Prime Coat: Primer, alkyd, quick dry, for metal, MPI #76.
b. Intermediate Coat: Alkyd, quick dry, matching topcoat.
c. Topcoat: Alkyd, quick dry, semi-gloss (MPI Gloss Level 5), MPI #81.

END OF SECTION

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REVISED		PREPARED	TITLE OF SHEET	ARCH/ENG PROJ #	DRAWING NO.
DATE	INITIAL	SMW DESIGNED SMW DRAWN RJL CHECKED 12/15/2022 DATE	**ARCHITECTURAL SPECS** EDUCATION CENTER FIRE SERVICE HOMESTEAD NATIONAL MONUMENT OF AMERICA 8523 NE-4 BEATRICE, NE 68310	07310.024 SUB SHEET NO. **A 02**	368 80056 PMIS **207662** SHEET **7** OF **31**

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ROOM SCHEDULE

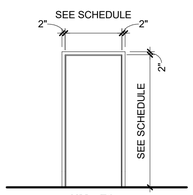
ROOM NO	ROOM NAME	FLOOR MATL	FLOOR FINISH	BASE MATL	CEILING HEIGHT	CEILING MATL	CEILING FINISH	NORTH WALL MATL	NORTH WALL FINISH	EAST WALL MATL	EAST WALL FINISH	SOUTH WALL MATL	SOUTH WALL FINISH	WEST WALL MATL	WEST WALL FINISH	REMARKS
100	OUTDOOR SHED	CONC	SEALED	--	VARIES	EXPOSED	--	PLYWOOD	--	PLYWOOD	--	PLYWOOD	--	PLYWOOD	--	

DOOR SCHEDULE

DOOR NO.	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR MATL & TYPE	DOOR FINISH	DOOR GLASS	FRAME MATL & TYPE	FRAME FINISH	DETAIL HEAD	DETAIL JAMB	DETAIL JAMB	DETAIL SILL	SET NO	LABEL	REMARKS
100	4' - 0"	7' - 0"	HM : F	Paint	- -	HM : F1	Paint	2/A101	3/A101	3/A101	1/A101	1	--	INSULATED DOOR

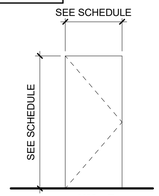
GENERAL FINISH NOTES

A. ALL HOLLOW METAL DOORS & FRAMES SHALL BE PRIMED AND PAINTED TO MATCH ADJACENT BUILDING DOORS AND FRAMES



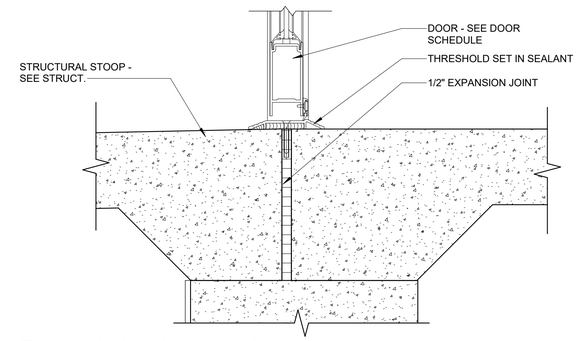
HM : F1

DOOR FRAME TYPES

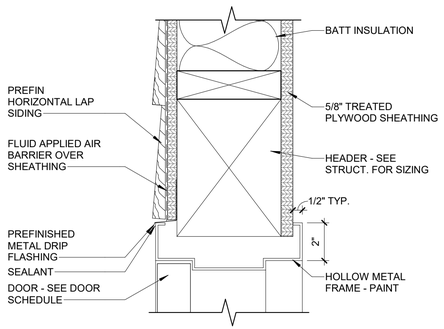


HM : F

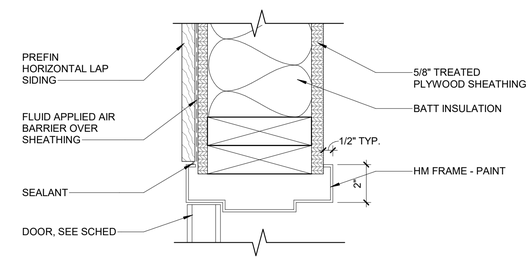
DOOR PANEL TYPES



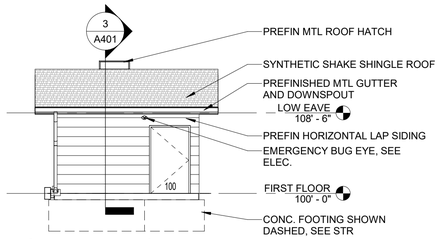
1 THRESHOLD @ ENTRY DOOR
SCALE: 3" = 1'-0"



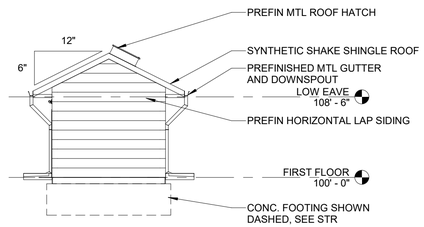
2 HOLLOW METAL DOOR - HEAD EXTERIOR
SCALE: 3" = 1'-0"



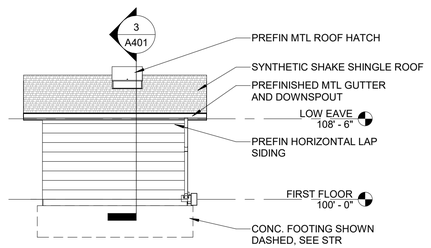
3 HOLLOW METAL DOOR - JAMB EXTERIOR
SCALE: 3" = 1'-0"



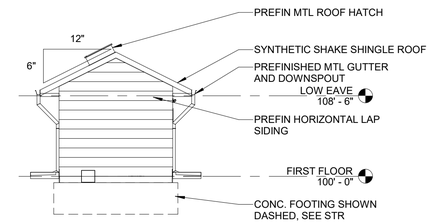
4 NORTH ELEVATION
SCALE: 1/8" = 1'-0"



5 WEST ELEVATION
SCALE: 1/8" = 1'-0"



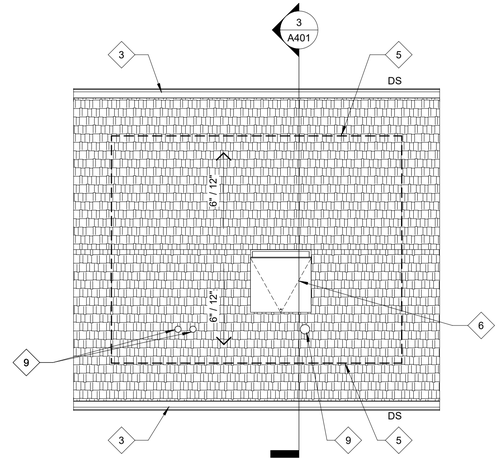
8 SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



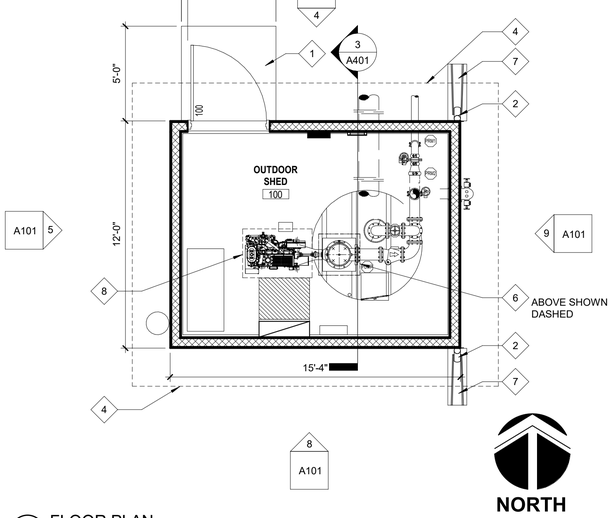
9 EAST ELEVATION
SCALE: 1/8" = 1'-0"

REF. NOTES (X):

1. STRUCTURAL STOOP, SEE STR.
2. PREFINISHED MET DOWNSPOUT
3. 6" METAL GUTTER WITH 4"X6" METAL DOWNSPOUTS
4. OUTLINE OF ROOF ABOVE
5. OUTLINE OF BUILDING BELOW
6. 36" X 36" ROOF HATCH WITH CRICKETS AS REQUIRED ON THE HIGH SIDE OF OPENING- ROOF HATCH TO OPEN FULLY TO ALLOW REMOVAL OF TURBINE FIRE PUMP. COORDINATE ROOF HATCH LOCATION WITH EQUIPMENT.
7. PRECAST CONC. SPLASHBLOCK
8. CONC CURB - SEE STR
9. MECH ROOF PENETRATION - COORDINATION LOCATION WITH FIRE PROTECTION SHEETS AND EQUIPMENT



6 ROOF PLAN
SCALE: 1/4" = 1'-0"



7 FLOOR PLAN
SCALE: 1/4" = 1'-0"

ARCHITECT RYAN J. LANGEMEIER A-2615 12-15-2022 STATE OF NEBRASKA

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REVISED DATE	REVISED INITIAL

PREPARED
SMW DESIGNED
SMW DRAWN
RJL CHECKED
12/15/2022 DATE

TITLE OF SHEET
FLOOR PLANS, ELEVATIONS, SCHEDULES
EDUCATION CENTER FIRE SERVICE
HOMESTEAD NATIONAL MONUMENT OF AMERICA
8523 NE-4
BEATRICE, NE 68310

ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **A101**

DRAWING NO. 368 / 80056
PMIS **207662**
SHEET **8** OF **31**

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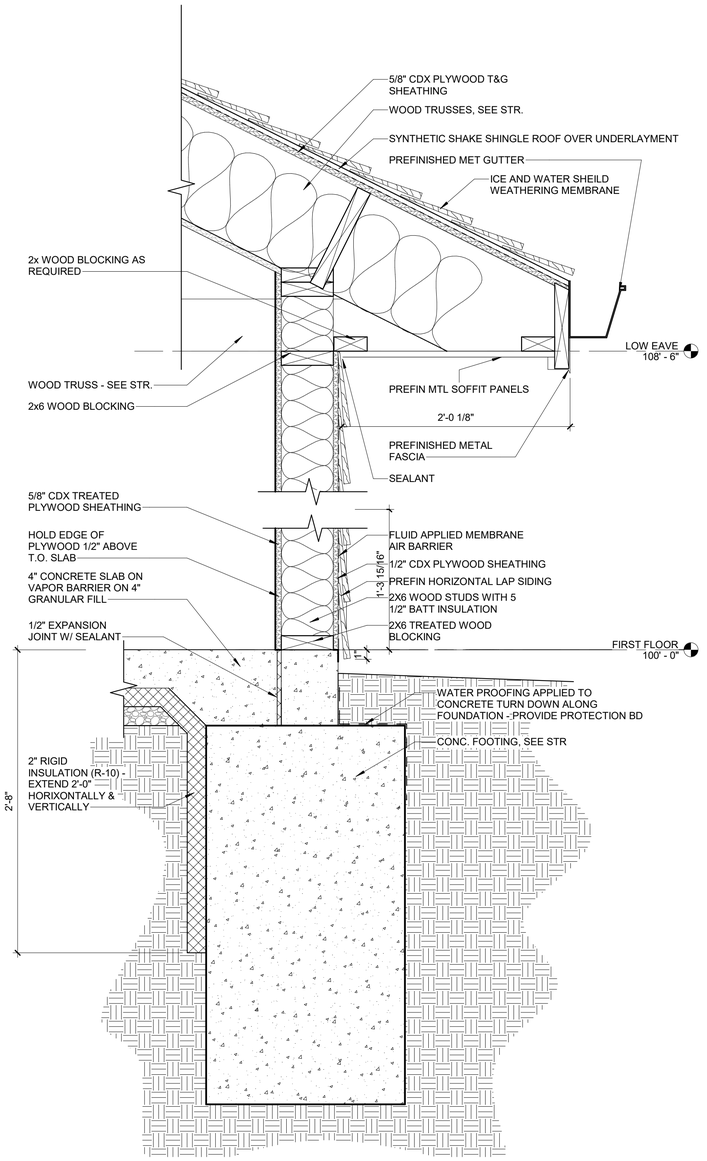
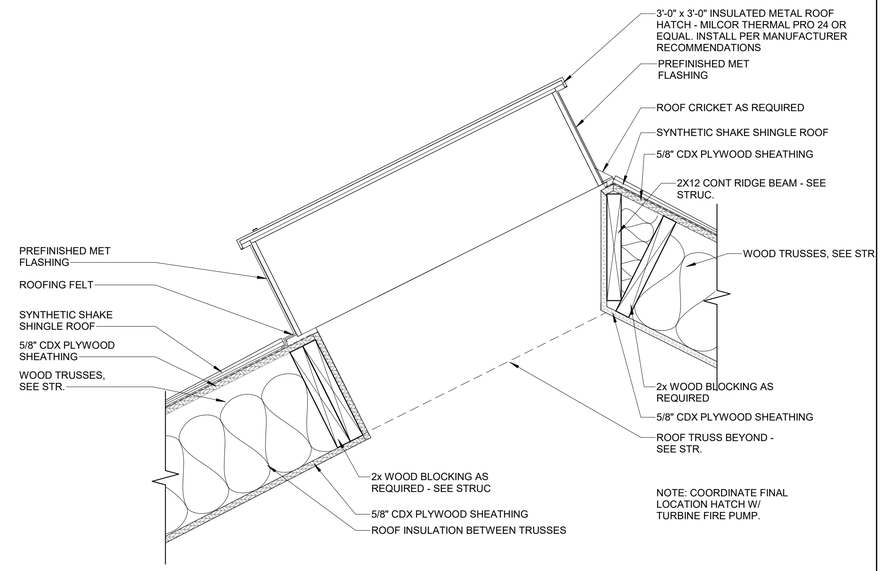
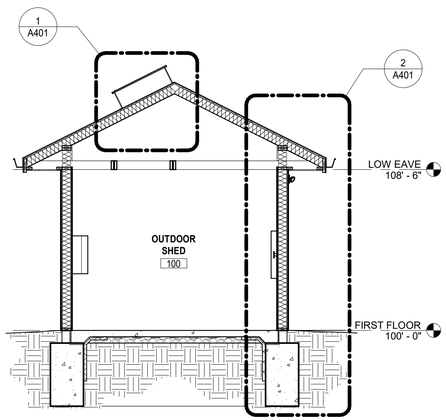


2 TYPICAL WALL SECTION
SCALE: 1 1/2" = 1'-0"



NOTE: COORDINATE FINAL LOCATION HATCH W/ TURBINE FIRE PUMP.

1 DETAIL SECTION AT ROOF HATCH
SCALE: 1 1/2" = 1'-0"



3 TYPICAL BUILDING SECTION
SCALE: 1/4" = 1'-0"

ARCHITECT
RYAN J. LANGEMEIER
A-2916
12-15-2022
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12/15/2022	DATE

TITLE OF SHEET

SECTIONS, DETAILS

EDUCATION CENTER FIRE SERVICE
HOMESTEAD NATIONAL MONUMENT OF AMERICA
8523 NE-4
BEATRICE, NE 68310

ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **A401**

DRAWING NO. 368 / 80056
PMIS **207662**
SHEET **9** OF **31**

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REFERENCE LEGEND

HEADER CALLOUT IN STUD WALL — H-X • HEADER DESIGNATION

LINTEL CALLOUT IN MASONRY WALL — L-X • LINTEL DESIGNATION

METAL STUD WALL CALLOUT — X • LETTER INDICATES METAL STUD WALL TYPE

CIP WALL CALLOUT — X • LETTER INDICATES CIP WALL TYPE

CMU WALL CALLOUT — X • LETTER INDICATES CMU WALL TYPE

SHEAR WALL CALLOUT — SHEAR WALL TYPE 'X' • SHEAR WALL TYPE DESIGNATION; MIN L = X'-X" • SHEAR WALL LENGTH

WALL FOOTING CALLOUTS
- GBX-X • GRADE BEAM DESIGNATION
- CFX-X • CONTINUOUS FOOTING DESIGNATION
- TSX-X • THICKENED SLAB DESIGNATION

PAD FOOTING CALLOUTS — FX.X • REFERENCE DESIGNATION

REFERENCE NOTE — X • REFERENCE DESIGNATION

ROOM / FRAMING ELEVATION — 1 • ELEVATION LETTER; DIRECTION OF VIEW; 1 XX-XX 1; 1 • SHEET NUMBER

EXTERIOR ELEVATION — DIRECTION OF VIEW; 1 • ELEVATION LETTER; 1 XX-XX 1; 1 • SHEET NUMBER

PLAN DETAIL — X • DETAIL NUMBER; XX-XX • SHEET NUMBER

SECTION/ DETAIL — SIM; X • SECTION/DETAIL NUMBER; XX-XX • SHEET NUMBER; INDICATES DIRECTION OF VIEW

NEW COLUMN — X • LETTER INDICATES NEW COLUMN LINE

EXISTING COLUMN — X • LETTER INDICATES EXISTING COLUMN LINE

MATCHLINE — AREA A / AREA B

LEVEL — NAME; ELEVATION • LEVEL CALLOUT DESIGNATION; ELEVATION DESIGNATION

TITLE MARKER — GRAPHIC AREA FOR DRAWING; 1 VIEW NAME • DETAIL NUMBER; TITLE; SCALE: 1/8" = 1'-0" • SCALE OF THE DRAWING

NORTH ARROW — NORTH; PLAN NORTH; TRUE NORTH

SYMBOLS

PLAN VIEW
- SHEAR WALL
- MASONRY-CMU
- MASONRY-VENEER
- STUD WALL

SECTION / ELEVATION VIEW
- CONCRETE
- GRAVEL
- EARTH / COMPACTED
- EARTH / NONCOMPACTED
- RIGID INSULATION
- JOINT FILLER
- STEEL
- GYPSUM
- FLEXIBLE INSULATION
- GROUT
- PLYWOOD
- WOOD (FINISH)
- MASONRY-CMU FACE
- MASONRY-CMU
- MASONRY-VENEER

ABBREVIATIONS

AB	ANCHOR BOLT
ACI	AMERICAN CONCRETE INSTITUTE
AFF	ABOVE FINISH FLOOR
AGG	AGGREGATE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AL	ALUMINUM
ANCH	ANCHOR
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APPD	APPROVED
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL OR ARCHITECT
AUTO	AUTOMATIC
AVG	AVERAGE
L	ANGLE
BL	BUILDING LINE
BLDG	BUILDING
BLKG	BLOCKING
BO	BOTTOM OF
BOT	BOTTOM
BRCG	BRACING
BRDG	BRIDGING
BRG	BEARING
BS	BOTH SIDES
BW	BOTH WAYS
C	CHANNEL (STRUCTURAL SHEETS)
CF	CUBIC FEET
CIP	CAST IN PLACE
CJ	CONTROL JOINT
CL	CENTER LINE
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
COMP	COMPRESSIBLE
CONC	CONCRETE
CONN	CONNECTION
CONSTR JT	CONSTRUCTION JOINT
CONT	CONTINUOUS (CONTINUATION)
CU YD	CUBIC YARDS
D	DEPTH (DEEP)
d	PENNY (as in nail - 10d)
DBL	DOUBLE
DEMO	DEMOLITION
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DL	DEAD LOAD
DWG	DRAWING
DWLS	DOWELS
EF	EACH FACE
EJ	EXPANSION JOINT
EL	ELEVATION - GRADE OR BUILDING
ELEV	ELEVATOR
EQ	EQUAL
EQUIP	EQUIPMENT
EW	EACH WAY
EXIST	EXISTING
EXPN	EXPANSION
EXT	EXTERIOR
F	FAHRENHEIT
FD	FLOOR DRAIN
FDN	FOUNDATION
FIN	FINISH
FLR	FLOOR
FT	FEET (FOOT)
FTG	FOOTING
FV	FIELD VERIFY
GA	GAGE OR GAUGE
GALV	GALVANIZED
GRTG	GRATING
GWB	GYPSUM WALLBOARD
H or HT	HEIGHT (HIGH)
HDR	HEADER
HK	HOOK
HORIZ	HORIZONTAL(LY)
HPT	HIGH POINT
HS	HIGH STRENGTH
ID	INSIDE DIAMETER
IN	INCH
INSUL	INSULATION
INT	INTERIOR
KIP or K	KILOPOUND (1000 LBS)
KP	KICK PLATE
L	LENGTH (LONG)
LBS	POUNDS
LDG	LOADING
LL	LIVE LOAD
LLBB	LONG LEG BACK TO BACK
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LNTL	LINTEL
LONG	LONG LONGITUDINAL
LP	LOW POINT
LT WT	LIGHT WEIGHT
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MC	MISCELLANEOUS CHANNELS
MECH	MECHANICAL
MET	METAL
MFG	MANUFACTURING
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
NIC	NOT IN CONTRACT
NO	NUMBER
NR	NOT REQUIRED
NTS	NOT TO SCALE
OC	ON CENTER(S)
OCEW	ON CENTER EACH WAY
OD	OUTSIDE DIAMETER
OH	OVERHEAD
OPNG	OPENING
OPP	OPPOSITE
OZ	OUNCE
PC	PRECAST
PERF	PERFORATED
PLWD	PLYWOOD
POL	POLISH(ED)
PREFAB	PREFABRICATED
PS	PRESSED STEEL
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
QTY	QUANTITY
R	RADIUS
RD	ROOF DRAIN
REF	REFERENCE
REINF	REINFORCEMENT
REQD	REQUIRED
RTU	ROOF TOP UNIT
SCHED	SCHEDULE
SDI	STEEL DECK INSTITUTE
SF	SQUARE FOOT (FEET)
SHTG	SHEATHING
SIM	SIMILAR
SJI	STEEL JOIST INSTITUTE
SL	SNOW LOAD
SLBB	SHORT LEG BACK TO BACK
SPEC	SPECIFICATIONS
SS	STAINLESS STEEL
STD	STANDARD
STGR	STRINGER
STIFF	STIFFENER
STIRR	STIRRUPS
STL	STEEL
STR	STRUCTURAL
SUSP	SUSPENDED
TEMP	TEMPERATURE
TO	TOP OF
TOB	TOP OF BEAM
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOS	TOP OF STEEL
TOW	TOP OF WALL
TRANS	TRANSVERSE
TYP	TYPICAL
UNEX	UNEXCAVATED
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL
VEST	VESTIBULE
W	WIDE (WIDTH)
W/	WITH
W/O	WITHOUT
WF	WIDE FLANGE
WL	WIND LOAD
WP	WORK POINT
WT	WEIGHT
WWF	WELDED WIRE FABRIC

SCHEDULES

GRADE BEAM SCHEDULE

MARK	WIDTH	DEPTH	LONGITUDINAL REINFORCING	STIRRUPS
GB1-9	1' - 9"	3' - 4"	(3) #5 BARS BOT., (3) #5 BARS TOP	#4 @ 24" O.C.

WOOD STUD WALL SCHEDULE

LOCATION	STUD SIZE	STUD SPAC. (IN. O.C.)	SPECIES & GRADE
EXTERIOR LOAD BEARING WALLS	2X6	16	DF NO. 2

WOOD HEADER SCHEDULE

MARK	SIZE	# OF JACK STUDS	# OF KING STUDS	VENEER SUPPORT ANGLE
H-1	(3) DF#2 2X8	1	1	N.A.

SHEAR WALL SCHEDULE

MARK	SHEATHING	EDGE ATTACH	FIELD ATTACH	HOLDDOWN ANCHOR	NOTES
A	15/32" STRUCT. I OSB ONE SIDE	8d @ 6"	8d @ 12"	HDU2 - SDS2.5	DOUBLE STUDS EACH END

NOTES:
- ALL WALLS ARE TYPE 'A' UNLESS NOTED OTHERWISE
- PROVIDE 8d @ 6" SIDES; DOUBLE ROW OF 8d @ 4" (STAGGERED) TOP & BOT. PLATES AT ALL EXTERIOR BEARING WALLS BELOW ROOF TRUSSES.

TRUSS HOLDDOWN ANCHOR SCHEDULE

HOLDOWN	MAXIMUM UPLIFT REACTION	NOTES:
SIMPSON H2.5A	615 LBS	
SIMPSON H14	1050 LBS	PROVIDE SIMPSON TSP STRAPS BETWEEN STUDS AND TOP PLATE EACH SIDE OF TRUSS BEARING
SIMPSON LGT2	2125 LBS	LOCATE BUILT-UP STUD BELOW TRUSS BEARING
SIMPSON VGT	3555 LBS	LOCATE BUILT-UP STUD BELOW TRUSS BEARING & PROVIDE WITH HDU2 CONNECTOR BELOW TOP PLATE AT STUD

REF. NOTES ( ) X

PROJECT STRUCTURAL REFERENCED NOTES

1. STRUCTURAL STOOP - SEE SHEET S201 FOR TYPICAL DETAIL. REFERENCE ARCHITECTURAL DRAWINGS FOR STOOP DIMENSIONS.
2. 'C.J.' INDICATES CONTROL JOINT - SEE TYPICAL DETAIL ON SHEET S201 AND STRUCTURAL NOTES FOR MORE INFORMATION.
3. 6" CONCRETE SLAB ON GRADE W/ 4X4-W2.9X2.9 W.W.F. OVER 15 MIL. VAPOR BARRIER OVER 4" GRANULAR FILL. (TOP OF SLAB = 100'-0")
4. MCNICHOLS GALVANIZED 'GW' SERIES SERRATED STEEL BAR GRATING W/ 2 1/2"X3/16" BEARING BARS SPACED AT 1 3/16" O.C. (OR APPROVED EQUAL). CUT GRATING TO BE CIRCULAR AROUND PIT AND CUT HOLE IN GRATING FOR PUMP ROD.
5. CONCRETE PEDESTAL - SEE MANUFACTURER FOR OVERALL DIMENSIONS AND SEE FPE DWGS FOR LOCATION. SEE DETAIL 8/S201 FOR REINF.
6. 2X6 OUTRIGGERS @ 24" O.C. (MAX.) TO BE STICK FRAMED OR PRE-FABRICATED BY TRUSS MFR.
7. ROOF PENETRATION - SEE FPE FOR LOCATION AND SIZE
8. BURIED PIPE - SEE FPE DWGS

STRUCTURAL SHEET LIST

PROFESSIONAL CIVIL ENGINEER — TYLER L. SCHMIDT E-17949 — STATE OF NEBRASKA — 12-15-2022

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SHEET **10** OF **31**

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APPLICABLE CODES AND STANDARDS

1. 2021 INTERNATIONAL BUILDING CODE
2. ACI 318-19 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
3. TMS 402-16 - BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES
4. AWC NDS-2018 - NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION WITH 2018 SUPPLEMENT

DESIGN CRITERIA

FLOOR LIVE LOAD	PSF
1. MECHANICAL EQUIPMENT ROOM	150 PSF OR EQUIP. WEIGHT IF GREATER

ROOF LIVE LOAD	PSF
1. ROOF LIVE LOAD (MINIMUM, NON-REDUCIBLE)	20

ROOF SNOW LOAD

1. GROUND SNOW LOAD (P_g):	25 PSF
2. FLAT-ROOF SNOW LOAD (P_f):	20 PSF
3. RAIN ON SNOW SURCHARGE:	5 PSF
4. DRIFT SNOW LOAD	PER ASCE 7
5. SNOW EXPOSURE FACTOR (C_e):	1.0
6. SNOW LOAD IMPORTANCE FACTOR (I):	1.2
7. THERMAL FACTOR (C_t):	1.2

WIND DESIGN DATA

1. ULTIMATE DESIGN WIND SPEED (V_{ult}):	120 MPH
2. NOMINAL DESIGN WIND SPEED (V_{asd}):	93 MPH
3. RISK CATEGORY:	III
4. WIND EXPOSURE:	CATEGORY C
5. INTERNAL PRESSURE COEFFICIENT (GC_{pi}):	+/-0.18
6. COMPONENTS AND CLADDING DESIGN WIND PRESSURE:	
A. ROOF - ZONE 1	26.9 PSF
B. ROOF - ZONE 2	52.4 PSF
C. ROOF - ZONE 3	60.1 PSF
D. WALL - ZONE 4	31.0 PSF
E. WALL - ZONE 5	35.9 PSF

EARTHQUAKE DESIGN DATA

1. SEISMIC IMPORTANCE FACTOR (I):	1.0
2. RISK CATEGORY:	III
3. 0.2 SEC SPECTRAL RESPONSE ACCELERATION (S_S):	0.075
4. 1.0 SEC SPECTRAL RESPONSE ACCELERATION (S_1):	0.047
5. SITE CLASS:	D
6. 0.2 SEC SPECTRAL RESPONSE COEFFICIENT (S_{DS}):	0.080
7. 1.0 SEC SPECTRAL RESPONSE COEFFICIENT (S_{D1}):	0.075
8. SEISMIC DESIGN CATEGORY:	B
9. BASIC SEISMIC-FORCE-RESISTING SYSTEM:	
A. WOOD STUD SHEAR WALLS	
10. DESIGN BASE SHEAR (V):	0.2 KIPS
11. SEISMIC RESPONSE COEFFICIENT (C_S):	0.019
12. RESPONSE MODIFICATION FACTOR (R):	6.5
13. ANALYSIS PROCEDURE USED:	
A. EQUIVALENT LATERAL FORCE PROCEDURE	

MATERIAL DATA

CONCRETE AND REINFORCING

1. CONCRETE STRENGTH (f'_c @ 28 DAYS)
   - A. FOOTINGS 3,000 PSI
   - B. FOUNDATION WALLS 4,500 PSI
   - C. GRADE SUPPORTED SLABS 4,000 PSI
   - D. CONCRETE NOT SPECIFIED 3,000 PSI
2. ALL CONCRETE EXPOSED TO FREEZE-THAW CONDITIONS SHALL HAVE A MINIMUM STRENGTH (f'_c @ 28 DAYS) OF 4,500 PSI. THIS DOES NOT INCLUDE FOOTINGS/GRADE BEAMS THAT ARE COVERED BY SOIL.
3. CEMENT TYPE: PORTLAND TYPE 1L
4. AGGREGATES
   - A. NORMAL WEIGHT, 1 1/2" MAX. SIZE - ASTM C33
   - B. PROVIDE AGGREGATES FREE OF MATERIALS WITH DELETERIOUS REACTIVITY TO ALKALI IN CEMENT, FROM A SINGLE SOURCE WITH DOCUMENTED SERVICE RECORD DATA OF AT LEAST 10 YEARS SATISFACTORY SERVICE IN SIMILAR APPLICATIONS AND SERVICE CONDITIONS USING SIMILAR AGGREGATES AND CEMENTITIOUS MATERIALS.
5. REINFORCING STEEL ASTM A615, GRADE 60
6. WELDED WIRE FABRIC ASTM A185
7. PREFORMED EXPANSION JOINT (1/2") ASTM D1751

WOOD

1. WOOD SPECIES: DOUGLAS FIR LARCH (DF) - 19% MAX. MOISTURE CONTENT
2. MEMBER GRADES (UNLESS OTHERWISE INDICATED ON PLAN)
   - A. STUDS NO. 2
   - B. BLOCKING STUD
   - C. ROOF RAFTERS NO. 2
   - D. COLUMNS AND POSTS NO. 2
   - E. HEADERS AND LEDGERS NO. 2
3. OSB ROOF SHEATHING: 5/8" APA RATED, EXPOSURE I, SPAN RATING 32/16
4. OSB WALL SHEATHING: STRUCTURAL I, EXPOSURE I, SPAN RATING 24/0 (SEE SHEAR WALL SCHEDULE FOR THICKNESS)
5. LAMINATED VENEER LUMBER (LVL)
   - A. MIN. FLEXURAL BENDING STRESS (F_b) 2,600 PSI
   - B. MIN. MODULUS OF ELASTICITY (E) 1,900 KSI
   - C. MIN. SHEAR STRESS (F_v) 285 PSI
   - D. MIN. COMP. STRESS - PERP. ($F_{c\text{-}perpendicular}$) 750 PSI

STRUCTURAL NOTES

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE APPLICABLE BUILDING CODE.
2. THE STRUCTURE HAS BEEN DESIGNED TO RESIST DESIGN LOADS ONLY AS A COMPLETED STRUCTURE
   - A. APPLICATION OF ANY LOADS TO THE PARTIALLY COMPLETED STRUCTURE SHALL BE CONSIDERED BY THE CONTRACTOR AND SO INCLUDED IN THE DESIGN OF THE SHORING, BRACING, FORMWORK, AND ANY OTHER SUPPORTING ELEMENTS PROVIDED FOR CONSTRUCTION OF THE STRUCTURE.
   - B. WHERE CONSTRUCTION MATERIAL AND EQUIPMENT ARE TEMPORARILY STORED ON THE ROOF OR FLOOR FRAMING, THEY SHALL BE DISTRIBUTED SO THAT THE DESIGN LIVE LOAD AT THE LOADED AREA IS NOT EXCEEDED.
   - C. DO NOT BACKFILL AGAINST WALLS OR OTHER STRUCTURAL ELEMENTS UNTIL SUCH ELEMENTS HAVE REACHED THEIR INTENDED STRENGTH, HAVE BEEN ADEQUATELY BRACED, AND/OR HAVE OTHER INTEGRAL STRUCTURAL ELEMENTS IN PLACE WHICH ARE INTENDED TO RESIST THE LATERAL EARTH LOADS.
3. LATERAL LOAD RESISTING SYSTEM: ALL LATERAL LOAD RESISTANCE AND STABILITY IN THE COMPLETED STRUCTURE IS PROVIDED BY:
   - A. N-S DIRECTION: WOOD SHEAR WALLS
   - B. E-W DIRECTION: WOOD SHEAR WALLS
   - C. ROOF DIAPHRAGM: WOOD SHEATHING
4. DETAILS ON THE DRAWINGS INDICATED AS "TYPICAL" APPLY IN ALL AREAS WHERE CONDITIONS SIMILAR TO THE DETAIL OCCUR.
5. THE STRUCTURAL DRAWINGS ARE NOT INTENDED FOR USE AS SHOP ERECTION DRAWINGS. REPRODUCTION OF THESE DRAWINGS IN LIEU OF PREPARATION OF SHOP ERECTION DRAWINGS SIGNIFIES THE USERS' ACCEPTANCE THAT ALL INFORMATION SHOWN IS CORRECT AND APPROPRIATE FOR SHOP DRAWINGS AND THAT THE USER WILL BE FULLY RESPONSIBLE FOR EXPENSES THAT MAY OCCUR FROM SAID ACCEPTANCE.
6. UNLESS SPECIFICALLY NOTED, THERE ARE NO PROVISIONS MADE FOR FUTURE FLOORS, ROOFS, OR OTHER LOADS.

COORDINATION/VERIFICATION

1. CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH ANY PHASE OF THE WORK.
2. ANY PROPRIETARY STRUCTURAL SYSTEMS THAT ARE COMPOSED OF COMPONENTS TO BE FIELD ERECTED SHALL BE SUPERVISED BY THE SUPPLIER DURING MANUFACTURING, DELIVERY, HANDLING, STORAGE, AND ERECTION IN ACCORDANCE WITH THE INSTRUCTIONS PREPARED BY THE SUPPLIER.
3. CROSS REFERENCE STRUCTURAL DRAWINGS WITH MECHANICAL AND ELECTRICAL DRAWINGS, AND WITH THE ACTUAL EQUIPMENT SUPPLIED TO THE PROJECT, FOR THE LOCATION AND SIZE OF ALL SLAB OPENINGS, SLEEVES, INSERTS, FLOOR DEPRESSIONS, BLOCK-OUTS, CURBS, ANCHORS, BOLTS, ETC. REQUIRED FOR INSTALLATION.
4. PROVIDE ADEQUATE STRUCTURAL FRAMING AS APPROVED BY THE ENGINEER FOR ALL REQUIRED MECHANICAL OPENINGS THROUGH SLABS, WALLS, FLOOR DECK, ETC., AND SUPPORT OF ALL MECHANICAL EQUIPMENT. OPENINGS SHALL NOT BE PERMITTED THROUGH BEAMS UNLESS SPECIFICALLY DETAILED BY THE ENGINEER.
5. REFER TO ARCHITECTURAL DRAWINGS FOR ALL SURFACE FINISHES, DIMENSIONS, AND LOCATIONS OF SLAB DROPS, MASONRY CONTROL JOINTS, AND WALL OPENING REQUIREMENTS.

GEOTECHNICAL

1. BASIS OF DESIGN: THE FOUNDATION SYSTEM DESIGN IS BASED ON THE PRESUMPTIVE LOAD BEARING VALUES OF SOILS LISTED IN TABLE 1806.2 OF THE INTERNATIONAL BUILDING CODE.
2. FOUNDATION SYSTEM: SHALLOW FOOTINGS
3. MAXIMUM ALLOWABLE SOIL BEARING CAPACITY 1,500 PSF
4. LATERAL EARTH PRESSURE:
   - A. PASSIVE RESISTANCE 180 PCF
   - B. ACTIVE PRESSURE 50 PCF
   - C. AT-REST PRESSURE 65 PCF
5. SUBGRADE PREPARATION:
   - A. HEAVILY ORGANIC OR ROOT INFESTED TOPSOIL SHALL BE EXCAVATED AND DISCARDED OR STOCKPILED FOR LATER USE IN COVERING FINISHED LANDSCAPED AREAS AFTER CONSTRUCTION. REMOVE TOPSOIL TO A MINIMUM DEPTH OF 8 INCHES. DEEPER STRIPPING SHALL BE DONE IF ORGANIC MATERIALS REMAIN BELOW A DEPTH OF 8 INCHES.
   - B. REMOVE ALL EXISTING STRUCTURES TO BE DEMOLISHED PRIOR TO GRADING. THIS INCLUDES PAVING, SIDEWALKS, AND OTHER MISCELLANEOUS SMALL STRUCTURES.
6. STRUCTURAL FILL REQUIREMENTS:
   - A. CLEAN, INORGANIC, LOW TO MEDIUM PLASTICITY LEAN CLAY (CL) OR SILT (ML), OR A COMBINATION OF THESE TWO MATERIALS
   - B. MAXIMUM LIQUID LIMIT (LL) 45
   - C. MAXIMUM PLASTICITY INDEX 22
   - D. WATER CONTENT (% OF OPTIMUM) +/-3%
   - E. MAXIMUM LOOSE LIFT 8"
   - F. MINIMUM COMPACTION 95% (STANDARD PROCTOR TEST ASTM D-698)
7. SPREAD FOOTINGS SHALL BE PLACED ON NEAT, CLEAN AND DRY EXCAVATIONS. EXTREME CARE SHALL BE TAKEN WHEN EXCAVATING NEAR THE BEARING SURFACE. FOOT TRAFFIC SHALL BE KEPT TO A MINIMUM NECESSARY TO PLACE THE FOOTING REINFORCEMENT AND CONCRETE.
8. CONTRACTOR SHALL PROVIDE FOR ADEQUATE DRAINAGE OF SURFACE WATER AWAY FROM THE STRUCTURE AND EXCAVATED AREAS DURING CONSTRUCTION. THIS INCLUDES NECESSARY PUMPING, TRENCHING, BACKFILL AND/OR DIKE CONSTRUCTION.
9. GRANULAR SUBBASE UNDER SLAB ON GRADE:
   - A. MINIMUM THICKNESS SEE PLAN
   - B. MINIMUM COMPACTION 95% (STANDARD PROCTOR TEST ASTM D-698)
   - C. GRADATION REQUIREMENTS
     - a. 100% PASSING THE 3/4" SIEVE
     - b. LESS THAN 15% PASSING THE 100 SIEVE
     - c. LESS THAN 2% PASSING THE 200 SIEVE

CAST-IN-PLACE CONCRETE (033000)

GENERAL CONCRETE REQUIREMENTS

1. CONCRETE BATCH DESIGN(S) SHALL BE PROPORTIONED AND PRODUCED IN ACCORDANCE WITH ACI 318, IN PARTICULAR CHAPTER 5, AND ACI 301. MIX AND DELIVER IN ACCORDANCE WITH ASTM C94.
2. CONCRETE STRENGTH: SEE MATERIAL DATA NOTES
3. SLUMP LIMITS
   - A. GRADE SUPPORTED SLABS, SUSPENDED SLABS AND CONCRETE TOPPINGS: 5 INCHES OF SLUMP, PLUS OR MINUS 1 INCH.
   - B. CONCRETE WITH PLASTICIZERS: 8 INCHES OF SLUMP, PLUS OR MINUS 1 INCH.
   - C. ALL OTHER CONCRETE: 4 INCHES OF SLUMP, PLUS OR MINUS 1 INCH.
4. MAXIMUM W/C RATIO: 0.45
5. AIR ENTRAINMENT
   - A. GRADE SUPPORTED SLABS, SUSPENDED SLABS AND CONCRETE TOPPINGS: DO NOT ALLOW AIR CONTENT OF TROWEL-FINISHED FLOORS TO EXCEED 3%.
   - B. CONCRETE EXPOSED TO WEATHER: 5% MINIMUM AIR CONTENT
   - C. ALL OTHER CONCRETE: 5.5% AIR CONTENT, PLUS OR MINUS 1.5%.
6. ADMIXTURES: SUBMIT AS REQUIRED FOR APPROVAL
7. FLY ASH: MAX. 25% OF CEMENT CONTENT
8. CONSTRUCTION JOINTS MUST HAVE PRIOR REVIEW BY THE ENGINEER. ALL CONTINUOUS REINFORCING SHALL BE CARRIED THROUGH THE JOINT.
9. CONSTRUCTION JOINT LOCATIONS:
   - A. FND WALLS AND FOOTINGS MIDWAY BETWEEN COLUMNS
   - B. WALLS DO NOT ALIGN WITH FOOTING JOINTS
10. CONCRETE TO CONCRETE COLD JOINTS - PROVIDE 1/4" INTENTIONALLY ROUGHENED SURFACE AT ALL HORIZONTAL JOINTS.
11. EXPOSED CORNERS: PROVIDE A 3/4" CHAMFER AT ALL EXPOSED CONCRETE CORNERS.
12. CURING: CONCRETE SHALL BE MAINTAINED IN A MOIST CONDITION FOR A MINIMUM OF SEVEN DAYS AFTER ITS PLACEMENT. IF FORMWORK IS REMOVED PRIOR TO SEVEN DAYS, APPLY MOIST CURING TO NEWLY EXPOSED SURFACES. APPROVED CURING COMPOUNDS MAY BE USED IN LIEU OF MOIST CURING.
13. REINFORCING BAR WELDING: ABSOLUTELY NO WELDING OF REINFORCING BARS OR TORCHING TO BEND REINFORCING BARS SHALL BE ALLOWED WITHOUT THE SPECIFIC APPROVAL OF THE ENGINEER.
14. MINIMUM CONCRETE CLEAR COVER:
   - A. FOOTINGS
     - a. TOP 2"
     - b. BOTTOM 3"
     - c. SIDES 3"
   - B. FOUNDATION WALLS
     - a. TOP 1-1/2"
     - b. BOTTOM 3"
     - c. SIDES 2"
   - C. INTERIOR SLABS (TOP) SEE TYPICAL SLAB JOINT DETAIL ON SHEET S201
   - D. EXTERIOR SLABS (TOP) 2"
   - E. OTHER COVER REQUIREMENTS SHALL BE AS NOTED IN APPLICABLE DETAILS.
15. BAR SUPPORT ACCESSORIES SHALL BE PROVIDED IN ACCORDANCE WITH THE LATEST ACI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES
   - A. BEAM REINFORCING: ON BAR BOLSTERS @ 4 FT. O.C. MAX.
   - B. SLAB REINFORCING: ON BAR BOLSTERS @ 4 FT. O.C. MAX.
   - C. NO ROCKS, CLAY TILE, OR CLAY BRICK SHALL BE USED TO SUPPORT REINFORCING.

CAST-IN-PLACE CONCRETE CONT. (033000)

16. NON-METALLIC, SHRINKAGE-RESISTANT GROUT
   - A. GROUT SHALL MEET REQUIREMENTS OF ASTM C 1107
   - B. GROUT SHALL BE FACTORY-PACKAGED, NON-METALLIC AGGREGATE GROUT
   - C. GROUT SHALL BE NON-CORROSIVE AND NON-STAINING
   - D. MIX GROUT WITH WATER TO CONSISTENCY SUITABLE FOR APPLICATION AND A 30-MINUTE WORKING TIME.
17. REINFORCING SHOP DRAWINGS: REINFORCING SUPPLIER SHALL PROVIDE COMPLETE PLACEMENT AND FABRICATION DRAWINGS FOR ALL REINFORCING INCLUDING THE LOCATION AND SIZE OF ALL ACCESSORIES AND SUPPORTS.
18. COLD WEATHER CONSTRUCTION:
   - A. COVER GROUND SURFACE WITH INSULATING BLANKETS AS REQUIRED TO MAINTAIN GROUND TEMPERATURE.
   - B. POUR CONCRETE FOOTINGS WITHIN 24 HOURS OF DIGGING.
   - C. WHEN AVERAGE HIGH AND LOW TEMPERATURE IS EXPECTED TO FALL BELOW 40 DEG F FOR THREE SUCCESSIVE DAYS, MAINTAIN DELIVERED CONCRETE MIXTURE TEMPERATURE WITHIN THE TEMPERATURE RANGE REQUIRED BY ACI 301.
   - D. DO NOT PLACE CONCRETE IN CONTACT WITH SURFACES LESS THAN 35 DEG F (1.7 DEG C), OTHER THAN REINFORCING STEEL.
   - E. PROVIDE INSULATING BLANKETS OVER CONCRETE WHILE CURING AS REQUIRED.
   - F. VERIFY CONCRETE STRENGTH PRIOR TO THE APPLICATION OF STRUCTURAL LOADS TO THE CONCRETE.
   - G. IN EXTREME WEATHER CONDITIONS CONSIDER UTILIZING A GROUND HEATING SYSTEM.
   - H. ALL FINAL WINTER FOUNDATION CONSTRUCTION PROCEDURES SHALL BE REVIEWED AND APPROVED BY THE GEOTECHNICAL ENGINEER.
19. CONCRETE TESTING SHALL BE PERFORMED ACCORDING TO THE FOLLOWING REQUIREMENTS:
   - A. TESTING FREQUENCY: OBTAIN ONE COMPOSITE SAMPLE FOR EACH DAY'S POUR FOR EACH CONCRETE MIXTURE EXCEEDING 5 CUBIC YARDS, BUT LESS THAN 25 CUBIC YARDS, PLUS ONE SET FOR EACH ADDITIONAL 50 CUBIC YARDS OR FRACTION THEREOF.
20. CONCRETE SHALL BE PLACED WITHIN 90 MINUTES OF ADDING WATER. CONTRACTOR SHALL REJECT ANY CONCRETE THAT HAS BEEN IN THE MIXING TRUCK MORE THAN 90 MINUTES AFTER ADDING WATER.

SLAB ON GRADE REQUIREMENTS

1. SLAB THICKNESS: SEE PLAN
2. SLAB REINFORCING: SEE PLAN
3. GRANULAR SUBBASE: SEE GEOTECHNICAL NOTES
4. VAPOR RETARDER: ASTM E 1745, CLASS A. SEE PLAN FOR THICKNESS. LAP AND TAPE ALL JOINTS AND HOLES.
5. SLAB SURFACE SEALER:
   - A. SEALHARD BY L & M CONSTRUCTION CHEMICALS INC., OR EQUAL. APPLY AT MANUFACTURERS RECOMMENDED RATE.
6. CRACK CONTROL JOINTS (WHETHER CONSTRUCTION JOINTS OR SAWED JOINTS) IN SLABS ON GRADE SHALL OCCUR AS SHOWN AND ACROSS ALL DOOR OPENINGS. LOCATE JOINTS AT RE-ENTRANT CORNERS OF SLABS.
   - A. MAXIMUM SPACING OF CONTROL JOINTS: 12 FEET
7. CURING: CONCRETE SHALL BE MAINTAINED IN A MOIST CONDITION FOR A MINIMUM OF SEVEN DAYS AFTER ITS PLACEMENT. APPROVED CURING COMPOUNDS MAY BE USED IN LIEU OF MOIST CURING. CURING COMPOUNDS SHALL BE NON-RESIDUAL TYPE AND COMPATIBLE WITH BONDING OF FLOOR COVERING AND/OR SPECIFIED SEALER.
8. SEAL ALL EXPOSED CONSTRUCTION/CRACK CONTROL JOINTS.
   - A. SEALANT: SEE ARCHITECTURE.
9. FLOOR FINISH CRITERIA:
   - A. COMPLY WITH ACI 302.1R RECOMMENDATIONS FOR SCREEDING, RESTRAIGHTENING, AND FINISHING OPERATIONS FOR CONCRETE SURFACES. DO NOT WET CONCRETE SURFACES.
   - B. SCRATCH FINISH:
     - a. APPLY TO SURFACES TO RECEIVE CONCRETE FLOOR TOPPINGS AND TO RECEIVE MORTAR SETTING BEDS FOR BONDED CEMENTITIOUS FLOOR FINISHES.
     - b. WHILE STILL PLASTIC, TEXTURE CONCRETE SURFACE WITH STIFF BRUSHES, BROOMS, OR RAKES TO PRODUCE A PROFILE DEPTH OF 1/4 INCH IN ONE DIRECTION.
   - C. BROOM FINISH:
     - a. APPLY TO EXTERIOR CONCRETE PLATFORMS, STEPS, AND RAMPS.
     - b. IMMEDIATELY AFTER FLOAT FINISHINGK, SLIGHTLY ROUGHEN TRAFFICKED SURFACE BY BROOMING WITH FIBER-BRISTLE BROOM PERPENDICULAR TO THE MAIN TRAFFIC ROUTE.
10. FLATNESS CRITERIA: OVERALL VALUES OF FLATNESS, F(F) 35; AND OF LEVELNESS, F(L) 25; WITH MINIMUM LOCAL VALUES OF FLATNESS, F(F) 24; AND OF LEVELNESS, F(L) 17.

ANCHORAGE REQUIREMENTS

1. HEADED CONCRETE ANCHORS (HCA): AUTOMATICALLY END WELDED IN THE SHOP OR FIELD IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. ANCHOR WELDS SHALL BE TESTED PER AWS SECTION 7.7.
2. POST-INSTALLED MECHANICAL ANCHORS: INSTALL USING MINIMUM TORQUE, EMBEDMENTS, EDGE DISTANCES AND SPACING (UNLESS OTHERWISE NOTED) AS RECOMMENDED BY THE ANCHOR MANUFACTURER.
3. POST-INSTALLED ADHESIVE ANCHORS: INSTALLATION TO MEET MANUFACTURER'S RECOMMENDATIONS (UNLESS NOTED OTHERWISE)INCLUDING MINIMUM EMBEDMENTS, EDGE DISTANCES, SPACING, PROCEDURES, AND CURING TIME PRIOR TO LOADING.
4. POST-INSTALLED ANCHORS SHALL BE LOCATED PER THE DETAILS.
5. AVOID CUTTING OR DAMAGING EXISTING REINFORCING. SHOULD LOCATIONS OF DRILLED HOLES BE FOUND DIRECTLY ALIGNED WITH REINFORCING BARS, NOTIFY ENGINEER FOR NECESSARY ADJUSTMENTS TO THE DESIGN.

SHEATHING (061000)

1. ROOF SHEATHING: SEE MATERIAL DATA NOTES
2. WALL SHEATHING: SEE MATERIAL DATA NOTES
3. ROOF SHEATHING NAILING: COMMON WIRE NAILS SHALL BE USED AND PENETRATE SUPPORTING MEMBERS A MINIMUM OF 1-5/8". INDIVIDUAL PIECES OF SHEATHING SHALL NOT BE LESS THAN 24" IN THEIR SHORTEST PLAN DIRECTION NOR LESS THAN 8 SQ. FT. IN AREA:
   - A. ROOF SHEATHING:
     - a. SHEET EDGES 10d @ 6" O.C.
     - b. INTERMEDIATE FRAMING MEMBERS 10d @ 12" O.C.
4. WALL SHEATHING NAILING: SEE SHEAR WALL SCHEDULE AND TYPICAL SHEAR WALL DETAILS
5. PROVIDE BLOCKING OR PANEL EDGE CLIPS AT ALL PANEL EDGES.
6. OPENINGS IN SHEATHING: EDGES OF ALL OPENINGS THROUGH SHEATHING SHALL BE NAILED PER THE REQUIRED EDGE NAILING ABOVE.

ROUGH CARPENTRY (061000)

1. DESIGN CRITERIA: WOOD FRAMING SHALL BE INSTALLED PER THE REQUIREMENTS OF THE AF&PA [AWC] NDS.
2. WOOD SPECIES: SEE MATERIAL DATA NOTES
3. MEMBER GRADES: SEE MATERIAL DATA NOTES
4. LAMINATED VENEER LUMBER (LVL): SEE MATERIAL DATA NOTES
5. NOTCHING & CUTTING IN WOOD: JOISTS, RAFTERS AND BEAMS SHALL NOT BE NOTCHED, EXCEPT WHERE SHOWN IN DETAILS. OBTAIN ENGINEER'S APPROVAL FOR ANY HOLES THROUGH OR NOTCHES IN THE TOP OF HORIZONTAL MEMBERS.
6. SILL PLATES AT LOAD BEARING WALLS:
   - A. 2X SILL PLATES SHALL BE PRESSURE TREATED
   - B. FASTEN TO FOUNDATION AT SHEAR WALLS PER SHEAR WALL SCHEDULE & TYPICAL DETAILS.
   - C. FASTEN AT ALL OTHER LOAD BEARING WALLS PER DETAILS INDICATED ON PLAN.
7. NAILING SCHEDULE: USE THE FOLLOWING TABLE UNLESS NOTED OTHERWISE ON THE PLANS OR DETAILS (COMMON WIRE NAILS OR EQUAL)
   - A. TABLE 2304.10.2 IN THE 2021 INTERNATIONAL BUILDING CODE
8. WOOD CONNECTIONS: NOTATIONS ON DRAWINGS RELATING TO FRAMING CLIPS, JOISTS AND PURLIN HANGERS, AND OTHER CONNECTING DEVICES REFER TO CATALOG NUMBERS OF CONNECTORS MANUFACTURED BY THE SIMPSON STRONG-TIE COMPANY. EQUIVALENT DEVICES BY OTHER MANUFACTURERS MAY BE USED PROVIDED THEY HAVE ICBO APPROVAL FOR EQUAL LOAD CAPACITIES. WHERE SPECIFIC CONNECTORS ARE NOT INDICATED, SIMILAR DEVICES TO THOSE SHOWN SHALL BE USED.
9. FRAMING AT WALL OPENINGS: PROVIDE TWO - 2X8 HEADERS ON CRIPPLE STUDS, AND FULL HEIGHT DOUBLE STUDS EACH SIDE OF ALL OPENINGS IN STUD WALLS NOT DETAILED OTHERWISE.
10. FRAMING AT WALLS: PROVIDE DOUBLE JOISTS UNDER ALL PARTITIONS AND WALLS PARALLEL TO THE JOIST FRAMING.
11. FRAMING AT FLOOR/ROOF OPENINGS: PROVIDE DOUBLE HEADERS AND DOUBLE JOISTS OR PURLINS EACH SIDE OF ALL OPENINGS IN FLOORS AND ROOFS UNLESS DETAILED OTHERWISE.
12. BLOCKING AT STUDS: PROVIDE CONTINUOUS SOLID BLOCKING AT 6 FT. MAXIMUM CENTERS IN ALL STUD WALLS OVER 8 FT. IN HEIGHT.
13. BLOCKING AND BRIDGING AT JOISTS: PROVIDE SOLID BLOCKING AT ALL JOIST, RAFTER AND PURLIN BEARING POINTS. PROVIDE CROSS-BRIDGING OR BLOCKING AT 8 FT. MAXIMUM CENTERS FOR ALL HORIZONTAL SPANNING MEMBERS WITH A NOMINAL DEPTH/THICKNESS OF 6:1 OR MORE.

SHOP-FABRICATED WOOD TRUSSES (061753)

1. DESIGN CRITERIA: TRUSS VENDOR IS TO SUBMIT TO THE ARCHITECT, ENGINEER, AND CITY DESIGN CALCULATIONS BY A LICENSED ENGINEER AND SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION. SHOP DRAWINGS ARE TO SHOW ALL TEMPORARY AND PERMANENT BRACING REQUIRED BY DESIGN AND SIZES AND POSITIONING OF CONNECTOR PLATES. DESIGN CALCULATIONS SHALL BE SEALED BY THE LICENSED ENGINEER.
2. DESIGN RESPONSIBILITIES - TRUSSES SHALL BE DESIGNED UNDER THE FOLLOWING FORMAT:
   - A. LATERAL FORCES APPLIED TO THE TRUSSES, SUCH AS DRAG TRUSS LOADS, COLLECTORS, ETC., ARE INDICATED ON THE PLANS WHERE APPLICABLE.
   - B. ALL TRUSS-TO-TRUSS CONNECTIONS ARE THE RESPONSIBILITY OF THE TRUSS ENGINEER.
   - C. DRAG LOADS (HORIZONTAL TRUSS TRANSFERS) CONNECTIONS BETWEEN THE TRUSS AND THE STRUCTURE ARE INDICATED ON THE PLANS WHERE APPLICABLE.
   - D. ALL TRUSS-TO-STRUCTURE (WALLS OR BEAMS) CONNECTIONS ARE INDICATED ON THE PLANS WHERE APPLICABLE.
   - E. IT IS THE RESPONSIBILITY OF THE TRUSS ENGINEER TO DEVELOP THE LOADING REQUIRED TO IMPLEMENT THE REQUIRED SNOW LOADS PER IBC AND ASCE 7 SPECIFICATIONS. THIS INCLUDES ADDITIONAL SNOW LOAD AT EAVES, AND UNBALANCED LOADING ON THE GABLE AND HIP ROOFS.
   - F. IT IS THE RESPONSIBILITY OF THE TRUSS ENGINEER TO REVIEW ALL OF THE INDICATED DESIGN SPECIFICATIONS, ROOF TRUSS SUPPORTS, AND DRAG DETAILS AND TO INCORPORATE THESE REQUIREMENTS INTO THE ENGINEERING DESIGN OF THE ROOF TRUSS SYSTEM.
   - G. THE TRUSS ENGINEER SHOULD DEVELOP A TRUSS LAYOUT PLAN FOR THE TRUSS SYSTEM THAT CLEARLY INDICATES THE TRUSS VERTICAL SUPPORT CONDITIONS, TRUSS-TO-TRUSS CONNECTIONS, DRAG TRUSSES AND COLLECTORS, AND ANY OTHER FIELD-INSTALLED REINFORCEMENT, INCLUDING FIELD-INSTALLED TOP CHORD REINFORCEMENT AT EAVES NECESSARY TO EXECUTE THE TRUSS SYSTEM DESIGN. THE TRUSS ROOF FRAMING PLAN SHALL BE SEALED BY A LICENSED PROFESSIONAL ENGINEER AND BE INCLUDED WITH THE INDIVIDUAL TRUSS CUT SHEETS. THE TRUSS ENGINEER SHOULD ALSO PROVIDE PROPER SUPERVISION OF ANY TRUSS COMPANY TECHNICIANS.
   - H. TRUSS BRACING: TEMPORARY ERECTION BRACING AND PERMANENT WEB BRACING SHALL BE DESIGNED BY THE TRUSS MANUFACTURER.
3. WOOD TRUSS DESIGN LOADS (IN ADDITION TO SELF-WEIGHT)
   - A. ROOF DEAD LOAD (TOP CHORD) 10 PSF
   - B. ROOF DEAD LOAD (BOTTOM CHORD) 5 PSF
   - C. ROOF LIVE LOAD (TOP CHORD) SEE DESIGN CRITERIA NOTES
   - D. ROOF LIVE LOAD (BOTTOM CHORD) 10 PSF
4. WOOD TRUSS DEFLECTION CRITERIA
   - A. ROOF TRUSSES: LIMIT VERTICAL DEFLECTION TO 1/240 OF TRUSS SPAN
5. ANCHOR TRUSSES SECURELY AT BEARING POINTS USING METAL TRUSS TIE-DOWNS OR TRUSS HANGERS AS APPLICABLE.

SPECIAL INSPECTIONS (IBC 2021)

SPECIAL INSPECTIONS SHALL BE PROVIDED BY THE OWNER FOR THE WORK IN ACCORDANCE WITH IBC CHAPTER 17. CONTRACTOR SHALL NOTIFY AND ACCOMMODATE THE APPLICABLE INSPECTOR DURING APPROPRIATE PHASES OF THE WORK AS REQUIRED FOR EACH TYPE OF INSPECTION.

CONCRETE CONSTRUCTION

1. INSPECTION OF REINFORCEMENT, AND VERIFY PLACEMENT. **(PERIODIC)**
2. INSPECT ANCHORS CAST IN CONCRETE. **(PERIODIC)**
3. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS.
   - A. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS. **(CONTINUOUS)**
   - B. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.A. **(PERIODIC)**
4. VERIFY USE OF REQUIRED DESIGN MIX. **(PERIODIC)**
5. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE. **(CONTINUOUS)**
6. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES. **(PERIODIC)**
7. INSPECT ERECTION OF PRECAST CONCRETE MEMBERS. **(PERIODIC)**
8. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED. **(PERIODIC)**

SOILS

1. VERIFY MATERIALS BELOW SHALLOW FOOTINGS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY. **(PERIODIC)**
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL. **(PERIODIC)**
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS. **(PERIODIC)**
4. DURING FILL PLACEMENT, VERIFY 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. **(CONTINUOUS)**
5. PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY. **(PERIODIC)**

PREFABRICATED WOOD STRUCTURAL ELEMENTS

1. MANUFACTURER'S CERTIFICATE OF COMPLIANCE TO QUALITY ASSURANCE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS IS REQUIRED.

WOOD FRAMING ELEMENTS

1. NAILING, BOLTING, ANCHORING, AND OTHER FASTENING OF SHEAR WALLS AND DIAPHRAGMS WHERE THE NAIL SPACING IS 4" OR LESS. **(PERIODIC)**
2. LOCATION, TYPE, SIZE, AND SPACING OF WOOD FRAMING CONNECTORS INCLUDING HURRICANE TIES, STRAPS, CLIPS AND HANGERS. **(PERIODIC)**
3. VERIFICATION OF SHEARWALL HOLDDOWNS AND ANCHORAGES TO CONCRETE. **(PERIODIC)**

PROFESSIONAL CIVIL ENGINEER
TYLER L. SCHMIDT
E-17949
STATE OF NEBRASKA
12-15-2022

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REVISED		PREPARED	TITLE OF SHEET	ARCH/ENG PROJ #	DRAWING NO.
DATE	INITIAL	TLS DESIGNED	**STRUCTURAL NOTES**	07310.024	368 / 80056
		TLS DRAWN	EDUCATION CENTER FIRE SERVICE HOMESTEAD NATIONAL MONUMENT OF AMERICA 8523 NE-4 BEATRICE, NE 68310	SUB SHEET NO.	PMIS **207662**
		KMW CHECKED		**S 01**	SHEET **11** OF **31**
		12/15/2022 DATE			

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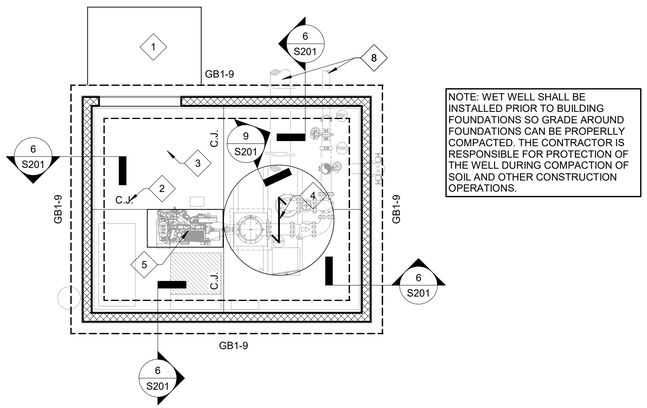
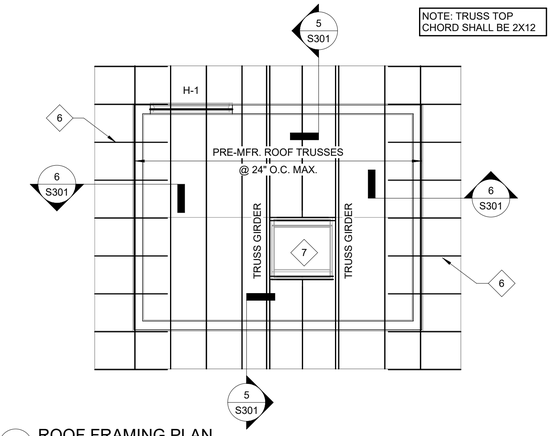


NOTE: WET WELL SHALL BE INSTALLED PRIOR TO BUILDING FOUNDATIONS SO GRADE AROUND FOUNDATIONS CAN BE PROPERLLY COMPACTED. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF THE WELL DURING COMPACTION OF SOIL AND OTHER CONSTRUCTION OPERATIONS.

1 FOUNDATION PLAN
SCALE: 1/4" = 1'-0"



NOTE: TRUSS TOP CHORD SHALL BE 2X12

2 ROOF FRAMING PLAN
SCALE: 1/4" = 1'-0"

FOUNDATION PLAN NOTES:

A. REFERENCE SHEET S01 FOR STRUCTURAL NOTES AND SHEET S00 FOR SCHEDULES.

B. REFERENCE SHEET S201 FOR TYPICAL FOUNDATION DETAILS NOT NECESSARILY INDICATED ON PLAN.

C. VERIFY ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS.

D. TOP OF FOOTING (T.O.F.) ELEVATION IS 99'-4", TYPICAL U.N.O.

E. FINISHED FLOOR ELEVATION (F.F.E.) IS 100'-0", TYPICAL U.N.O.

F. GRADE BEAMS ARE REQUIRED AT ALL EXTERIOR WALLS. BOTTOM OF GRADE BEAM SHALL HAVE A MINIMUM DEPTH OF 42" BELOW EXTERIOR GRADE.

G. STRUCTURAL STOOPS ARE REQUIRED AT ALL EXTERIOR SWING DOORS. SEE TYPICAL DETAIL ON SHEET S201.

H. CONTRACTOR FIELD VERIFY EXISTING CONDITIONS AND NOTIFY ENGINEER OF RECORD OF ANY DISCREPANCIES WITH CONSTRUCTION DOCUMENTS.

I. ALL EXTERIOR WALLS ARE SHEAR WALLS. SEE SHEAR WALL SCHEDULE ON S 00

REF. NOTES (X):

1 STRUCTURAL STOOP - SEE SHEET S201 FOR TYPICAL DETAIL. REFERENCE ARCHITECTURAL DRAWINGS FOR STOOP DIMENSIONS.

2 'C.J.' INDICATES CONTROL JOINT - SEE TYPICAL DETAIL ON SHEET S201 AND STRUCTURAL NOTES FOR MORE INFORMATION.

3 6" CONCRETE SLAB ON GRADE W/ 4X4-W2.9X2.9 W.W.F. OVER 15 MIL. VAPOR BARRIER OVER 4" GRANULAR FILL. (TOP OF SLAB = 100'-0")

4 MCNICHOLS GALVANIZED 'GW' SERIES SERRATED STEEL BAR GRATING W/ 2 1/2"X3/16" BEARING BARS SPACED AT 1 3/16" O.C. (OR APPROVED EQUAL). CUT GRATING TO BE CIRCULAR AROUND PIT AND CUT HOLE IN GRATING FOR PUMP ROD.

5 CONCRETE PEDESTAL - SEE MANUFACTURER FOR OVERALL DIMENSIONS AND SEE FPE DWGS FOR LOCATION. SEE DETAIL 8/S201 FOR REINF.

6 2X6 OUTRIGGERS @ 24" O.C. (MAX.) TO BE STICK FRAMED OR PRE-FABRICATED BY TRUSS MFR.

7 ROOF PENETRATION - SEE FPE FOR LOCATION AND SIZE

8 BURIED PIPE - SEE FPE DWGS

ROOF FRAMING PLAN NOTES:

A. REFERENCE SHEET S01 FOR STRUCTURAL NOTES AND SHEET S00 FOR SCHEDULES.

B. REFERENCE SHEET S301 FOR TYPICAL FRAMING DETAILS NOT NECESSARILY INDICATED ON PLAN.

C. VERIFY ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS.

D. PROVIDE TRUSS ANCHORS PER SCHEDULE ON S00 AT ALL TRUSS BEARING LOCATIONS.

E. REFERENCE ARCHITECTURAL SECTIONS FOR TRUSS BEARING HEIGHTS, CEILING PROFILE REQUIREMENTS, AND OVERHANG CONDITIONS.

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HOMESTEAD NATIONAL MONUMENT OF AMERICA
8523 NE-4
BEATRICE, NE 68310

ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **S101**
DRAWING NO. 368 / 80056
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SHEET **12** OF **31**

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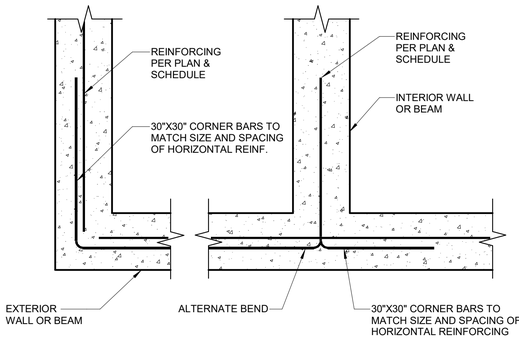
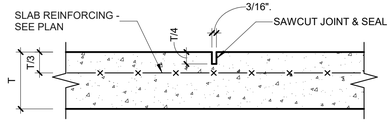


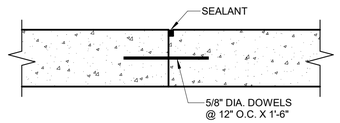
PLAN VIEW

THIS DETAIL APPLICABLE TO:
1. ALL PERIMETER FOUNDATION GRADEWALLS
2. ALL PERIMETER FOUNDATION GRADEBEAMS
3. ALL CONCRETE WALLS

1 TYPICAL CONCRETE WALL CORNER REINFORCING
SCALE: 3/4" = 1'-0"



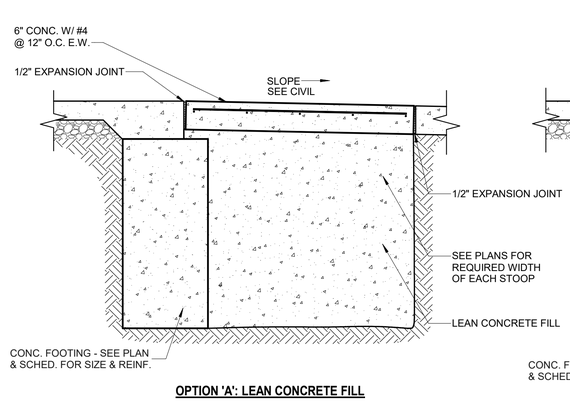
TYPICAL CONTROL JOINT (C.J.)



TYPICAL CONSTRUCTION JOINT

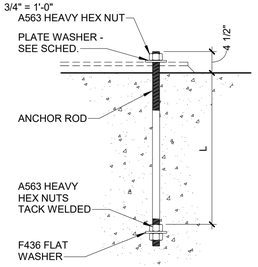
NOTES:
1. ALL FLOOR SLABS SHALL BE PLACED IN PAVING LANE PATTERN. A MAXIMUM JOINT SPACING OF 12'-0" U.N.O. AND A MAXIMUM SLAB PANEL ASPECT RATIO (LENGTH/WIDTH) OF 1.5 SHALL BE OBSERVED.
2. ALL JOINTS TERMINATING A POUR SHALL BE CONSTRUCTION JOINTS.
3. TIME SAW CUTTING OPERATION TO PRECLUDE SHRINKAGE, CRACKING, AND DISLODGING OF AGGREGATE.

2 TYPICAL CONCRETE SLAB JOINT DETAILS
SCALE: 3/4" = 1'-0"



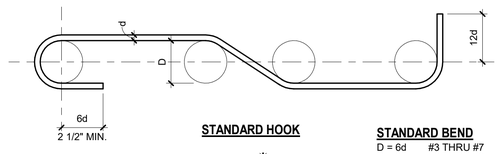
OPTION 'A': LEAN CONCRETE FILL **OPTION 'B': STRUCTURAL SLAB**

3 TYPICAL CONCRETE STOOP DETAILS
SCALE: 3/4" = 1'-0"



DIA. (IN.)	MIN. L (IN.)	BASE PLATE HOLE Ø (IN.)	PLATE WASHER THICKNESS (IN.)	PLATE WASHER SIZE (IN.)
3/4	8	15/16	1/4	2
7/8	10	1 1/16	5/16	2 1/2
1	12	1 1/4	3/8	3
1 1/8	14	1 7/16	1/2	3 1/2
1 1/4	16	1 9/16	1/2	3 1/2
1 3/8	18	1 11/16	1/2	4
1 1/2	20	1 13/16	1/2	4

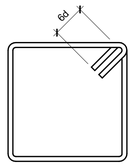
NOTE: PROVIDE ANCHOR AND PLATE DIMENSIONS AS TYPICAL, U.N.O.



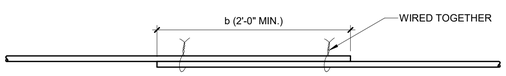
STANDARD HOOK

STANDARD BEND
D = 6d #3 THRU #7
D = 8d #8 THRU #9
D = 10d #10 THRU #11

d = BAR DIAMETER



TYPICAL CLOSED TIE

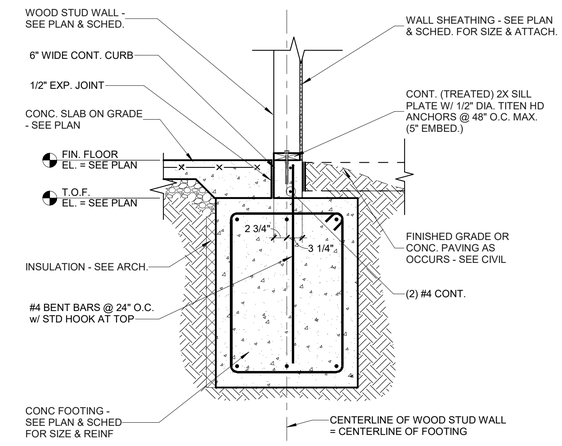


TYPICAL LAP SPLICE

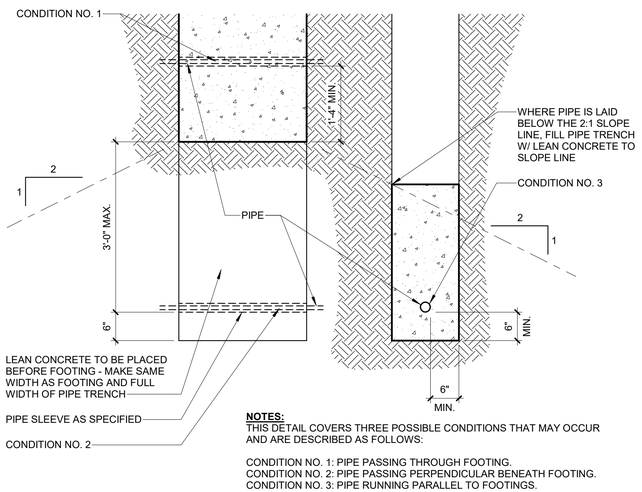
TENSION BAR LAP LENGTH (b)		
(FOR LENGTH b - SEE REINF. BAR DETAIL AND KEY NOTES)		
BAR SIZE	BARS SPACED > $2d_b$	BARS SPACED < $2d_b$ (OTHER)
3	28"	42"
4	37"	56"
5	46"	70"
6	56"	83"
7	81"	122"
8	93"	139"
9	105"	157"
10	118"	176"
11	131"	196"

SPLICE LENGTH IS FOR TYPE B SPLICES PER ACI 318.
BARS ARE ASSUMED TO BE TOP BARS & NOT EPOXY COATED.
f'_c = 3,000 PSI (NORMAL WEIGHT) BAR COVER > d_b
f_y = 60,000 PSI d_b = BAR DIAMETER

TABLE APPLIES TO CIP CONCRETE



4 TYPICAL REINFORCING DETAILS
SCALE: 3/4" = 1'-0"

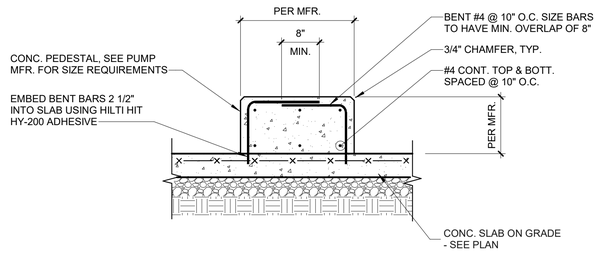


NOTES:
THIS DETAIL COVERS THREE POSSIBLE CONDITIONS THAT MAY OCCUR AND ARE DESCRIBED AS FOLLOWS:

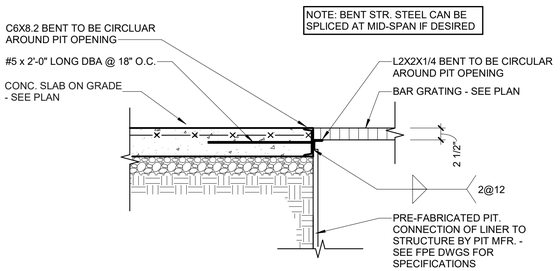
CONDITION NO. 1: PIPE PASSING THROUGH FOOTING.
CONDITION NO. 2: PIPE PASSING PERPENDICULAR BENEATH FOOTING.
CONDITION NO. 3: PIPE RUNNING PARALLEL TO FOOTINGS.

7 TYPICAL CONCRETE FOOTING AT ADJACENT UTILITIES
SCALE: 3/4" = 1'-0"

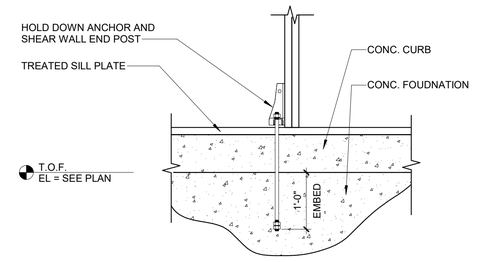
5 TYPICAL ANCHOR ROD DETAIL
SCALE: 3/4" = 1'-0"



8 SECTION AT PUMP PEDESTAL
SCALE: 3/4" = 1'-0"



9 SECTION AT PIT
SCALE: 3/4" = 1'-0"



10 TYPICAL SHEAR WALL HOLD DOWN ANCHOR
SCALE: 3/4" = 1'-0"

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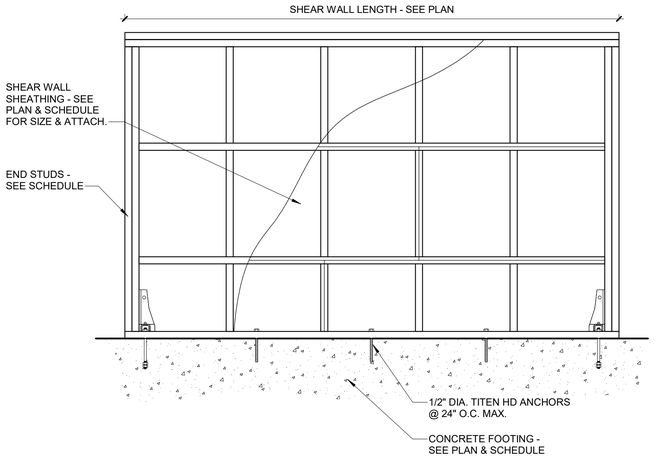
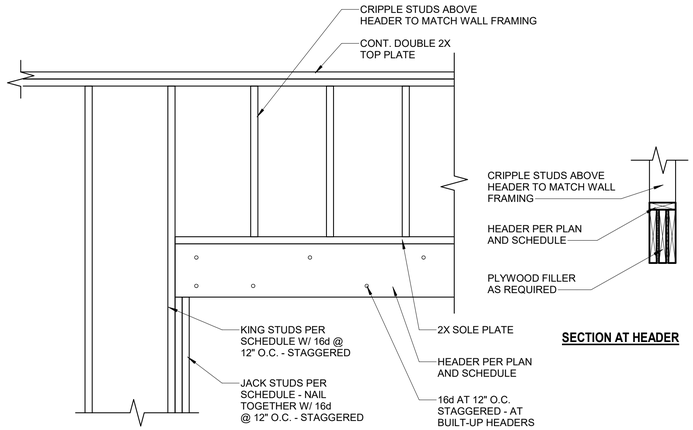
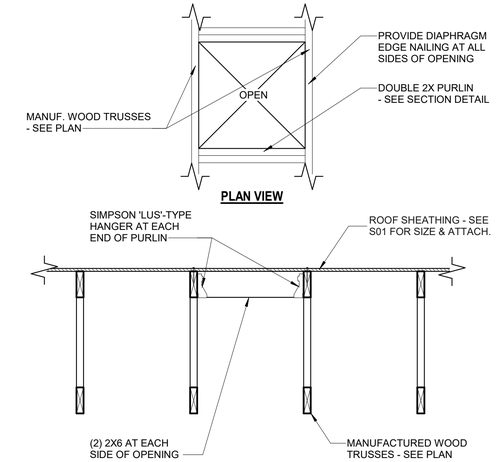


1 TYPICAL WOOD STUD SHEAR WALL ELEVATION
SCALE: 3/4" = 1'-0"

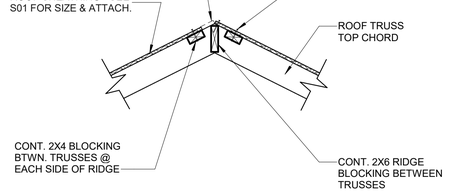


SECTION AT HEADER

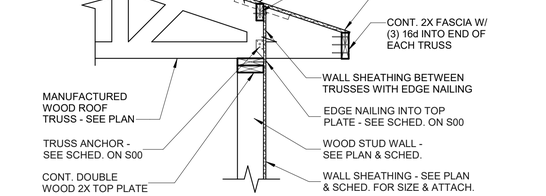
2 TYPICAL WOOD HEADER DETAIL
SCALE: 3/4" = 1'-0"



3 TYPICAL ROOF OPENING BETWEEN WOOD TRUSSES
SCALE: 3/4" = 1'-0"



4 TYPICAL RIDGE FRAMING AT WOOD ROOF TRUSSES
SCALE: 3/4" = 1'-0"



5 WOOD ROOF TRUSS AT WOOD STUD WALL
SCALE: 3/4" = 1'-0"

6 WOOD GABLE TRUSS CONNECTION AT WOOD STUD WALL
SCALE: 3/4" = 1'-0"

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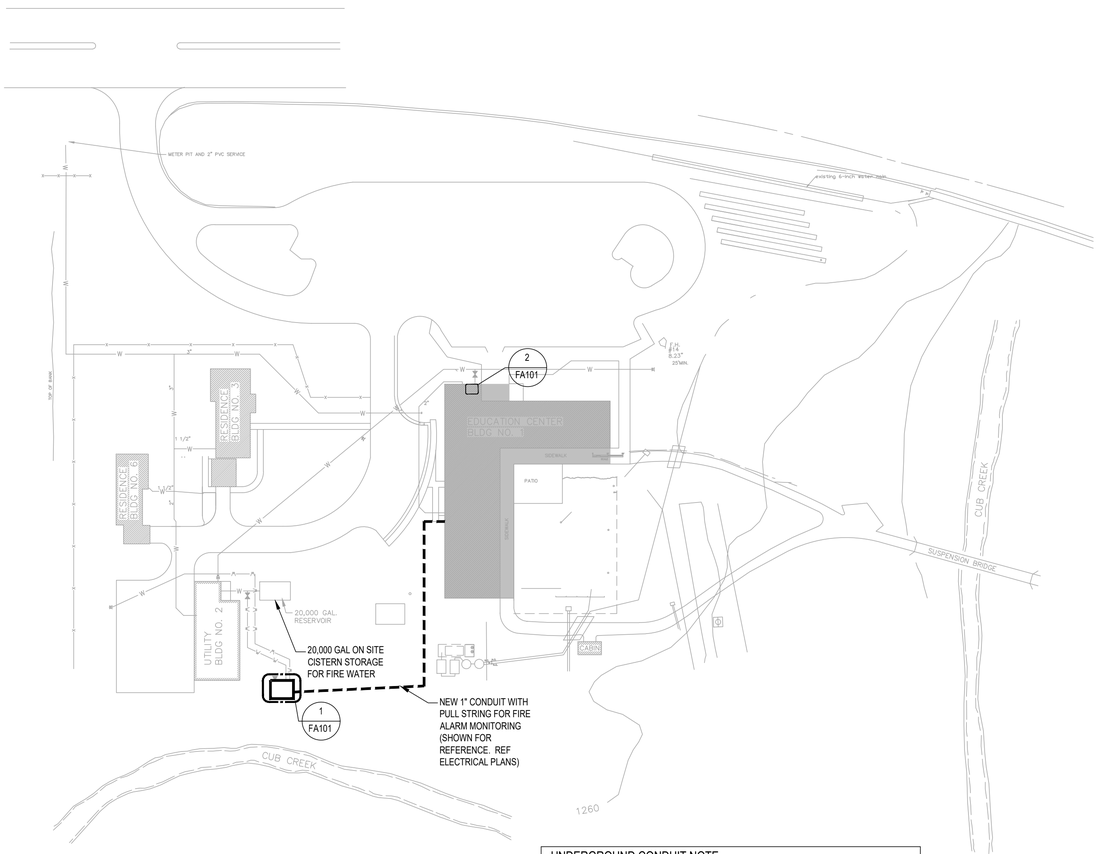

FIRE ALARM SITE PLAN

SCALE: 1" = 50'-0" FIN. FLOOR ELEV. = 100'-0"

UNDERGROUND CONDUIT NOTE

ALL UNDERGROUND CONDUIT, ETC. ARE SHOWN FOR REFERENCE ONLY. REFER TO CIVIL DRAWINGS FOR EXACT LOCATIONS, TYPES, AND SIZES OF ALL COMPONENTS IN ADDITION TO DETAILS OF CONSTRUCTION.

FIRE ALARM GENERAL NOTES

1. THE EXISTING FIRE ALARM SYSTEM SHALL OPERATE AS A STANDALONE LOW VOLTAGE SYSTEM AND SHALL BE AN INTELLIGENT ADDRESSABLE SUPERVISED SYSTEM. CIRCUITS SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS:
   - INITIATING DEVICE CIRCUITS - CLASS B
   - NOTIFICATION APPLIANCE CIRCUITS - CLASS B
   - SIGNALING LINE CIRCUITS - CLASS B
   - CIRCUITS FOR RELAY COIL OPERATION SHALL BE 24 VDC MAXIMUM WITH A SEPARATE OR INTEGRAL FIELD COLLAPSING DIODE.
2. THE FIRE ALARM SYSTEM SHALL BE DOCUMENTED IN ACCORDANCE WITH SECTION 26.3 AND 26.3.4 OF NFPA 72, 2022 EDITION.
3. UPON LOSS OF BUILDING POWER, THE ENTIRE SYSTEM SHALL TRANSFER TO SECONDARY POWER WITHIN TEN (10) SECONDS, AND WITHOUT LOSS OF SIGNALS. THE SYSTEM SHALL OPERATE UNDER SECONDARY POWER IN NORMAL OR TROUBLE CONDITIONS FOR TWENTY-FOUR (24) AND HAVE SUFFICIENT POWER TO SUPPORT COMPLETE ALARM CONDITION OPERATION FOR A SUBSEQUENT FIVE (5) MINUTES AT MAXIMUM CONNECTED LOAD.
4. ALL SIGNALING LINE CIRCUITS, INITIATING DEVICE CIRCUITS, AND NOTIFICATION APPLIANCE CIRCUITS SHALL BE SUPERVISED IN ACCORDANCE WITH NFPA 72.
5. PROVIDE END OF LINE RESISTORS FOR ALL INITIATING DEVICE CIRCUITS AND NOTIFICATION APPLIANCE CIRCUITS PER MANUFACTURER SPECIFICATIONS.
6. PROVIDE A COMPUTER GENERATED PRINTED LABEL FOR EACH INITIATING DEVICE INDICATING THE SPECIFIC ADDRESS FOR THAT DEVICE. THE LABEL SHALL INCLUDE THE PROGRAM NUMBER AND DEVICE NUMBER. THE LABEL SHALL BE LOCATED ON THE BASE OF ALL DETECTORS AND THE COVER PLATES OF EACH ADDRESSABLE DEVICE. HAND WRITTEN LABELS ARE NOT ACCEPTABLE.
7. PROVIDE A COMPUTER GENERATED PRINTED LABEL FOR EACH NOTIFICATION APPLIANCE INDICATING THE SPECIFIC CIRCUIT NUMBER FOR THAT APPLIANCE. THE LABEL SHALL INCLUDE END OF LINE RESISTOR LOCATION, CIRCUIT NUMBER AND APPLIANCE NUMBER. THE LABEL SHALL BE LOCATED ON THE BASE OF ALL NOTIFICATION APPLIANCES. HAND WRITTEN LABELS ARE NOT ACCEPTABLE.
8. NEW NOTIFICATION APPLIANCE CIRCUITS (NAC) SHALL BE DESIGNED FOR A MAXIMUM 1.6 AMPS, MAXIMUM 4.4 VDC DROP, AND MINIMUM OPERATING VOLTAGE OF 16 VDC. SEE FIRE ALARM NAC VOLTAGE DROP CALCULATIONS ON THIS SHEET.
9. ALL AUDIBLE APPLIANCES SHALL BE SET TO THE HIGH DBA SETTING AND SHALL SOUND A THREE-PULSE TEMPORAL PATTERN EVACUATION SIGNAL.
10. PROVIDE SYNCHRONIZATION OF ALL AUDIBLE AND VISUAL NOTIFICATION APPLIANCE CIRCUITS THROUGHOUT THE FACILITY. PROVIDE ALL REQUIRED SYNCHRONIZATION MODULES. PROVIDE MULTI-SYNC MODE SLAVE CONNECTIONS TO ALL AUXILIARY POWER SUPPLIES.
11. THE AUDIBLE/VISUAL AND VISUAL NOTIFICATION APPLIANCES SHALL BE RED IN COLOR, AND LISTED FOR THE INTENDED APPLICATION.
12. NOTIFICATION APPLIANCE POLARITY SHALL BE OBSERVED.
13. WHERE POSSIBLE, PROVIDE FLUSH MOUNTING OF NOTIFICATION APPLIANCES. WHERE SURFACE-MOUNTED NOTIFICATION APPLIANCES ARE NECESSARY, PROVIDE DECORATIVE BACKBOX SKIRT COVERING THE APPLIANCE BACKBOX.
14. MANUALLY ACTIVATING THE "ALARM SILENCE" AT THE FACP SHALL DE-ENERGIZE BOTH THE AUDIBLE AND VISUAL NOTIFICATION APPLIANCES. AN ADDITIONAL ALARM REPORTED TO THE FACP SUBSEQUENT TO ACTIVATING THE "ALARM SILENCE" SHALL RE-ENERGIZE THE AUDIBLE AND VISUAL NOTIFICATION APPLIANCES THROUGHOUT THE FACILITY.
15. THE WALL MOUNTED DEVICES AND APPLIANCES SHALL BE INSTALLED ALIGNED AESTHETICALLY WITH THE WALL ELEMENTS AND OTHER FIXTURES. ENSURE THE NOTIFICATION APPLIANCES ARE INSTALLED A MINIMUM OF ONE (1) FOOT FROM THE OTHER ITEMS TO AVOID OBSTRUCTION. COORDINATE INSTALLATION OF ALL WALL MOUNTED FIRE ALARM DEVICES AND NOTIFICATION APPLIANCES WITH THE ARCHITECTURAL DRAWINGS AND ALL OTHER TRADES PRIOR TO INSTALLATION.
16. DEVICES AND APPLIANCE LOCATIONS AS SHOWN ON THE FIRE ALARM PLANS ARE NOT DIMENSIONED FOR EXACT INSTALLATION. COORDINATE EXACT PLACEMENT OF ALL DEVICES AND APPLIANCES WITH THE ARCHITECTURAL PLANS, APPLICABLE TRADES, AND OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
17. ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL BACKGROUND INFORMATION IS SHOWN FOR COORDINATION PURPOSES ONLY. REFER TO THE PROPER DRAWINGS FOR EXACT LOCATIONS, SIZES AND QUANTITIES OF OTHER TRADES' WORK.
18. MOUNT SMOKE DETECTORS AT THE CEILING/DECK, AND NOT ON THE BOTTOM OF BEAMS OR JOISTS. LOCATE ALL SMOKE DETECTORS A MINIMUM OF THREE (3) FEET FROM ANY MECHANICAL DIFFUSERS, AND AS REQUIRED BY NFPA 72. THE SMOKE DETECTOR AND FIRE ALARM CABLING SHALL BE INSTALLED AND SUPPORTED A MINIMUM 1-1/2 INCHES FROM THE LOWEST SURFACE OF THE ROOF DECKING IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE.
19. SMOKE DETECTOR HEADS SHALL NOT BE INSTALLED UNTIL AFTER THE CONSTRUCTION CLEAN-UP OF ALL TRADES IS COMPLETE AND FINAL.
20. VERIFY ALL EQUIPMENT QUANTITIES, LOCATIONS, AND REQUIREMENTS. IF DISCREPANCIES ARE FOUND, CONTRACTOR SHALL IMMEDIATELY BRING THEM TO THE ATTENTION OF THE FIRE PROTECTION ENGINEER FOR RESOLUTION.

FIRE ALARM INSTALLATION NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH PBS-P100, NFPA STANDARDS AND ALL ADOPTED CODES.
2. FIRE ALARM CABLING SHALL BE ACCEPTABLE TO THE FIRE ALARM EQUIPMENT MANUFACTURER FOR THE INTENDED PURPOSE. SHOULD MANUFACTURER OF FIRE ALARM EQUIPMENT REQUIRE DIFFERENT TYPE OR SIZE OF CABLE THAN HEREIN SPECIFIED, THE LARGER OR MORE STRINGENT TYPE OF CABLE SHALL BE USED.
3. ALL FIRE ALARM CABLING WITHIN THE BUILDING SHALL BE PLENUM RATED TYPE FPLP. SEE WIRING LEGEND FOR CABLE TYPES AND SIZES.
4. PROVIDE ALL REQUIRED CONDUIT, BACKBOXES, AND FITTINGS FOR THE FIRE ALARM SYSTEM CABLING.
5. FIRE ALARM CABLING SHALL BE RED IN COLOR.
6. FIRE ALARM CABLING SHALL NOT BE PAINTED.
7. ALL CONDUIT RUNS SHALL BE NEATLY INSTALLED AND PROPERLY SECURED. ANY CABLING NOT INSTALLED IN A NEAT AND PROFESSIONAL MANNER SHALL BE PULLED OUT AND RE-RUN BY INSTALLER AT NO ADDITIONAL COST TO OWNER.
8. CONTRACTOR RUNNING CABLING MUST MARK BOTH ENDS OF CABLING, PROVIDE A WIRE LEGEND FOR ALL LOCATIONS, AND PROVIDE A CONTINUITY TEST LOG FOR EACH CABLE.
9. ALL CONDUIT SHALL BE SUPPORTED FROM BUILDING STRUCTURE AND NOT FROM GRID, TILES, OR SUPPORT WIRES.
10. ALL FIRE ALARM CABLING SHALL BE INSTALLED IN METALLIC CONDUIT.
11. ALL NON-POWER LIMITED FIRE ALARM CABLING FOR THE FIRE ALARM SYSTEM SHALL BE INSTALLED IN CONDUIT.
12. FOR DRYWALL APPLICATIONS, ALL CONDUIT AND BACKBOXES SHALL BE RECESSED INSIDE THE WALL.
13. EXPOSED CONDUIT IS NOT PERMITTED IN FINISHED AREAS.
14. COORDINATE DRILLING OF ANY HOLES (I.E. COLUMN PENETRATIONS) WITH THE OWNER'S REPRESENTATIVE AND ALL OTHER TRADES PRIOR TO INSTALLATION.
15. ALL FIRE ALARM DEVICES SHALL BE INSTALLED IN OR ON A PROPER BACKBOX. NO DEVICES SHALL BE INSTALLED WITHOUT A BACKBOX.
16. ALL CABLING, CONDUIT, AND BACKBOXES SHALL BE PROPERLY SUPPORTED AND SEISMICALLY BRACED (IF REQUIRED), AS REQUIRED BY ALL APPLICABLE CODES AND THE LOCAL JURISDICTION.
17. CONDUIT AND CABLING SHALL ENTER INTO THE FACP AND EACH APS ONLY AS APPROVED BY THE EQUIPMENT MANUFACTURER.
18. CONDUIT FILL SHALL NOT EXCEED 40%.
19. ALL FIRE ALARM JUNCTION BOXES SHALL BE RED IN COLOR.

FIRESTOP NOTES

1. ALL THROUGH-PENETRATIONS OF FIRE-RATED WALLS AND FLOORS SHALL BE FIRE-STOPPED.
2. FIRE-RATED GYPSUM BOARD WALLS CONSTRUCTED AS DESCRIBED IN THE INDIVIDUAL U300, U400, OR V400 SERIES DESIGNS IN THE U.L. FIRE RESISTANCE DIRECTORY (GENERALLY DOUBLE THICKNESS WALLBOARD) SHALL BE FIRE-STOPPED WITH U.L. SYSTEMS.
3. ALL REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOORS OR WALLS, AND ALL U.L. CLASSIFIED CONCRETE BLOCK WALLS SHALL BE FIRE-STOPPED WITH U.L. SYSTEMS.

FIREPROOFING NOTES (WHERE REQUIRED)

1. INSTALL ALL HANGERS, CLAMPS, CONDUIT, AND BACK BOXES FOR THE FIRE ALARM SYSTEM PRIOR TO THE APPLICATION OF FIREPROOFING ON STRUCTURAL MEMBERS.
2. INSTALL ALL HANGERS, CLAMPS, AND BACK BOXES FOR THE FIRE ALARM SYSTEM ON THE EDGE OF ANY JOIST REQUIRING FIREPROOFING. BACK BOXES SHALL BE FASTENED TO THE FLANGE OF THE JOIST UTILIZING BEAM CLAMPS, AND SHALL NOT BE ATTACHED DIRECTLY TO THE JOIST.
3. ANY DAMAGE TO FIREPROOFING ON THE BUILDING STRUCTURE AS A RESULT OF THE FIRE ALARM SYSTEM INSTALLATION SHALL BE REPAIRED BY A QUALIFIED FIREPROOFING CONTRACTOR. ALL DAMAGE AND REPAIR OF FIREPROOFING SHALL BE REPORTED TO AND COORDINATED THROUGH THE OWNER'S REPRESENTATIVE. THE FIRE ALARM CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FIREPROOFING REPAIRS AT NO ADDITIONAL COST TO THE OWNER.
4. VERIFY THE LOCATIONS OF ALL FIREPROOFING, PRIOR TO THE INSTALLATION OF ANY FIRE ALARM CONDUIT AND BACKBOXES.

SCOPE OF WORK

1. AN EXISTING FIRE ALARM SYSTEM SHALL REMAIN AND BE MODIFIED AS NECESSARY THROUGHOUT THE FACILITY.
2. THE FIRE ALARM SYSTEM SHALL REPORT ALL ALARM, SUPERVISORY, AND TROUBLE SIGNAL TO A UL CENTRAL STATION AS CURRENTLY CONFIGURED.
3. THE EXISTING FIRE ALARM SYSTEM SHALL MINIMALLY CONSIST OF, BUT NOT LIMITED TO THE FOLLOWING:
   - PROVIDE NEW MONITORING OF FIRE PUMP AND FIRE PUMP MONITORING EQUIPMENT.
   - EXISTING MONITORING OF THE FIRE SPRINKLER CONTROL VALVES AND WATERFLOW SWITCHES
   - EXISTING OCCUPANT NOTIFICATION THROUGHOUT (SPEAKER/VISUAL)
   - EXISTING MANUAL PULL STATIONS ADJACENT TO EXITS
   - EXISTING SMOKE DETECTION THROUGHOUT
   - EXISTING REMOTE TEST STATIONS FOR EACH DUCT DETECTOR
   - EXISTING POWER-LIMITED FIRE ALARM CABLING

APPLICABLE CODES

ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REFERENCED DESIGN STANDARDS.

2021 INTERNATIONAL BUILDING CODE

2021 INTERNATIONAL FIRE CODE

2022 EDITION NFPA 72 NATIONAL FIRE ALARM AND SIGNALING CODE

CONFLICTS BETWEEN THE REFERENCE NFPA STANDARDS, FEDERAL OR STATE CODES, SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTING OFFICER FOR RESOLUTION.

100% CD

PROFESSIONAL ELECTRICAL ENGINEER — PAUL T. KAHLE E-16532 — STATE OF NEBRASKA

12/15/2022

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12/15/2022 — DATE

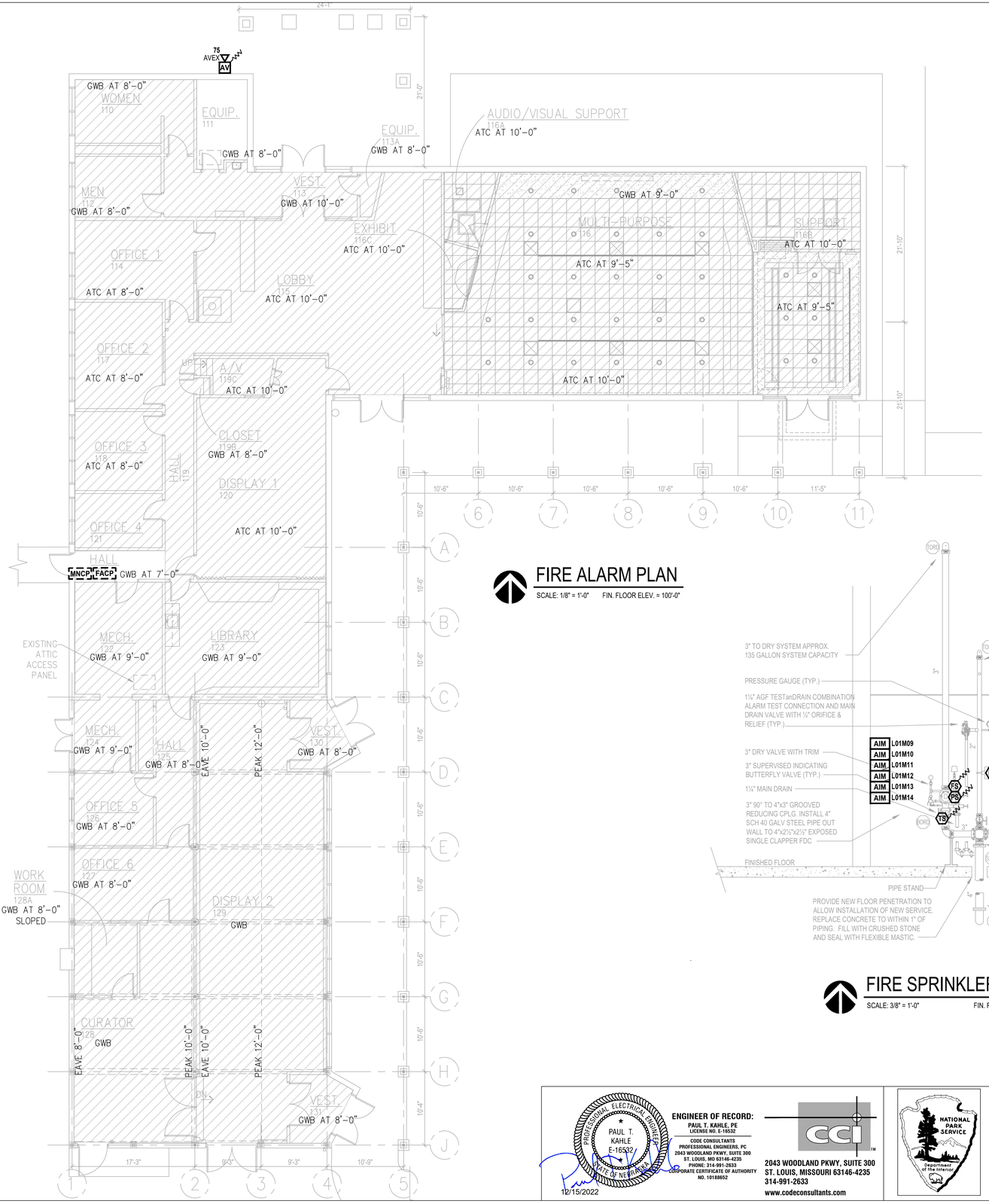
TITLE OF SHEET

SITE PLAN AND NOTES - FIRE ALARM

EDUCATION CENTER FIRE SERVICE
HOMESTEAD NATIONAL MONUMENT OF AMERICA
8523 NE-4
BEATRICE, NE 68310

ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **FA100**
DRAWING NO. 368 / 80056
PMIS / PKG. NO. **207662**
SHEET **15** OF **31**

FIRE ALARM SYMBOL KEY		QTY.
FACP	EXISTING FIRE ALARM CONTROL PANEL (SILENT KNIGHT 5820XL)	ETR
MNCP	EXISTING MASS NOTIFICATION CONTROL PANEL (SAFEPATH)	ETR
APS	EXISTING AUXILIARY POWER SUPPLY	ETR
SV	EXISTING WALL MOUNTED RED SPEAKER/VISUAL APPLIANCE (XX = CANDELA RATING)	ETR
AIM	ADDRESSABLE INPUT MODULE	7
SV SD** XX	WALL MOUNTED RED SPEAKER/VISUAL APPLIANCE (XX = CANDELA RATING)	1
FS	FLOW SWITCH	2
TS	TAMPER SWITCH	5
PS	WATERFLOW PRESSURE SWITCH	1
	FIRE ALARM PLENUM RATED CONDUCTORS IN RED CONDUIT	
	END OF LINE RESISTOR	



FIRE ALARM PLAN

SCALE: 1/8" = 1'-0" FIN. FLOOR ELEV. = 100'-0"

FIRE SPRINKLER RISER

SCALE: 3/8" = 1'-0" FIN. FLOOR ELEV. = 100'-0"

1 FA101 PREFABRICATED PUMP HOUSE FIRE PLAN

NOT TO SCALE

100% CD

PAUL T. KAHLE E-16532 PROFESSIONAL ELECTRICAL ENGINEER STATE OF NEBRASKA
12/15/2022

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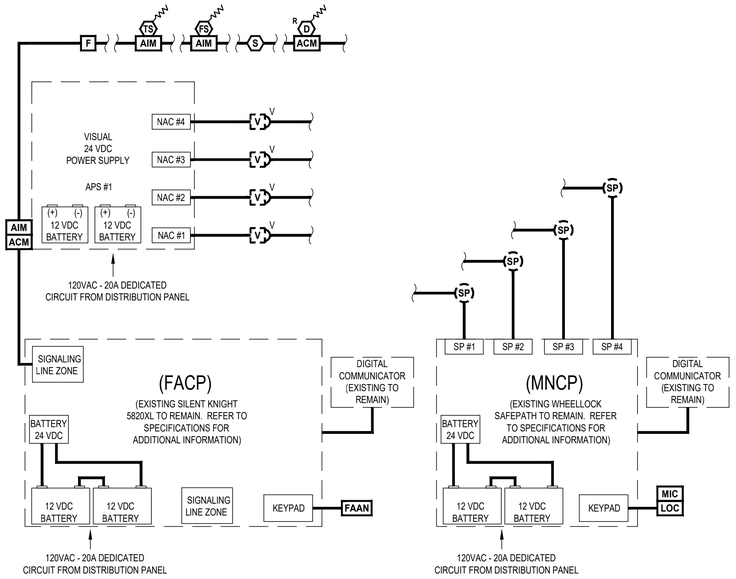
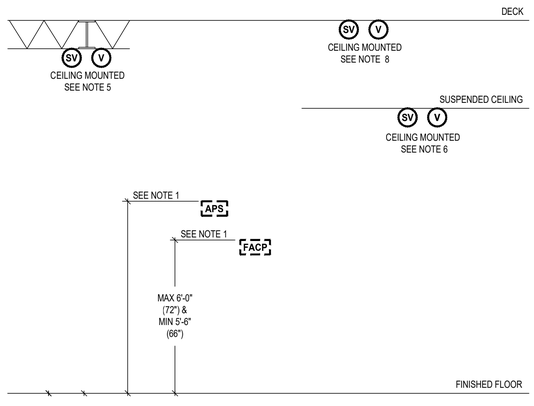


FIRE ALARM RISER DIAGRAM

NOT TO SCALE



NOTES:

1. COORDINATE EXACT MOUNTING HEIGHT OF CONTROL PANELS, ANNUNCIATOR AT FACP AND AUXILIARY POWER SUPPLIES WITH THE OWNER'S REPRESENTATIVE, ELECTRICAL CONTRACTOR, AND AHJ PRIOR TO INSTALLATION. SEE CONTROL PANEL LAYOUT DETAIL ON THIS SHEET.
2. WHERE INDICATED ON THE DRAWINGS - LOCATE CEILING MOUNTED NOTIFICATION APPLIANCES ON BOTTOM OF BEAMS OR JOISTS; WITH CLEAR LINE OF SITE IN ALL DIRECTIONS AND AS INDICATED IN NFPA 72.
3. WHERE INDICATED ON THE DRAWINGS - LOCATE CEILING MOUNTED NOTIFICATION APPLIANCES FLUSH WITH THE SUSPENDED CEILING; ALIGNED WITH LIGHTING, SPRINKLERS, AND OTHER ARCHITECTURAL FIXTURES; WITH CLEAR LINE OF SITE IN ALL DIRECTIONS AND AS INDICATED IN NFPA 72.
4. WHERE INDICATED ON THE DRAWINGS -THE CEILING MOUNTED NOTIFICATION APPLIANCE SHALL BE INSTALLED ON THE BOTTOM OF JOIST / DECK WITHIN FIFTEEN (15) FEET OF EACH END OF THE CORRIDOR IN ACCORDANCE WITH NFPA 72.

TYPICAL FIRE ALARM MOUNTING HEIGHT DETAIL

NOT TO SCALE

FIRE ALARM MATRIX

	ACTUATES ALARM CONDITION AT FIRE ALARM CONTROL PANEL	ANNUNCIATES ALARM CONDITION AT REMOTE FIRE ALARM ANNUNCIATOR KEYPAD	TRANSMITS ALARM SIGNAL TO APPROVED U.L. LISTED CENTRAL STATION	ACTUATES SUPERVISORY CONDITION AT FIRE ALARM CONTROL PANEL	ANNUNCIATES SUPERVISORY CONDITION AT REMOTE FIRE ALARM ANNUNCIATOR KEYPAD	TRANSMITS SUPERVISORY CONDITION AT REMOTE FIRE ALARM CONTROL PANEL TO APPROVED U.L. LISTED CENTRAL STATION	ACTUATES TROUBLE CONDITION AT FIRE ALARM CONTROL PANEL	ANNUNCIATES TROUBLE CONDITION AT REMOTE FIRE ALARM ANNUNCIATOR KEYPAD	TRANSMITS TROUBLE SIGNAL TO APPROVED U.L. LISTED CENTRAL STATION	ACTIVATES INTERIOR AUDIBLE/VISUAL NOTIFICATION APPLIANCES THROUGHOUT	ACTIVATES EXTERIOR NOTIFICATION APPLIANCE	SHUTS DOWN AFFECTED HVAC UNITS
FIRE SPRINKLER SYSTEMS												
- WATERFLOW SWITCHES	●	●	●							●	●	
- CONTROL VALVE TAMPER SWITCHES				●	●	●						
- LOW SUPERVISORY AIR (DRY PIPE)				●	●	●						
- NITROGEN GENERATOR TROUBLE				●	●	●						
MANUAL PULL STATIONS	●	●	●							●		
SMOKE DETECTION DEVICES												
- SPOT TYPE - EXISTING TO REMAIN	●	●	●							●		
- AIR HANDLING UNIT - EXISTING TO REMAIN				●	●	●						●
LOSS OF PRIMARY POWER AT THE FACP OR APS							●	●	●			
ABNORMAL CIRCUIT (OPEN, GROUND FAULT, SHORT) OR DEVICE							●	●	●			
FIRE PUMP MONITORING												
- PUMP RUNNING				●	●	●						
- CONTROLLER IN OFF/MANUAL				●	●	●						
- PUMP TROUBLE (LOW FUEL, LOSS OF AC POWER, LOW TEMP)				●	●	●						

FIRE ALARM SYMBOL KEY		QTY.
FACP	EXISTING FIRE ALARM CONTROL PANEL (SILENT KNIGHT 5820XL)	ETR
MNCP	EXISTING MASS NOTIFICATION CONTROL PANEL (SAFEPATH)	ETR
APS	EXISTING AUXILIARY POWER SUPPLY	ETR
SV V	EXISTING WALL MOUNTED RED SPEAKER/VISUAL APPLIANCE (XX = CANDELA RATING)	ETR
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TS	TAMPER SWITCH	5
PS	WATERFLOW PRESSURE SWITCH	1
———	FIRE ALARM PLENUM RATED CONDUCTORS IN RED CONDUIT	
~W~	END OF LINE RESISTOR	

CONTROL-BY-EVENT PROGRAMMING MATRIX

ADDRESS	TYPE I.D.	ALPHANUMERIC LABEL OF DEVICE
L01M01	MONITOR	FIRE PUMP RUNNING
L01M02	MONITOR	FIRE PUMP CONTROLLER IN OFF/MANUAL
L01M03	MONITOR	PUMP TROUBLE (LOW FUEL, LOSS OF AC POWER, LOW TEMP)
L01M04	MONITOR	LOW WATER LEVEL
L01M05	MONITOR	FLOW SWITCH (PUMP HOUSE WET SYSTEM)
L01M06	MONITOR	TAMPER SWITCH (PUMP HOUSE WET SYSTEM)
L01M07	MONITOR	TAMPER SWITCH (PUMP HOUSE UNDERGROUND SUPPLY)
L01M08	MONITOR	TAMPER SWITCH (PUMP RETICULATE & TEST HEADER NORMALLY CLOSED)
L01M09	MONITOR	FLOW SWITCH (WET SYSTEM)
L01M10	MONITOR	TAMPER SWITCH (WET SYSTEM)
L01M11	MONITOR	FLOW SWITCH (DRY SYSTEM)
L01M12	MONITOR	TAMPER SWITCH
L01M13	MONITOR	LOW AIR SUPERVISORY SWITCH
L01M14	MONITOR	NNITROGEN GENERATOR TROUBLE CONDITION

100% CD

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FLOOR PUMP PLAN - FIRE ALARM
EDUCATION CENTER FIRE SERVICE
HOMESTEAD NATIONAL MONUMENT OF AMERICA
8523 NE-4
BEATRICE, NE 68310

ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **FA102**
DRAWING NO. 368 / 80056
PMIS / PKG. NO. **207662**
SHEET **17** OF **31**

SPECIFICATIONS 28 31 11 ADDRESSABLE FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

1.2 SUMMARY

A. SECTION INCLUDES THE FOLLOWING:

1. ADDRESSABLE FIRE ALARM CONTROL PANEL (EXISTING TO REMAIN)
2. DIGITAL ALARM COMMUNICATOR TRANSMITTER (EXISTING TO REMAIN)
3. CIRCUITS
4. ADDRESSABLE INTERFACE MODULES
5. NOTIFICATION APPLIANCES

1.3 DEFINITIONS

A. AHJ: AUTHORITY HAVING JURISDICTION

B. DACT: DIGITAL ALARM COMMUNICATOR TRANSMITTER

C. FACP: FIRE ALARM CONTROL PANEL

D. FAEM: FIRE ALARM EQUIPMENT MANUFACTURER

E. IDC: INITIATING DEVICE CIRCUIT

F. NAC: NOTIFICATION APPLIANCE CIRCUIT

G. NICET: NATIONAL INSTITUTE FOR CERTIFICATION IN ENGINEERING TECHNOLOGIES

H. NFPA: NATIONAL FIRE PROTECTION ASSOCIATION

I. NRTL: NATIONALLY RECOGNIZED TESTING LABORATORY

J. SLC: SIGNALING LINE CIRCUIT

K. UL: UNDERWRITERS LABORATORIES, INC.

1.4 REFERENCES

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REFERENCED DESIGN STANDARDS.

B. IF THERE IS A CONFLICT BETWEEN THE APPLICABLE CODES, REFERENCED DESIGN STANDARDS, OR LOCAL AMENDMENTS AND THIS SPECIFICATION, IT IS THE CONTRACTOR'S RESPONSIBILITY TO IMMEDIATELY BRING THE CONFLICT TO THE OWNER'S REPRESENTATIVE AND ENGINEER FOR RESOLUTION.

1.5 SYSTEM OPERATIONAL DESCRIPTION

A. THE FIRE ALARM SYSTEM SHALL BE A NON-CODED, ADDRESSABLE SYSTEM, WITH AUTOMATIC SENSITIVITY CONTROL OF CERTAIN SMOKE DETECTORS AND MULTIPLEXED SIGNAL TRANSMISSION, DEDICATED TO FIRE ALARM SERVICE ONLY.

B. THE SYSTEM SHALL OPERATE AS A LOW VOLTAGE FIRE ALARM SYSTEM AND SHALL BE A COMPLETE INTELLIGENT ADDRESSABLE SUPERVISED FIRE ALARM SYSTEM AS HEREINAFTER SPECIFIED. INITIATION CIRCUITS SHALL MEET THE MINIMUM REQUIREMENTS OF CLASS B. SUPERVISORY CIRCUITS SHALL MEET THE MINIMUM REQUIREMENTS OF CLASS B. NOTIFICATION CIRCUITS SHALL MEET THE MINIMUM REQUIREMENTS OF CLASS B. SIGNALING LINE CIRCUITS SHALL MEET THE MINIMUM REQUIREMENTS OF CLASS B. AUXILIARY CIRCUITS, WHERE NOT INSTALLED AS SIGNALING LINE CIRCUITS, SHALL MEET THE MINIMUM REQUIREMENTS OF A CLASS B, STYLE W NOTIFICATION CIRCUIT. CIRCUITS FOR RELAY COIL OPERATION SHALL BE 24 VOLT MAXIMUM WITH A SEPARATE OR INTEGRAL FIELD COLLAPSING DIODE.

C. THE CONTROL PANELS AND POWER SUPPLIES SHALL RECEIVE THEIR POWER FROM 120 VOLT AC DEDICATED BRANCH CIRCUITS. THE CIRCUIT DISCONNECTING MEANS SHALL HAVE A RED MARKING, SHALL BE ACCESSIBLE ONLY TO AUTHORIZED PERSONNEL, AND SHALL BE IDENTIFIED AS "FIRE ALARM CIRCUIT". THE 24 VOLT DC POWER FOR ALL SYSTEM INITIATION, SUPERVISORY, NOTIFICATION AND CONTROL CIRCUITS SHALL BE PROVIDED BY THE FIRE ALARM CONTROL PANEL POWER SUPPLIES OR LISTED POWER SUPPLIES.

D. SYSTEM OPERATION SHALL BE AS FOLLOWS:

1. UPON LOSS OF BUILDING POWER, THE ENTIRE SYSTEM SHALL TRANSFER TO SECONDARY POWER WITHIN TEN (10) SECONDS, AND WITHOUT LOSS OF SIGNALS. THE SYSTEM SHALL OPERATE UNDER SECONDARY POWER IN NORMAL OR TROUBLE CONDITIONS FOR TWENTY-FOUR (24) HOURS AND HAVE SUFFICIENT POWER TO SUPPORT COMPLETE ALARM CONDITION OPERATION FOR A SUBSEQUENT FIVE (5) MINUTES OF EVACUATION ALARM OPERATION AT MAXIMUM CONNECTED LOAD.

2. ABNORMAL CIRCUIT CONDITIONS OR DEVICES, AS REQUIRED FOR THE CLASS AND STYLE OF THE CIRCUIT, SHALL INITIATE A "TROUBLE" CONDITION AT THE CONTROL PANELS AND REMOTE ANNUNCIATORS FOR THAT SPECIFIC CIRCUIT OR DEVICE. THE "TROUBLE" INDICATION SHALL DESCRIBE THE NATURE OF THE CONDITION ON THE AFFECTED CIRCUIT OR DEVICE. THE FIRE ALARM SYSTEM SHALL TRANSMIT A "TROUBLE" CONDITION TO AN APPROVED SUPERVISING STATION.

3. ACTIVATION OF ANY SUPERVISORY DEVICE SHALL INITIATE A "SUPERVISORY" CONDITION AT THE CONTROL PANELS AND REMOTE ANNUNCIATORS FOR THAT SPECIFIC DEVICE. THE "SUPERVISORY" INDICATION SHALL DESCRIBE THE NATURE OF THE CONDITION AND SPECIFIC ADDRESS AND ALPHANUMERIC DESCRIPTION OF THE DEVICE AFFECTED. THE FIRE ALARM SYSTEM SHALL TRANSMIT A "SUPERVISORY" CONDITION TO AN APPROVED SUPERVISING STATION.

4. ACTIVATION OF ANY ALARM DEVICE SHALL INITIATE AN "ALARM" CONDITION AT THE CONTROL PANELS AND REMOTE ANNUNCIATORS FOR THAT SPECIFIC DEVICE. THE "ALARM" INDICATION SHALL DESCRIBE THE NATURE OF THE CONDITION AND SPECIFIC ADDRESS AND ALPHANUMERIC DESCRIPTION OF THE DEVICE AFFECTED. THE FIRE ALARM SYSTEM SHALL TRANSMIT A "ALARM" CONDITION TO AN APPROVED SUPERVISING STATION.

E. INITIATION OF AN "ALARM" CONDITION SHALL RESULT IN THE FOLLOWING FUNCTIONS TO BE PERFORMED BY THE SYSTEM:

1. INITIATE AN ALARM INDICATION ON THE CONTROL PANEL BY TONE AND ILLUMINATE THE CORRESPONDING DEVICE SPECIFIC ALPHANUMERIC LCD DESCRIPTION. MANUALLY ACTIVATING THE "ALARM SILENCE" SHALL SILENCE THE TONE AT THE PANEL. THE ALARM ALPHANUMERIC DISPLAY SHALL REMAIN "ON" AT THE CONTROL PANEL UNTIL THE CONDITION CAUSING THE ALARM HAS BEEN CLEARED AND RESET. AN ADDITIONAL ALARM REPORTED TO THE PANEL SUBSEQUENT TO ACTIVATING THE "ALARM SILENCE" SHALL REACTIVATE THE CONTROL PANEL TONE.

2. ACTIVATE THE AUDIBLE AND VISUAL NOTIFICATION APPLIANCES THROUGHOUT THE BUILDING.

3. MANUALLY ACTIVATING THE "ALARM SILENCE" AT THE PANEL SHALL DE-ENERGIZE THE AUDIBLE AND VISUAL NOTIFICATION APPLIANCES. AN ADDITIONAL ALARM REPORTED TO THE PANEL SUBSEQUENT TO ACTIVATING THE "ALARM SILENCE" SHALL RE-ENERGIZE THE AUDIBLE AND VISUAL NOTIFICATION APPLIANCES IN THE BUILDING.

4. TRANSMIT A "ALARM" SIGNAL TO THE APPROVED SUPERVISING STATION.

F. ACTUATION OF ALARM NOTIFICATION APPLIANCES, FIRE SAFETY FUNCTIONS, AND ANNUNCIATION AT THE PROTECTED PREMISES SHALL OCCUR WITHIN TEN (10) SECONDS AFTER THE ACTIVATION OF AN INITIATING DEVICE.

1.6 DESCRIPTION OF WORK

A. PROVIDE ALL REQUIRED LABOR, WARRANTY LABOR, MATERIALS, EQUIPMENT, SYSTEM PROGRAMMING, TESTING, SUBMITTALS AND SERVICES NECESSARY FOR A COMPLETE AND OPERATIONAL FIRE ALARM SYSTEM AS HEREINAFTER DESCRIBED, AND AS SHOWN ON THE ENGINEERING DRAWINGS.

B. PROVIDE A MINIMUM OF TWO (2) HOURS TRAINING, FOR STAFF PERSONNEL, IN THE OPERATION AND USE OF THE SYSTEM.

C. IT IS INTENDED THAT THE ENGINEERING DRAWINGS AND SPECIFICATIONS SHALL DESCRIBE AND PROVIDE FOR A WORKING INSTALLATION COMPLETE IN EVERY DETAIL AND ALL ITEMS NECESSARY FOR SUCH COMPLETE INSTALLATION SHALL BE PROVIDED WHETHER OR NOT SPECIFICALLY MENTIONED HEREIN OR SHOWN ON THE ENGINEERING DRAWINGS.

1.7 SUBMITTALS

A. THE ENGINEERING DRAWINGS HAVE BEEN PREPARED USING AUTOCAD. THESE DOCUMENTS WILL BE MADE AVAILABLE EITHER IN ELECTRONIC OR HARD COPY FORM. UTILIZATION OF THESE DOCUMENTS FOR THE DEVELOPMENT OF SHOP DRAWINGS AND SUBMITTALS DOES NOT RELIEVE THE CONTRACTOR FROM ANY RESPONSIBILITIES REQUIRED HEREIN.

B. SUBMITTALS WILL BE DISAPPROVED UNLESS REQUIRED EQUIPMENT LITERATURE, CALCULATIONS, AND COMPLETE SHOP DRAWINGS ARE SUBMITTED TOGETHER AS ONE PACKAGE FOR REVIEW.

C. IN THE SUBMITTALS, THE CONTRACTOR SHALL PROVIDE A COMPLETE PACKAGE WITH DRAWINGS, EQUIPMENT LITERATURE AND CALCULATIONS AS ONE PACKAGE FOR REVIEW. THE SUBMITTAL SHALL BE COMPLETE IN NATURE AND IN ACCORDANCE WITH THE SHOP DRAWING PROVISIONS OF NFPA 72. THE SYSTEM.

1. SHOP DRAWINGS. THE SPECIFIC QUANTITY TO BE SUBMITTED SHALL BE CONFIRMED WITH THE GENERAL CONTRACTOR AND OWNER. ELECTRONIC SUBMITTALS ARE ACCEPTABLE. SUBMITTAL MUST BE COMPREHENSIVE OF THE ENTIRE PROJECT, COMPLETE IN ALL DETAIL, AND INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

a. FLOOR PLANS SHOWING EQUIPMENT PLACEMENT, POINT TO POINT WIRING, WIRING TYPES AND SIZES, CONDUIT TYPES AND SIZES, WIRING AND RACEWAY ROUTES, AND PROPOSED MOUNTING METHODS FOR CONDUIT AND BACKBOXES. FLOOR PLANS SHALL BE AUTOCAD GENERATED.

b. SEQUENCE OF OPERATIONS IN MATRIX FORM TO INCLUDE A DETAILED DESCRIPTION OF THE OPERATION OF EACH SYSTEM FUNCTION FOR ALL POSSIBLE CONDITIONS.

c. RISER DIAGRAM SHOWING TYPICAL WIRING CONNECTIONS FOR EACH TYPE OF DEVICE AND MODULE.

d. DETAILED WIRING DIAGRAMS FOR MAJOR SYSTEM COMPONENTS (CONTROL PANELS, POWER SUPPLIES, ETC.).

e. SUPERVISORY AND ALARM CURRENT CALCULATIONS FOR PRIMARY POWER AND EMERGENCY BATTERY SIZING OF ALL CONTROL PANELS AND AUXILIARY POWER SUPPLIES.

1) BATTERY CALCULATIONS SHALL LIST THE TYPE OF DEVICES AND MODULES, QUANTITIES, AMPERAGE DRAW FOR STANDBY AND ALARM CONDITIONS FOR EACH DEVICE, THE TOTAL AMPERAGE DRAW FOR EACH PANEL, AND EACH PANEL'S BATTERY AMP/HOUR RATING.

2) THE CALCULATED LOAD SHALL BE THE DESIGN LOAD, INCLUDING ALL REQUIRED SPARE CAPACITY.

3) THE BATTERY CALCULATIONS SHALL INCLUDE A TWENTY (20) PERCENT SAFETY MARGIN TO THE CALCULATED AMP-HOUR RATING.

f. A COMPLETE LIST OF ALL PROPOSED ALPHANUMERIC DESCRIPTIONS AND THEIR ASSOCIATED POINT ADDRESS AND CIRCUIT NUMBER.

g. VOLTAGE DROP CALCULATIONS FOR ALL NOTIFICATION APPLIANCE CIRCUITS.

1) CALCULATIONS SHALL FOLLOW THE VOLTAGE DROP CALCULATION CRITERIA AS OUTLINED IN NFPA 72 AND UL 864.

2) CALCULATIONS SHALL USE THE WORST CASE OPERATING VOLTAGE OF EACH CONTROL PANEL OR POWER SUPPLY AS A STARTING VOLTAGE. THE STARTING VOLTAGE SHALL BE 20.4 VDC, UNLESS WRITTEN DOCUMENTATION IS PROVIDED CONFIRMING THAT THE SPECIFIC CONTROL PANEL OR POWER SUPPLY IS CAPABLE OF MAINTAINING A VOLTAGE HIGHER THAN 20.4 VDC.

3) CALCULATIONS SHALL USE THE LOWEST OPERATING VOLTAGE OF THE NOTIFICATION APPLIANCES AND THE ASSOCIATED INCREASED CURRENT DRAW. THE LOWEST OPERATING VOLTAGE SHALL BE THE UL STANDARD OPERATING VOLTAGE OF 16 VDC, UNLESS APPROVED OTHERWISE BY THE ENGINEER.

2. MANUFACTURER'S LITERATURE ON ALL SYSTEM EQUIPMENT. THE SPECIFIC QUANTITY TO BE SUBMITTED SHALL BE CONFIRMED WITH THE GENERAL CONTRACTOR AND OWNER. ELECTRONIC SUBMITTALS ARE ACCEPTABLE.

a. LITERATURE SHALL INCLUDE SPECIFICATION AND DESCRIPTION OF RECOMMENDED SUPPORTING METHODS, ENCLOSURES OR BOXES, AND WIRING CONNECTIONS.

b. THE EXACT COMPONENTS TO BE UTILIZED ON THIS SPECIFIC PROJECT SHALL BE INDICATED, BY HIGHLIGHTING OR ARROWS, ON EACH DATA SHEET OF THE EQUIPMENT LITERATURE.

3. QUALIFICATIONS AND AUTHORIZATION OF THE REPRESENTATIVE OF THE FAEM.

D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACCURACY OF ALL SUBMITTALS REQUIRED TO BE REVIEWED BY THE ENGINEER PRIOR TO EQUIPMENT RELEASE OR INSTALLATION. THE SUBMITTAL REVIEW DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF PROVIDING A CODE COMPLIANT INSTALLATION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY ADDITIONAL COSTS RESULTING FROM REPLACEMENT OF EQUIPMENT OR MATERIALS NOT REVIEWED PRIOR TO INSTALLATION.

E. THE CONTRACTOR SHALL SUBMIT ALL REQUIRED DRAWINGS, MANUFACTURERS' LITERATURE, CALCULATIONS AND ANY OTHER MATERIALS REQUIRED BY THE CONTRACTING OFFICER AND ENGINEER FOR REVIEW.

1.8 PROJECT RECORD DOCUMENTS

A. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ON SITE AN UP-TO-DATE RECORD SET OF SATISFACTORY SHOP DRAWINGS WHICH SHALL BE MARKED TO SHOW EACH AND EVERY CHANGE MADE TO THE FIRE ALARM SYSTEM FROM THE ORIGINAL APPROVED SHOP DRAWINGS. THIS SHALL NOT BE CONSTRUED AS AUTHORIZATION TO DEVIATE FROM OR MAKE CHANGES TO THE SHOP DRAWINGS REVIEWED BY THE ENGINEER WITHOUT WRITTEN INSTRUCTIONS FROM THE ENGINEER IN EACH CASE. THIS SET OF DRAWINGS SHALL BE ISSUED ONLY AS A RECORD SET. THESE DRAWINGS SHALL BE MADE AVAILABLE TO THE OWNER, OR THE OWNER'S REPRESENTATIVE, UPON REQUEST.

B. THE PREPARATION OF A RECORD OF COMPLETION SHALL BE IN ACCORDANCE WITH NFPA 72. RECORD OF COMPLETION SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

1. A FINAL COPY OF THE RECORD OF COMPLETION SHALL BE PROVIDED AFTER COMPLETION OF THE OPERATIONAL ACCEPTANCE TESTS.

2. THIS COPY SHALL BE UPDATED TO REFLECT ALL SYSTEM ADDITIONS OR MODIFICATIONS AND MAINTAINED IN A CURRENT CONDITION AT ALL TIMES.

3. ALL DOCUMENTS SHALL BE LOCATED IN SEPARATE ENCLOSURE OR CABINET. LOCATION OF DOCUMENTATION CABINET SHALL BE COORDINATED WITH AHJ PRIOR TO INSTALLATION AND LABELED "SYSTEM RECORD DOCUMENTS".

C. PRIOR TO FINAL PAYMENT FOR THE FIRE ALARM SYSTEM AND THE BEGINNING OF THE WARRANTY PERIOD, SUBMIT A DIGITAL AND TWO (2) SETS (OR AS DIRECTED BY THE OWNER'S REPRESENTATIVE) OF THE FOLLOWING COMPLETED PROJECT RECORD DOCUMENTS TO THE OWNER'S REPRESENTATIVE:

1. COPIES OF ALL TEST AND INSPECTION REPORTS AS REQUIRED BY THE AHJ AND NFPA 72:

a. THE RECORD OF COMPLETION FORM AND THE INSPECTION AND TESTING FORM SHALL BE IN THE FORMAT AS OUTLINED IN NFPA 72.

2. ACCURATE RECORD (AS-BUILT) DRAWINGS OF THE COMPLETE INSTALLATION TO INCLUDE, BUT NOT BE LIMITED TO, THE INFORMATION REQUIRED FOR THE SHOP DRAWINGS. RECORD DRAWINGS OF THE FLOOR PLANS SHALL BE AUTOCAD GENERATED.

3. ORIGINAL WARRANTY DOCUMENTS INCLUDING, BUT NOT LIMITED TO, THOSE OF THE FAEM. WARRANTY DOCUMENTS SHALL REFERENCE AND BE BINDING TO THE WARRANTY PROVISIONS SPECIFIED IN THE WARRANT PORTION OF THIS SPECIFICATION.

4. A DETAILED DESCRIPTION OF ROUTINE MAINTENANCE REQUIRED OR RECOMMENDED, OR AS WOULD BE PROVIDED UNDER A MAINTENANCE CONTRACT, INCLUDING A TESTING SCHEDULE AND DETAILED MAINTENANCE INSTRUCTIONS FOR EACH TYPE OF DEVICE INSTALLED

1.9 QUALITY ASSURANCE

A. ALL WORK SHALL MEET THE REQUIREMENTS OF THE NATIONAL PARK SERVICE, ARCHITECT, ENGINEER AND AUTHORITY HAVING JURISDICTION (AHJ).

B. ALL EQUIPMENT AND COMPONENTS SHALL BE UL LISTED, FOR THE ACTUAL INTENDED USE, UNLESS HEREINAFTER SPECIFICALLY EXCLUDED FROM SUCH A LISTING.

C. INSTALLATION AND SUPERVISION OF INSTALLATION SHALL BE IN STRICT COMPLIANCE WITH THE REQUIREMENTS OF THE REGULATIONS, LICENSES, AND PERMITS FOR FIRE ALARM SYSTEM INSTALLERS IN THIS JURISDICTION.

D. INSTALLER MUST HAVE BEEN ACTIVELY ENGAGED IN THE BUSINESS OF SELLING, INSTALLING, AND SERVICING FIRE ALARM SYSTEMS FOR AT LEAST FIVE (5) YEARS. INSTALLER MUST BE AN AUTHORIZED REPRESENTATIVE OF THE FAEM AND HAVE TECHNICAL FACTORY TRAINING SPECIFICALLY FOR THE SYSTEM PROPOSED.

E. THE FAEM SHALL HAVE A REPRESENTATIVE SUPERVISE THE FINAL CONNECTION OF DEVICES, WIRING, AND PROGRAMMING OF THE CONTROL PANELS. THE FAEM REPRESENTATIVE SHALL BE NICET CERTIFIED AS LEVEL II OR HIGHER FIRE ALARM PROTECTION / FIRE ALARM SYSTEMS ENGINEERING TECHNICIAN.

1.10 SOFTWARE SERVICE AGREEMENT

A. COMPLY WITH UL 864.

B. BEGINNING WITH SUBSTANTIAL COMPLETION (AS DETERMINED BY THE OWNER), PROVIDE SOFTWARE SUPPORT FOR TWO (2) YEARS.

C. UPDATE SOFTWARE TO LATEST VERSION AT PROJECT COMPLETION. INSTALL AND PROGRAM SOFTWARE UPGRADES THAT BECOME AVAILABLE WITHIN TWO (2) YEARS FROM DATE OF SUBSTANTIAL COMPLETION. UPGRADING SOFTWARE SHALL INCLUDE OPERATING SYSTEM. UPGRADE SHALL INCLUDE NEW OR REVISED LICENSES FOR USE OF SOFTWARE.

1. PROVIDE MINIMUM THIRTY (30) DAYS' NOTICE TO OWNER TO ALLOW SCHEDULING AND ACCESS TO SYSTEM AND TO ALLOW OWNER TO UPGRADE COMPUTER EQUIPMENT IF NECESSARY.

1.11 REGULATORY REQUIREMENTS

A. ALL WORK SHALL MEET THE REQUIREMENTS OF ALL APPLICABLE CODES AND REFERENCED DESIGN STANDARDS.

B. NO APPROVALS OR INTERPRETATIONS OF THE DESIGN DOCUMENTS SHALL BE PURSUED EXCEPT THROUGH THE CONTRACTING OFFICER.

C. ANY WORK PERFORMED PRIOR TO THE SATISFACTORY REVIEW OF THE SHOP DRAWINGS BY THE CONTRACTING OFFICER, AND DETERMINED TO BE NONCOMPLIANT WITH THE CONTRACT DOCUMENTS OR APPLICABLE CODES BY THE CONTRACTING OFFICER WILL BE REPLACED AT THE CONTRACTORS' EXPENSE.

D. THE SYSTEM WILL NOT BE ACCEPTABLE UNTIL FINAL TESTING AND RECEIPT OF THE INSPECTION AND TESTING FORM HAS BEEN OBTAINED.

1.12 WARRANTY

A. REPAIR ALL DEFECTIVE WORKMANSHIP OR REPLACE ALL DEFECTIVE MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER'S REPRESENTATIVE. WORKMANSHIP OR EQUIPMENT FOUND TO BE DEFECTIVE DURING THAT PERIOD SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

B. THE WARRANTY OR ANY PART OF THE WARRANTY SHALL NOT BE MADE VOID BY ANY REQUIRED OPERATION OR INSPECTION OF THE SYSTEM AFTER ACCEPTANCE DURING THE WARRANTY PERIOD. THE OWNER MAY SELECT QUALIFIED FIRMS OTHER THAN WARRANTOR TO PROVIDE REQUIRED TESTS AND INSPECTIONS. SYSTEM TESTING AND INSPECTIONS WILL BE CONDUCTED ONLY BY A DULY LICENSED COMPANY UNDER CONTRACT WITH THE OWNER TO PERFORM SCHEDULED TESTING AND INSPECTIONS AS REQUIRED BY THE AHJ. THE OWNER MAY ELECT TO HAVE A REPRESENTATIVE PRESENT AT THE SCHEDULED TESTING DURING THE WARRANTY PERIOD.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. SILENT KNIGHT 5820 XL (EXISTING TO REMAIN)

2.2 ADDRESSABLE INTERFACE MODULES

A. MONITOR MODULES

1. PROVIDE ADDRESSABLE MONITOR MODULES WHERE REQUIRED TO INTERFACE WITH CONTACT ALARM DEVICES, OR TO CONNECT A SUPERVISED ZONE OF CONVENTIONAL INITIATING DEVICES (ANY NORMALLY OPEN DRY CONTACT DEVICE) TO AN INTELLIGENT SLC LOOP.

2. PROVIDE ADDRESS-SETTING MEANS AND STORE AN INTERNAL IDENTIFICATION CODE WHICH THE CONTROL PANEL SHALL USE TO IDENTIFY THE TYPE OF DEVICE. FLASH STATUS/POWER LED UNDER NORMAL CONDITIONS, INDICATING THAT THE MONITOR MODULE IS OPERATIONAL AND IN REGULAR COMMUNICATION WITH THE CONTROL PANEL. THE LED MAY BE PLACED INTO STEADY ILLUMINATION BY THE CONTROL PANEL, INDICATING THAT AN ALARM CONDITION HAS BEEN DETECTED. WHERE STATUS LED IS PROVIDED, MANUFACTURER PROVIDED COVER PLATE WITH VIEWING HOLE SHALL BE PROVIDED.

3. PROVIDE AN AUTOMATIC TEST FEATURE TO PERMIT FUNCTIONAL TESTING OF THE DEVICE FROM THE MAIN CONTROL PANEL. INDICATE RESULTS OF THE TEST ON THE LCD DISPLAY AT THE CONTROL PANEL.

4. MONITOR MODULES WITH MULTIPLE INPUT CONTACT CONNECTIONS ARE ACCEPTABLE IF EACH INPUT IS CAPABLE OF INDEPENDENT PROGRAMMING AND FUNCTIONAL OPERATION.

5. ACCEPTABLE MANUFACTURER IS FIRE-LITE MMF-300.

B. CONTROL/RELAY MODULES

1. PROVIDE ADDRESSABLE CONTROL/RELAY MODULES WHERE REQUIRED TO INTERFACE WITH A DRY CONTACT (FORM C) RELAY. PROVIDE POWER FOR THE RELAY ACTUATION FROM THE INTELLIGENT SLC LOOP.

2. MINIMUM RATING OF FORM C CONTACTS SHALL BE TWO (2.0) AMPERES AT 24 VOLTS AND ONE HALF (0.5) AMPERES AT 120 VOLTS AC.

3. PROVIDE ADDRESS-SETTING MEANS AND STORE AN INTERNAL IDENTIFICATION CODE WHICH THE CONTROL PANEL SHALL USE TO IDENTIFY THE TYPE OF DEVICE. FLASH STATUS LED UNDER NORMAL CONDITIONS, INDICATING THAT THE CONTROL MODULE IS OPERATIONAL AND IN REGULAR COMMUNICATION WITH THE CONTROL PANEL. THE LED MAY BE PLACED INTO STEADY ILLUMINATION BY THE CONTROL PANEL, INDICATING THAT AN ALARM CONDITION HAS BEEN DETECTED. WHERE STATUS LED IS PROVIDED, MANUFACTURER PROVIDED COVER PLATE WITH VIEWING HOLE SHALL BE PROVIDED.

4. CONTROL/RELAY MODULES WITH MULTIPLE OUTPUT CONTACT CONNECTIONS ARE ACCEPTABLE IF EACH OUTPUT IS CAPABLE OF INDEPENDENT PROGRAMMING AND FUNCTIONAL OPERATION.

5. ACCEPTABLE MANUFACTURER IS FIRE-LITE CMF-300 / CRF-300.

2.3 NOTIFICATION APPLIANCES

A. EXTERIOR AUDIBLE/VISUAL NOTIFICATION APPLIANCES - WALL MOUNTED

1. PROVIDE SOLID STATE ELECTRONIC AUDIBLE NOTIFICATION APPLIANCES WITH INTEGRAL VISUAL NOTIFICATION APPLIANCE OPERABLE AT 24 VOLT DC AND POLARIZED SUPERVISION. THE APPLIANCES SHALL UTILIZE A HIGH INTENSITY SOLID STATE XENON STROBE TUBE WITH ASSOCIATED LENS/REFLECTOR SYSTEM. THE APPLIANCES SHALL BE CONSTRUCTED OF HIGH-IMPACT RED THERMOPLASTIC, SHALL INDICATE "FIRE" AND SHALL BE UL LISTED FOR WALL MOUNTED APPLICATIONS.

2. WHERE POSSIBLE, PROVIDE FLUSH MOUNTING OF APPLIANCES. WHERE SURFACE MOUNTING IS NECESSARY, PROVIDE A DECORATIVE BACKBOX SKIRT COVERING THE APPLIANCE BACKBOX.

3. PROVIDE APPLIANCES UL LISTED FOR OUTDOOR (WEATHERPROOF) APPLICATION.

4. PROVIDE MOUNTING ON BACKBOXES UL LISTED FOR OUTDOOR (WEATHERPROOF) APPLICATION AND FOR USE WITH THE APPLIANCES.

5. ACCEPTABLE MANUFACTURER IS WHEELOCK ASWP OR COMPATIBLE.

2.4 CONDUCTORS

A. CONDUCTORS FOR ANY POWER LIMITED CIRCUITS SHALL BE TYPE FPL, FPLP, OR FPLR.

B. CONDUCTORS FOR ANY NON-POWER LIMITED CIRCUITS SHALL BE TYPE NPLF, NPLFP, NPLFR OR THHN INSTALLED IN CONDUIT.

C. WHERE THE SIZE OR TYPE OF CONDUCTOR HEREINAFTER SPECIFIED CONFLICTS WITH THE FAEM'S REQUIREMENTS, THE LARGER SIZE OR MORE SPECIALIZED CONDUCTOR TYPE WILL BE USED.

D. CONDUCTORS FOR WET LOCATIONS SHALL BE AS FOLLOWS:

1. TYPES RHW, TW, THW, THHW, THWN, XHHW OR OTHER TYPE LISTED FOR USE IN WET LOCATIONS.

2. TYPE LISTED FOR DIRECT BURIAL.

E. ALL ELECTRICAL CHARACTERISTICS (CONDUCTOR-TO-CONDUCTOR CAPACITANCE, DC RESISTANCE, ETC.) OF THE FIRE ALARM CONDUCTORS SHALL MEET THE REQUIREMENTS OF THE SELECTED FAEM FOR THE INTENDED APPLICATION.

F. ALL FIRE ALARM CONDUCTORS SHALL CONFORM TO THE REQUIREMENTS OF ARTICLE 760 OF THE NATIONAL ELECTRICAL CODE, AND ALL LOCAL CODES AND STANDARDS.

G. ALL FIRE ALARM CABLING SHALL BE PERMANENTLY LABELED WITH INDUSTRY STANDARD LABELS TO CLEARLY INDICATE THE ASSOCIATED CIRCUITS. HANDWRITTEN LABELS ARE NOT ACCEPTABLE.

2.5 RACEWAY

A. THE FOLLOWING RACEWAY TYPES SHALL BE PERMITTED:

1. EMT CONDUIT (3/4 INCH MINIMUM).

2. RIGID CONDUIT (3/4 INCH MINIMUM).

3. NON-METALLIC CONDUIT FOR WET LOCATIONS (3/4 INCH MINIMUM).

4. SURFACE MOUNTED METALLIC RACEWAY WITH A MINIMUM SIZE EQUIVALENT TO THREE QUARTER (3/4) INCH NOMINAL CONDUIT.

B. ALL RACEWAY TYPES SHALL BE NEW. INSTALLING USED RACEWAY IS UNACCEPTABLE.

C. USING EXISTING RACEWAY IS UNACCEPTABLE WITHOUT PRIOR WRITTEN PERMISSION OF THE ENGINEER OR OWNER'S REPRESENTATIVE.

D. BOXES, SUPPORTS, AND OTHER ACCESSORIES FOR THE RACEWAY INSTALLATION SHALL BE LISTED FOR THE INTENDED APPLICATION.

PART 3 - EXECUTION

3.1 COORDINATION WITH OTHER TRADES

A. COORDINATE CLOSELY WITH ALL OTHER TRADES TO EXPEDITE CONSTRUCTION, ACCURATELY INTERFACE WITH RELATED SYSTEMS AND AVOID INTERFERENCES.

B. COORDINATE WITH THE GENERAL AND ELECTRICAL CONTRACTORS FOR INSTALLATION AND MOUNTING HEIGHTS OF ALL FIRE ALARM RACEWAY, BACK-BOXES AND JUNCTION BOXES.

3.2 INSTALLATION / APPLICATION

A. FURNISH AND INSTALL ALL CONTROL WIRING, RACEWAY AND OUTLET BOXES FOR THE FIRE ALARM SYSTEM.

B. FURNISH AND INSTALL ALL BACKBOXES, EQUIPMENT AND DEVICES FOR THE FIRE ALARM SYSTEM. BACKBOXES SHALL BE OF THE EXACT TYPE RECOMMENDED BY THE FAEM AS SHOWN ON THE EQUIPMENT AND DEVICE SUBMITTALS, AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

C. ALL FIRE ALARM CONDUIT, JUNCTION BOXES, PULL BOXES, CABLE SPLICES AND TERMINAL CABINETS SHALL BE ACCESSIBLE, PAINTED RED OR CLEARLY MARKED "FIRE ALARM". THE CONTRACTOR SHALL COMPLY WITH ANY LOCAL CODES OR AHJ REQUIREMENTS FOR CIRCUIT IDENTIFICATION. ANY ACCESS PANELS REQUIRED FOR THE ACCESSIBILITY TO THE JUNCTION BOXES, PULL BOXES, CABLE SPLICES AND TERMINAL CABINETS SHALL BE THE RESPONSIBILITY OF THE FIRE ALARM CONTRACTOR.

D. ALL WIRING CONDUCTORS AND CONDUITS SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER AT RIGHT ANGLES TO THE BUILDING WALLS, FLOORS AND CEILINGS, AND SUPPORTED FROM THE BUILDING STRUCTURE AT INTERVALS COMPLIANT WITH NEC REQUIREMENTS.

E. ALL POWER LIMITED WIRING CONDUCTORS FOR THE FIRE ALARM SYSTEM SHALL BE INSTALLED IN CONDUIT IN THE FOLLOWING LOCATIONS:

1. BELOW THE STRUCTURE.

2. CONCEALED ABOVE CEILINGS OR IN PARTITIONS (SUBJECT TO PHYSICAL DAMAGE).

3. WHERE REQUIRED BY APPLICABLE CODES.

4. WIRING CONDUCTORS IN FINISHED AREAS THAT CANNOT BE CONCEALED ARE ALLOWED TO BE INSTALLED IN SURFACE-MOUNTED METALLIC RACEWAY ONLY UPON APPROVAL OF THE OWNER'S REPRESENTATIVE.

F. ALL NON-POWER LIMITED WIRING CONDUCTORS FOR THE FIRE ALARM SYSTEM SHALL BE INSTALLED IN CONDUIT.

G. POWER LIMITED WIRING CONDUCTORS FOR THE FIRE ALARM SYSTEM ARE NOT REQUIRED TO BE INSTALLED IN CONDUIT IN THE FOLLOWING LOCATIONS:

1. ABOVE LAY-IN CEILINGS.

2. WHERE ALLOWED BY APPLICABLE CODES.

3. CONCEALED IN CEILINGS OR PARTITIONS NOT SUBJECT TO DAMAGE.

H. EXPOSED WIRING CONDUCTORS AND CONDUITS SHALL BE CONCEALED FROM PUBLIC VIEW AT ALL LOCATIONS BY ROUTING ON THE INSIDE OF JOISTS, ABOVE LAY-IN CEILINGS, OVER GIRDERS, WITHIN PARTITIONS OR IN ANY OTHER MANNER ACCEPTABLE TO THE OWNER'S REPRESENTATIVE.

I. EXPOSED WIRING CONDUCTORS SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE AT INTERVALS OF NO MORE THAN FIVE (5) FEET.

J. GROUND FIRE ALARM CONTROL PANEL AND ASSOCIATED CIRCUITS SHALL COMPLY WITH IEEE 1100. INSTALL A GROUND WIRE FROM MAIN SERVICE GROUND TO FIRE ALARM CONTROL PANEL.

K. ALL WIRING CONDUCTORS SHALL BE TAGGED AT ALL JUNCTION POINTS AND SHALL TEST FREE FROM GROUNDS OR CROSSES BETWEEN CONDUCTORS.

L. ALL WIRING CONDUCTORS SHALL BE PULLED SPLICE FREE. THE USE OF WIRE NUTS, CRIMPED CONNECTORS, OR TWISTING OF CONDUCTORS IS PROHIBITED. ALL TERMINATIONS SHALL BE AT A TERMINAL STRIP UTILIZING SCREW TERMINALS.

M. CONDUCTORS THAT ARE TERMINATED, SPLICED, OR OTHERWISE INTERRUPTED IN ANY ENCLOSURE, CABINET, MOUNTING, OR JUNCTION BOX SHALL BE CONNECTED TO SCREW-TYPE TERMINAL BLOCKS.

N. POWER-LIMITED WIRING CONDUCTORS SHALL NOT BE INSTALLED IN CONDUITS WITH ELECTRIC LIGHT, POWER CLASS 1, NON-POWER-LIMITED FIRE ALARM AND MEDIUM POWER NETWORK-POWERED BROADBAND COMMUNICATIONS CIRCUITS.

O. FINAL CONNECTIONS BETWEEN EQUIPMENT AND THE WIRING SYSTEM SHALL BE MADE UNDER DIRECT SUPERVISION OF A REPRESENTATIVE OF THE FAEM. IF OTHER PERSONNEL ARE REQUIRED BY THE AHJ TO BE PRESENT DURING FINAL CONNECTIONS, THIS SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF PROVIDING A REPRESENTATIVE OF THE FAEM FOR DIRECT SUPERVISION.

P. FIRE ALARM CABLING SHALL NOT BE PAINTED.

Q. CONDUITS SHALL ENTER THE CONTROL PANEL ENCLOSURES ONLY IN THE APPROVED LOCATIONS, AS IDENTIFIED IN THE FAEM INSTALLATION INSTRUCTIONS.

3.3 EQUIPMENT INSTALLATION

A. COMPLY WITH NFPA 72 FOR INSTALLATION OF FIRE ALARM EQUIPMENT.

B. WEATHERPROOF EXTERIOR NOTIFICATION APPLIANCES SHALL BE FLUSH MOUNTED AT THE FIRE DEPARTMENT CONNECTION ON THE BUILDING EXTERIOR AND WITH THE FINAL LOCATION AS ACCEPTABLE TO THE AHJ.

C. DEVICES AND APPLIANCES SHALL BE INSTALLED IN THE CENTER OR QUARTER POINT OF THE CEILING TILES. DEVICES AND APPLIANCES SHALL NOT BE SUPPORTED BY CEILING TILES. DEVICES AND APPLIANCES MUST BE ATTACHED TO BACKBOX SUPPORTED BY THE CEILING GRID.

D. ALL INITIATING DEVICES AND ADDRESSABLE MODULES SHALL BE MOUNTED IN A LOCATION ACCESSIBLE FOR TESTING AND MAINTENANCE.

3.4 RESTORATION OF SITE

A. WHERE SIDEWALKS, CURBS, AND LAWNS ARE EXCAVATED BY THE FIRE ALARM CONTRACTOR, THESE AREAS SHALL BE BACKFILLED AND REPLACED TO THE ORIGINAL CONDITION AND TO THE SATISFACTION OF THE CONTRACTING OFFICER.

3.5 PAINTING AND PATCHING

A. ALL FIRE ALARM CONDUIT SHALL BE THOROUGHLY CLEANED, REMOVING ALL DIRT, OIL, ETC. AND MADE READY TO RECEIVE PAINT.

B. HOLES IN WALLS OR FLOORS CUT DURING THE PERFORMANCE OF THIS WORK SHALL BE PATCHED OR COVERED WITH STANDARD ESCUTCHEON PLATES SO AS TO COMPLETELY CONCEAL THE CUTS WHERE THEY WOULD OTHERWISE BE EXPOSED TO VIEW.

C. HOLES IN WALLS AND CEILINGS CREATED BY THE REMOVAL OF FIRE ALARM EQUIPMENT NO LONGER USED SHALL BE PATCHED AND PAINTED TO MATCH THE EXISTING WALLS AND CEILINGS, OR COVERED WITH STANDARD ESCUTCHEON PLATES SO AS TO COMPLETELY CONCEAL THE "HOLES" WHERE THEY WOULD OTHERWISE BE EXPOSED TO VIEW.

D. ALL PENETRATIONS OF FIRE RATED ASSEMBLIES (WALL OR FLOOR CONSTRUCTION) SHALL BE FIRESTOPPED TO PRESERVE THE ORIGINAL FIRE RESISTANCE AND SMOKETIGHT INTEGRITY OF THE ASSEMBLY. ALL FIRESTOPPING METHODS SHALL BE UL LISTED THROUGH PENETRATION FIRESTOP SYSTEMS OR OTHERWISE APPROVED BY THE CONTRACTING OFFICER. SPECIFIC FIRESTOP ASSEMBLY SHALL BE IDENTIFIED AT THE PENETRATION LOCATION WITH A STICKER OR OTHER APPROVED IDENTIFICATION MEANS.

3.6 SYSTEM TESTS

A. ALL TEST AND INSPECTIONS SPECIFIED IN THIS SECTION SHALL BE REPORTED IN WRITING AND SUBMITTED IN ACCORDANCE WITH THIS SPECIFICATION SECTION.

B. THE SYSTEM SHALL MEET ALL THE REQUIREMENTS OF THE LISTED APPLICABLE CODES AND THE REQUIREMENTS OF THE AHJ. THE SYSTEM TESTS AND TEST DOCUMENTS, INCLUDING THOSE REQUIRED FOR AND BY THE APPROVED REMOTE MONITORING STATION, SHALL MEET THE REQUIREMENTS OF THE AHJ.

C. PROVIDE ONE HUNDRED (100) PERCENT INITIAL ACCEPTANCE TESTING OF THE ENTIRE FIRE ALARM SYSTEM PRIOR TO THE REQUIRED AHJ ACCEPTANCE TESTING. BEFORE REQUESTING THE AHJ ACCEPTANCE TESTING, FURNISH A WRITTEN STATEMENT TO THE OWNER'S REPRESENTATIVE INDICATING THAT THE SYSTEM HAS BEEN INSTALLED IN ACCORDANCE WITH THE APPROVED DOCUMENTS AND TESTED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND THE APPLICABLE NFPA REQUIREMENTS. THE RECORD OF COMPLETION SHALL BE COMPLETED AND SUBMITTED AS PART OF THE WRITTEN STATEMENT.

D. ALL TESTING, INSPECTION AND RETESTING REQUIRED FOR CERTIFICATION AND REQUIRED FOR ALL WARRANTY WORK OR REPLACEMENTS SHALL MEET THE REQUIREMENTS OF THE AHJ. THIS CERTIFICATION, INSPECTION, OR TESTING SHALL BE COMPLETED AT NO ADDITIONAL COST TO THE OWNER.

E. PROVIDE THE TESTING DATE IN WRITING TO THE OWNER A MINIMUM OF TWO (2) WEEKS BEFORE THE DATE. THE OWNER MAY ELECT TO HAVE A REPRESENTATIVE PRESENT FOR TESTING.

F. THE FIRE ALARM SYSTEM WILL NOT BE ACCEPTABLE UNTIL FINAL TESTING AND RECEIPT OF THE TESTING CERTIFICATES HAVE BEEN OBTAINED.

G. REACCEPTANCE TESTING SHALL BE PERFORMED TO VERIFY THE PROPER OPERATION OF ADDED OR REPLACED DEVICES AND APPLIANCES.

H. FIRE ALARM SYSTEM WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS AND INSPECTIONS.

3.7 DEMONSTRATION

A. TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN FIRE ALARM SYSTEM.

END OF SECTION 28 31 11

100% CD

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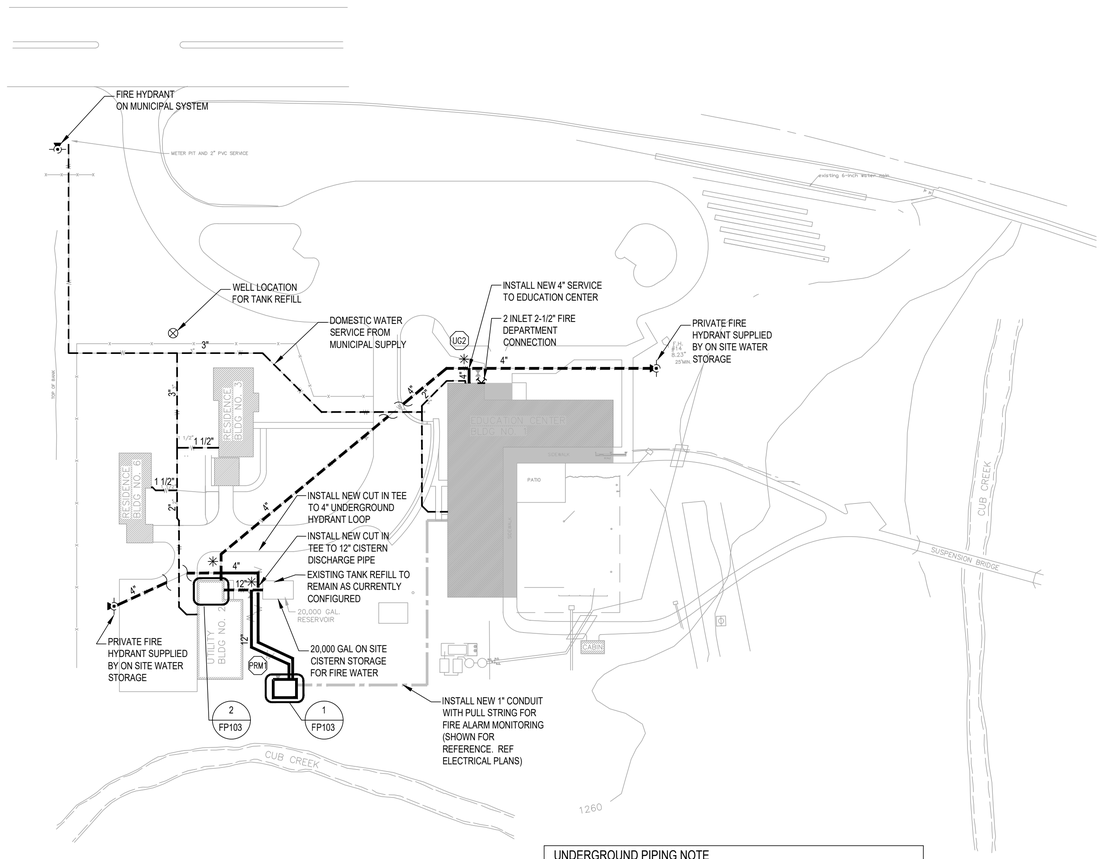
REVISED		PREPARED	TITLE OF SHEET	ARCH/ENG PROJ #	DRAWING NO.
DATE	INITIAL	JLK DESIGNED	SPECIFICATIONS - FIRE ALARM	07310.024	368 / 80056
		JLK DRAWN	EDUCATION CENTER FIRE SERVICE	SUB SHEET NO.	PMIS / PKG. NO. 207662
		JLK CHECKED	HOMESTEAD NATIONAL MONUMENT OF AMERICA	FA103	SHEET
		12/15/2022 DATE	8523 NE-4 BEATRICE, NE 68310		18 OF 31



FIRE SPRINKLER SITE PLAN

SCALE: 1" = 50'-0" FIN. FLOOR ELEV. = 100'-0"

UNDERGROUND PIPING NOTE

ALL UNDERGROUND PIPING, VALVES, FITTINGS, DIMENSIONS, ETC. ARE SHOWN FOR REFERENCE ONLY. REFER TO CIVIL DRAWINGS FOR EXACT LOCATIONS, TYPES, AND SIZES OF ALL COMPONENTS IN ADDITION TO DETAILS OF CONSTRUCTION.

DESIGN CRITERIA

MUSEUM, OFFICE AREAS, BREAKROOM AND RESTROOMS (LIGHT HAZARD WET PIPE FIRE SPRINKLER SYSTEMS):

DENSITY - 0.10 GPM/SQ FT

OPERATING AREA - 945 SQ FT (AREA REDUCED WITH QUICK RESPONSE AREA REDUCTION FOR 12 FT MAXIMUM CEILING)

TEMPERATURE CLASSIFICATION / NOMINAL K-FACTOR / RESPONSE TYPE - ORD / 5.6 / QR

HOSE STREAM ALLOWANCE - 100 GPM

DURATION: 30 MINUTES

ATTIC (LIGHT HAZARD DRY PIPE FIRE SPRINKLER SYSTEM IN COMBUSTIBLE ATTIC WITH MEMBERS 4'-0" O.C. AND 4 IN 12 PITCH):

DENSITY - 0.10 GPM/SQ FT

OPERATING AREA - PER THE ATTIC SPRINKLER CUT SHEET, CALCULATE THE SEVEN (7) MOST DEMANDING BACK-TO-BACK SPRINKLERS ALONG WITH TWO (2) STANDARD SPRAY UPRIGHTS. BACK-TO-BACK SPRINKLERS TO DISCHARGE A MINIMUM 22.6 PSI AND 38 GPM FOR A ROOF SPAN LESS THAN 60' (51" ACTUAL).

TEMPERATURE CLASSIFICATION / NOMINAL K-FACTOR / RESPONSE TYPE -
-ATTIC: INT / 8.0 / QR
-SSU: INT / 5.6 / QR

HOSE STREAM ALLOWANCE: 100 GPM

DURATION: 30 MINUTES

SPRINKLER SPACING SHALL BE AS SHOWN ON THE ENGINEERING DRAWINGS.

ACOUSTICAL TILE - LOCATE SPRINKLERS IN ACCORDANCE WITH THE ENGINEERING DRAWINGS. NOT MORE THAN A 3 IN. RADIUS TOLERANCE ABOUT THE POINT IDENTIFIED BY DIMENSION WILL BE ACCEPTED. WHERE ROWS OF SPRINKLERS ARE PROVIDED WITHIN THE SAME CEILING PLANE, ANY PART OF THE TOLERANCE USED FOR ONE SPRINKLER SHALL BE THE SAME FOR ALL OTHERS IN THAT SAME ROW.

HARD CEILINGS - LOCATE SPRINKLERS IN ACCORDANCE WITH THE ENGINEERING DRAWINGS. SPRINKLERS SHALL BE IN LINE WITH LIGHT FIXTURES AND OTHER SPRINKLERS WHERE INDICATED ON THE DRAWINGS. COORDINATE CLOSELY WITH THE ELECTRICAL CONTRACTOR.

UNFINISHED AREAS - LOCATE SPRINKLERS AS SHOWN ON THE ENGINEERING DRAWINGS.

THE FIRE PROTECTION WATER SUPPLY WILL BE PROVIDED BY A VERTICAL TURBINE FIRE PUMP DRAWING SUCTION FROM A 20,000 GALLON UNDERGROUND CISTERN. THE CISTERN IS AUTOMATICALLY REFILLED BY AN ONSITE WELL. MINIMUM TANK REFILL SHALL BE CAPABLE OF 20,000 GALLON FILL TIME IN 8 HRS.

THE WATER SUPPLY SHALL BE CONSIDERED EFFECTIVE AT THE FIRE PUMP DISCHARGE FLANGE. THE APPROXIMATE WATER SUPPLY ELEVATION IS EVEN WITH THE FINISH FLOOR.

A FIRE BOOSTER PUMP WILL BE PROVIDED TO SUPPLEMENT SYSTEM PRESSURE. THE FIRE PUMP IS RATED AT 100 PSI AT 500 GPM FLOWING. THE SELECTED FIRE PUMP SHALL NOT EXCEED 120% OF RATED PRESSURE AT CHURN OR DROP BELOW 65% OF RATED PRESSURE AT 150% CAPACITY. THE ESTIMATED FIRE PUMP CURVE IS BEST REPRESENTED BY THE FOLLOWING COORDINATES.

CHURN:	110 PSI	AT	0 GPM
RATED:	100 PSI	AT	500 GPM
150%:	65 PSI	AT	750 GPM

THE ABOVE WATER SUPPLY COORDINATES DO NOT INCLUDE THE REQUIRED 10 PSI SAFETY FACTOR THAT SHALL BE ENFORCED. NO SUBSTITUTIONS OF WATER SUPPLY DATA OR ITS EFFECTIVE POINT WILL BE ALLOWED.

PROVIDE FIRE DEPARTMENT CONNECTION AS REQUIRED.

SYMBOL KEY

- EXISTING UNDERGROUND WATER MAIN
- NEW PIPING
- XXX — RECOMMENDED CENTER LINE ELEVATION OF PIPE A.F.F. AND/OR CENTER LINE ELEVATION OF PIPE FROM TOP OF JOIST
- GLOBE VALVE
- RISER
- FIRE DEPARTMENT CONNECTION
- RISE FROM LEFT TO RIGHT AND DROP FROM RIGHT TO LEFT
- CAPPED PIPE
- PLUGGED OUTLET
- XX — HYDRAULIC REFERENCE POINT
- CENTER LINE OF SPRINKLER: ALIGN WITH LIGHTS AND/OR OTHER SPRINKLERS: COORDINATE WITH OTHER TRADES.
- PIPE HANGER
- TRAPEZE HANGER
- ZONE BOUNDARY LINE

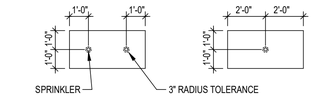
GENERAL NOTES

1. PROVIDE ALL NECESSARY OFFSETS, RAISES OR DROPS IN PIPING AND AUXILIARY DRAINS REQUIRED BY BUILDING CONDITIONS IN ORDER TO PROVIDE A FULLY FUNCTIONING COMPLIANT FIRE SPRINKLER SYSTEM PER NFPA, FIRE PROTECTION ENGINEER OF RECORD AND AUTHORITY HAVING JURISDICTION. (WHETHER OR NOT SHOWN ON THE DRAWINGS).
2. THE CONTRACTOR MUST REVIEW THE CONSTRUCTION DOCUMENTS AND EXAMINE THE JOB CONDITIONS AND VERIFY ALL MEASUREMENTS, DISTANCES, ELEVATIONS, CLEARANCES, PIPE SIZES, ETC., PRIOR TO BID. SHOULD MODIFICATIONS TO THESE PLANS BECOME NECESSARY TO PROPERLY COORDINATE THE SYSTEM WITH OTHER TRADES, IT WILL BE THE CONTRACTORS RESPONSIBILITY TO COORDINATE APPROVAL OF THESE CHANGES WITH THE CONTRACTING OFFICER.
3. ARCHITECTURAL, CIVIL, STRUCTURAL, MECHANICAL, AND ELECTRICAL BACKGROUND INFORMATION IS SHOWN FOR COORDINATION PURPOSES ONLY. REFER TO THE PROPER DRAWINGS FOR EXACT LOCATIONS, SIZES, AND QUANTITIES OF OTHER TRADES' WORK. OBSTRUCTION TO SPRINKLER DISCHARGE MUST BE CONSIDERED DURING SHOP DRAWING PRODUCTION AND INSTALLATION. EXTRA SPRINKLERS MAY BE REQUIRED AT NO ADDITIONAL COST TO OWNER.
4. THE ENGINEERING DRAWINGS HAVE BEEN PREPARED USING AUTOCAD. THE DRAWINGS ARE 100% CAD. THESE DOCUMENTS WILL BE MADE AVAILABLE TO THE SUCCESSFUL FIRE SPRINKLER CONTRACTOR IN EITHER ELECTRONIC FORM.
5. THE CONTRACTOR SHALL SUBMIT COMPLETE FIRE SPRINKLER SHOP DRAWINGS AS REQUIRED BY THE SPECIFICATIONS. CONTRACTOR SHALL BASE SHOP DRAWINGS DESIGN ON THE FIRE PROTECTION DRAWINGS AND SPECIFICATIONS. SPRINKLER SHOP DRAWINGS SHALL INCLUDE ALL NECESSARY ELEVATIONS, HANGER LOCATIONS, PIPE LENGTHS, DIMENSIONS, FABRICATION METHODS/NOTES, MATERIAL DATA, AND AND ANY OTHER INFORMATION NECESSARY TO CLARIFY THE INTENT OF INSTALLATION. CONTRACTOR SHALL PROVIDE PIPE SIZES, SPRINKLER SPACING, AND ALL SYSTEM CONFIGURATIONS AS SHOWN. ANY ALTERNATES IN DESIGN OF THE SYSTEM OR IN MATERIALS OR EQUIPMENT USED MUST BE APPROVED IN WRITING FROM THE CONTRACTING OFFICER PRIOR TO BIDDING, FABRICATION, OR INSTALLATION.
6. THE CONTRACTOR SHALL DOCUMENT ALL FIELD COORDINATION CHANGES ON THE INSTALLATION DRAWINGS. ONCE INSTALLATION IS COMPLETE THE CONTRACTOR SHALL SUPPLY AS-BUILT DRAWINGS TO THE OWNER.
7. SUPPLY ONLY ONE (1) SPRINKLER FROM A SINGLE BRANCH LINE OUTLET. PROVIDE NEW BRANCH LINES AS REQUIRED.
8. SPRINKLERS NEAR A HEAT SOURCE (UNIT HEATERS, DIFFUSERS, STEAM MAINS, SKYLIGHTS, ETC.) SHALL HAVE TEMPERATURE RATINGS IN ACCORDANCE WITH NFPA 13.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER PROTECTION OF PENETRATIONS OF RATED ASSEMBLIES WITH A LISTED FIRE STOPPING METHOD.
10. SPRINKLER PROTECTION IS REQUIRED IN ELECTRICAL ROOMS. NO MAIN PIPING SHALL PENETRATE OR PASS ABOVE THE ELECTRICAL ROOMS. BRANCHLINE PIPING SHALL NOT PASS ABOVE THE ELECTRICAL PANELS.
11. THE CONTRACTOR SHALL DIVERT ALL DRAIN AND INSPECTORS TEST CONNECTION DISCHARGE AWAY FROM FINISHED SURFACES. SPLASH BLOCKS SHALL BE PROVIDED AS NECESSARY TO PROTECT LANDSCAPED SURFACES FROM DAMAGE.

SPRINKLER BELOW DUCT NOTE

PROVIDE SPRINKLER PROTECTION BELOW DUCTS IN EXPOSED STRUCTURE AREAS PER NFPA 13.

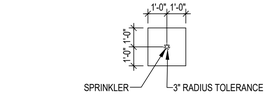
SPRINKLER LOCATIONS (2' x 4' CEILING TILE)



NOTE:

SPRINKLERS SHALL BE POSITIONED AS SHOWN WITH A 3" TOLERANCE. HOWEVER, SHOULD ANY PART OF THE TOLERANCE BE USED, THEN ALL THE SPRINKLERS IN THE ROW SHALL BE OFFSET BY THE SAME DISTANCE IN THE SAME DIRECTION. ADDITIONALLY, SPACING SHALL NOT EXCEED 130 SQ FT FOR STANDARD COVERAGE SPRINKLERS OR 256 SQ FT FOR EXTENDED COVERAGE SPRINKLERS.

SPRINKLER LOCATIONS (2' x 2' CEILING TILE)



NOTE:

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CONSTRUCTION NOTES

1. DURING CONSTRUCTION, FIRE SPRINKLER CONTRACTOR SHALL KEEP FIRE SPRINKLER SYSTEMS OUT OF CONSTRUCTION AREA FULLY CHARGED AND OPERATIONAL DURING BUSINESS HOURS.
2. COORDINATE REQUIRED SHUT-DOWNS OF THE EXISTING SYSTEMS WITH THE CONTRACTING OFFICER AND FIRE DEPARTMENT.
3. PROVIDE TEMPORARY PIPING AND FITTINGS AS REQUIRED TO MAINTAIN SERVICE TO FIRE SPRINKLER SYSTEMS (NEW AND EXISTING) DURING CONSTRUCTION.
4. COORDINATE CONSTRUCTION PHASES WITH CONTRACTING OFFICER AND GENERAL CONTRACTOR.

HANGER NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL HANGER TYPES AND LOCATIONS. THE HANGERS SHALL COMPLY WITH NFPA 13 AND RECOMMENDED PRACTICES BY THE NATIONAL DESIGN SPECIFICATION OFR WOOD CONSTRUCTION.
2. PIPES LARGER THAN 2-1/2 IN. RUNNING PARALLEL TO BAR JOISTS SHALL BE HUNG FROM TRAPEZE HANGERS SUPPORTED NEARLY EQUALLY BY TWO JOISTS.
3. ONLY ONE PIPE SHALL BE SUPPORTED FROM A SINGLE TRAPEZE HANGER UNLESS OTHERWISE APPROVED IN WRITING BY THE STRUCTURAL ENGINEER OF RECORD.
4. HANGERS WITH MORE THAN 150 POUNDS OF LOAD SHOULD BE ATTACHED TO THE TOP CHORD OF THE JOIST AT A PANEL POINT.
5. CONTRACTOR SHALL NOT CUT WOOD MEMBERS UNLESS ANALYSIS IS PROVIDED BY A STRUCTURAL ENGINEER.
6. ALL HOLES IN WOOD MEMBERS SHALL BE PRE-DRILLED

UNDERGROUND PIPING NOTE

1. INSTALLATION AND MATERIAL TO BE PER NFPA 24. PIPING UNDER FOOTINGS TO BE DUCTILE IRON OR ON-PIECE STAINLESS STEEL RISER ASSEMBLY .
2. PIPING AND ATTACHED APPURTENANCES SUBJECTED TO SYSTEM WORKING PRESSURE SHALL BE HYDROSTATICALLY TESTED AT 200 PSI OR 50 PSI IN EXCESS OF THE SYSTEM WORKING PRESSURE, WHICHEVER IS GREATER, AND SHALL MAINTAIN THAT PRESSURE IN ACCORDANCE WITH NFPA 24 HYDROSTATIC TESTING PROCEDURE FOR TWO HOURS. PROVIDE HYDROSTATIC TEST OF UNDERGROUND AT BEGINNING OF PROJECT TO VERIFY SYSTEM INTEGRITY.
3. UNDERGROUND PIPE TO BE FLUSHED PRIOR TO CONNECTION TO OVERHEAD SPRINKLER PIPING. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT FLUSHING OF THE UNDERGROUND PIPING HAS OCCURRED PRIOR TO CONNECTION.
4. PROVIDE THRUST BLOCKING, THRUST RODS AND JOINT RESTRAINT AS REQUIRED BY NFPA 24. RESTRAINING EQUIPMENT SHALL BE PROTECTED WITH SUITABLE CORROSIOIN-RETARTING MATERIAL OR DEMONSTRATE ADEQUATE CORROSION RESISTANCE PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
5. UNDERGROUND PIPING MUST BE INSTALLED BY A CONTRACTOR LICENSED WITH THE AUTHORITY HAVING JURISDICTION. ALL THE TESTING MUST BE COMPLETED IN ACCORDANCE WITH NFPA 13, NFPA 24 AND NFPA 25. ALL THE COMPLETED REPORTS MUST BE SUBMITTED TO THE AUTHORITY HAVING JURISDICTION, AND STORED ON SITE DURING CONSTRUCTION AND PROVIDED TO OWNER AT PROJECT COMPLETION.

FIRE DEPARTMENT CONNECTION NOTES

1. FIRE DEPARTMENT CONNECTION SHALL BE LOCATED WHERE SHOWN ON FIRE PROTECTION DRAWINGS IN AN ACCESSIBLE LOCATION.
2. THE FIRE DEPARTMENT CONNECTION SHALL BE INSTALLED AT A MINIMUM OF 18" AND A MAXIMUM OF 42" ABOVE GRADE.
3. THE FIRE DEPARTMENT CONNECTION SHALL MINIMALLY CONSIST OF TWO 2 1/2" INLETS WITH NATIONAL STANDARD THREADS.
4. THE SUPPLY LINE FROM THE FIRE DEPARTMENT CONNECTION TO THE RISER MANIFOLD SHALL BE A MINIMUM OF 4 IN. DIAMETER PIPING.
5. COORDINATE THE LOCATION OF THE FIRE DEPARTMENT CONNECTION TO BE WITHIN 300 FT OF AN EXISTING FIRE HYDRANT .
6. PROVIDE AN ELECTRIC BELL AT THE LOCATION SHOWN ON THE PLANS. THESE DEVICES SHALL ACTIVATE ON WATERFLOW ONLY.
7. PROVIDE SIGNAGE AT FIRE DEPARTMENT CONNECTION AS REQUIRED BY NFPA 13.

100% CD

PROFESSIONAL FIRE PROTECTION ENGINEER
WILLIAM B. SMITH
E-14915
STATE OF NEBRASKA
12-15-2022

ENGINEER OF RECORD:
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DATE	INITIAL

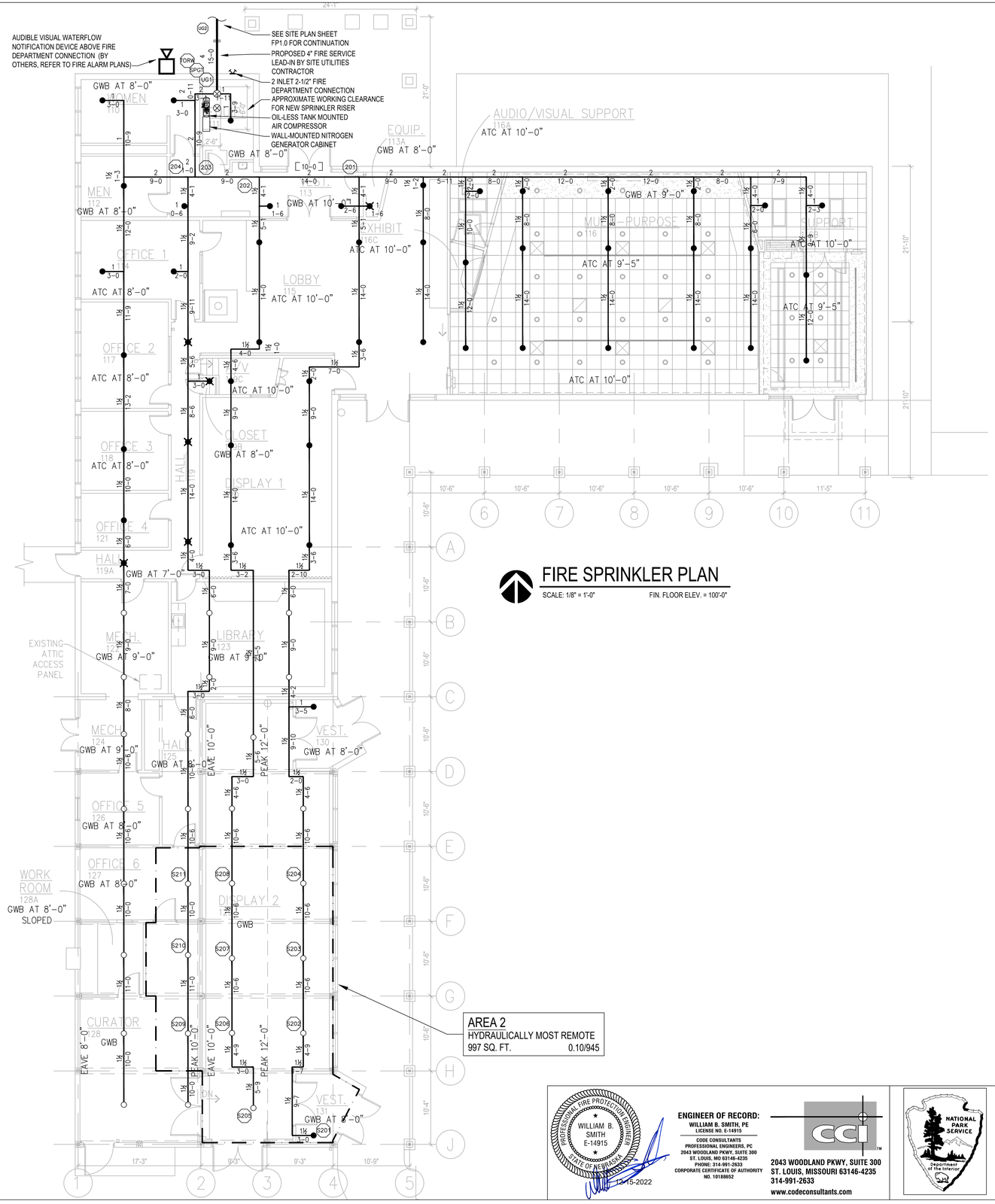
PREPARED
JLK — DESIGNED
JLK — DRAWN
JLK — CHECKED
12/15/2022 — DATE

TITLE OF SHEET

SITE PLAN AND NOTES - FIRE PROTECTION

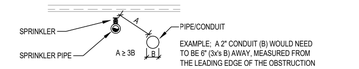
EDUCATION CENTER FIRE SERVICE
HOMESTEAD NATIONAL MONUMENT OF AMERICA
8523 NE-4
BEATRICE, NE 68310

ARCH/ENG PROJ # 07310.024	DRAWING NO. 368 / 80056
SUB SHEET NO. FP100	PMIS / PKG. NO. 207662
	SHEET 19 OF 31



FIRE SPRINKLER PLAN

SCALE: 1/8" = 1'-0" FIN. FLOOR ELEV. = 100'-0"



OBSTRUCTIONS SHALL BE POSITIONED AWAY FROM SPRINKLERS A MINIMUM DISTANCE OF THREE TIMES THE MAXIMUM DIMENSION OF THE OBSTRUCTION (E.G. PIPE, CONDUIT, LIGHT FIXTURES) UP TO A CLEAR DISTANCE OF 24 IN.

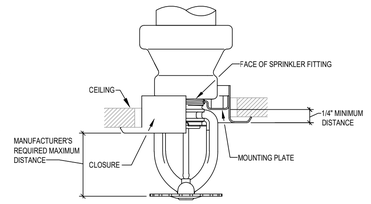
TYPICAL PIPE/CONDUIT CLEARANCE REQUIREMENT FOR STANDARD COVERAGE FIRE SPRINKLERS

NOT TO SCALE ELEVATION VIEW

LIGHT FIXTURES, LOCATED VERTICALLY WITHIN 18 IN. OF THE SPRINKLER, SHALL BE POSITIONED AWAY FROM THE SPRINKLER A MINIMUM DISTANCE OF THREE TIMES THE MAXIMUM DIMENSION OF THE LIGHT FIXTURES UP TO A CLEAR DISTANCE OF 24 IN.

TYPICAL LIGHT FIXTURE CLEARANCE REQUIREMENTS FOR STANDARD COVERAGE FIRE SPRINKLERS

NOT TO SCALE ELEVATION VIEW



VERTICAL TOLERANCE FOR RECESSED SPRINKLERS

NOT TO SCALE

SYMBOL KEY

- EXISTING UNDERGROUND WATER MAIN
- NEW PIPING
- XX" — RECOMMENDED CENTER LINE ELEVATION OF PIPE A.F.F. AND/OR CENTER LINE ELEVATION OF PIPE FROM TOP OF JOIST
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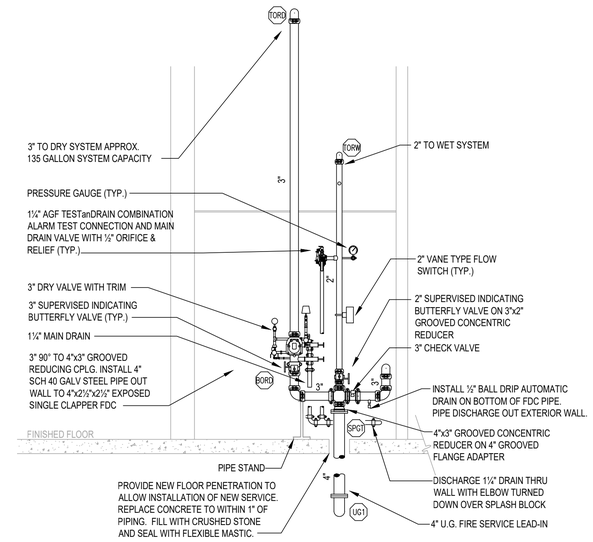
- TRAPEZE HANGER
- ZONE BOUNDARY LINE

NOTE

STRUCTURAL SHOWN FOR REFERENCE ONLY, VERIFY ACTUAL STRUCTURAL LOCATIONS.

SPRINKLER LEGEND

SYMBOL	SPRINKLER TYPE	TEMP.	K	FINISH	RESP.	QTY.
●	WHITE STANDARD COVERAGE PENDENT WITH RECESSED ESCUTCHEON	ORD	5.6	WHITE	QR	45
✕	WHITE STANDARD COVERAGE PENDENT WITH CONCEALED ESCUTCHEON	ORD	5.6	WHITE	QR	6
○	UPRIGHT	INT	5.6	BRASS	QR	29
⋈	DUAL DIRECTION STYLE ATTIC SPRINKLER	INT	8.0	BRASS	QR	43
◉	WHITE DRY PENDENT (PROVIDE ON 2-PIECE TELESCOPING ESCUTCHEON IF ADJACENT TO SURFACE MOUNTED LIGHT FIXTURES) AND 1" DROP	INT	5.6	WHITE	QR	20
○	UPRIGHT WITH GUARD AND WATER SHIELD	INT	5.6	BRASS	QR	13



FIRE SPRINKLER RISER

SCALE: 3/8" = 1'-0" FIN. FLOOR ELEV. = 100'-0"

100% CD

PROFESSIONAL FIRE PROTECTION ENGINEER ★ WILLIAM B. SMITH E-14915 ★ STATE OF NEBRASKA
12-15-2022

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FLOOR PLAN - FIRE PROTECTION

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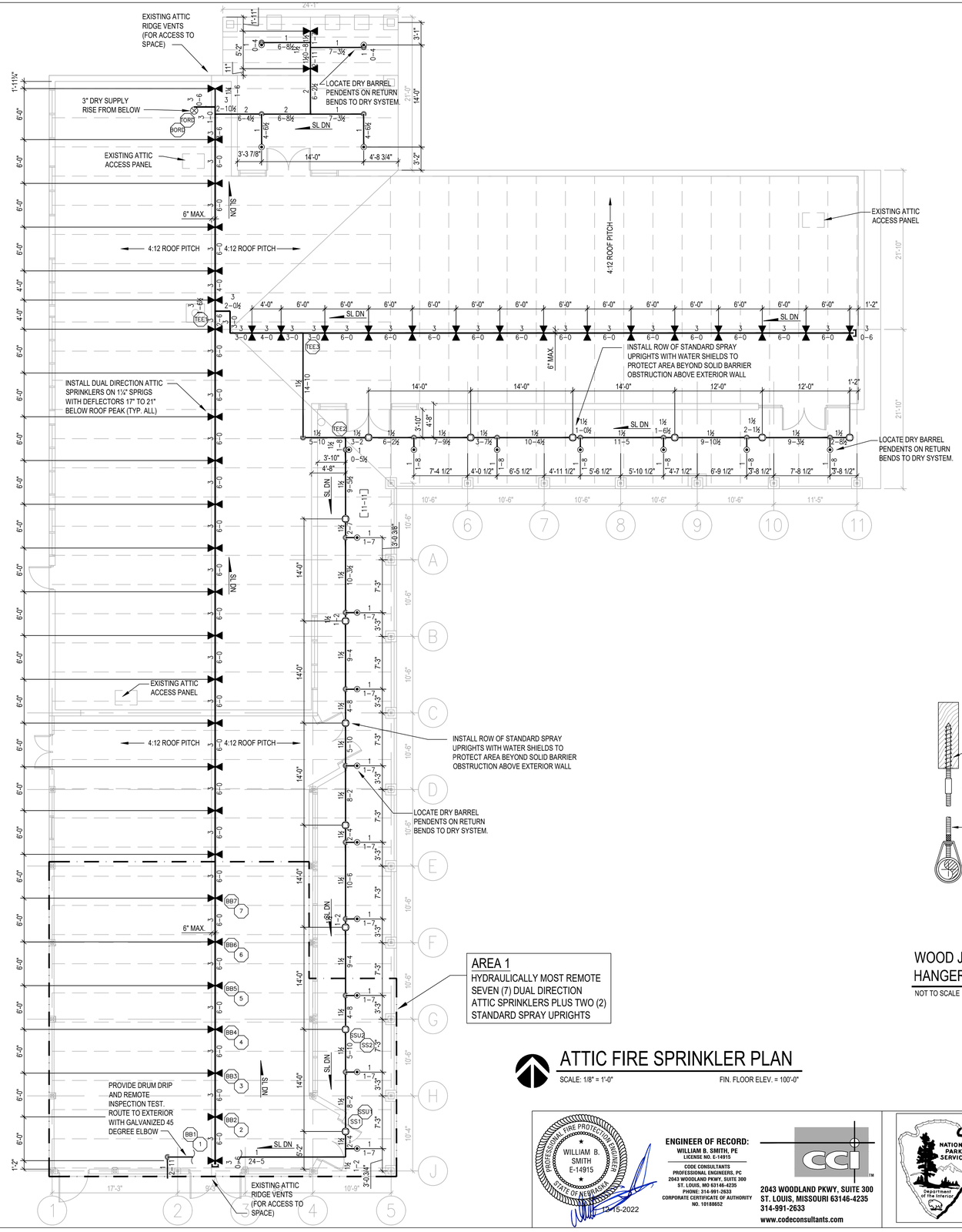
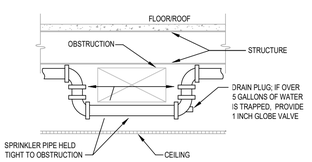


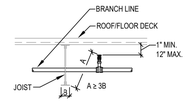
ATTIC FIRE SPRINKLER PLAN

SCALE: 1/8" = 1'-0" FIN. FLOOR ELEV. = 100'-0"



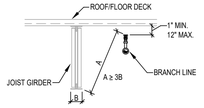
TYPICAL OFFSET AT OBSTRUCTION

NOT TO SCALE



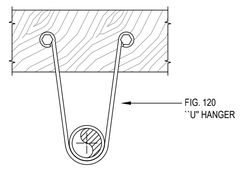
TYPICAL JOIST CLEARANCE REQUIREMENT

NOT TO SCALE (STANDARD COVERAGE UPRIGHT ON SPRIG)



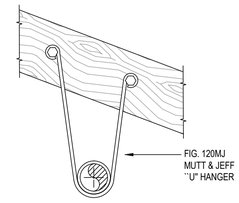
TYPICAL JOIST GIRDER CLEARANCE REQUIREMENT

NOT TO SCALE (STANDARD COVERAGE UPRIGHT ON SPRIG)



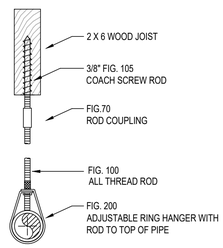
"U" HANGER

NOT TO SCALE



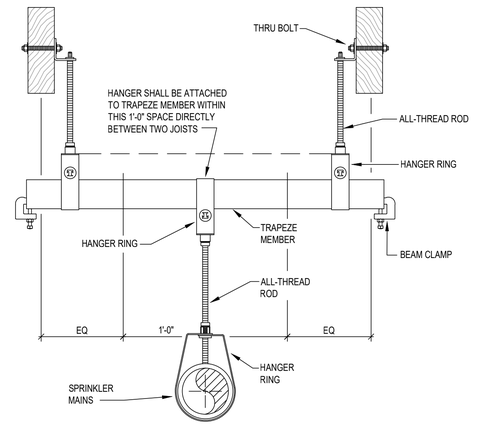
MUTT & JEFF "U" HANGER

NOT TO SCALE



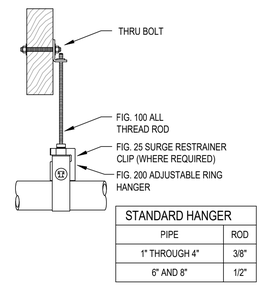
WOOD JOIST COACH SCREW HANGER FOR 1"- 4" PIPE

NOT TO SCALE



TRAPEZE HANGER

NOT TO SCALE



STANDARD HANGER	
PIPE	ROD
1" THROUGH 4"	3/8"
6" AND 8"	1/2"

TOP BEAM CLAMP, ROD, AND RING

NOT TO SCALE

SYMBOL KEY

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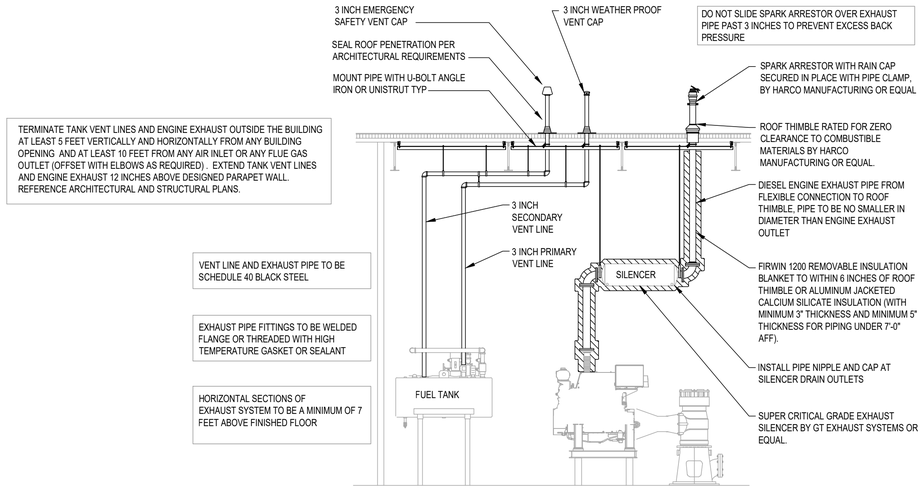
JLK	DESIGNED
JLK	DRAWN
JLK	CHECKED
12/15/2022	DATE

TITLE OF SHEET

ATTIC PLAN - FIRE PROTECTION

EDUCATION CENTER FIRE SERVICE
HOMESTEAD NATIONAL MONUMENT OF AMERICA
8523 NE-4
BEATRICE, NE 68310

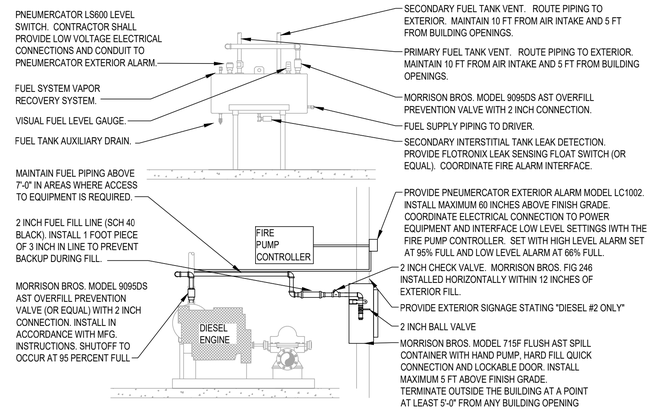
ARCH/ENG PROJ # 07310.024	DRAWING NO. 368 / 80056
SUB SHEET NO. FP102	PMIS / PKG. NO. 207662
	SHEET 21 OF 31



DIESEL VENTING AND EXHAUST

NOT TO SCALE

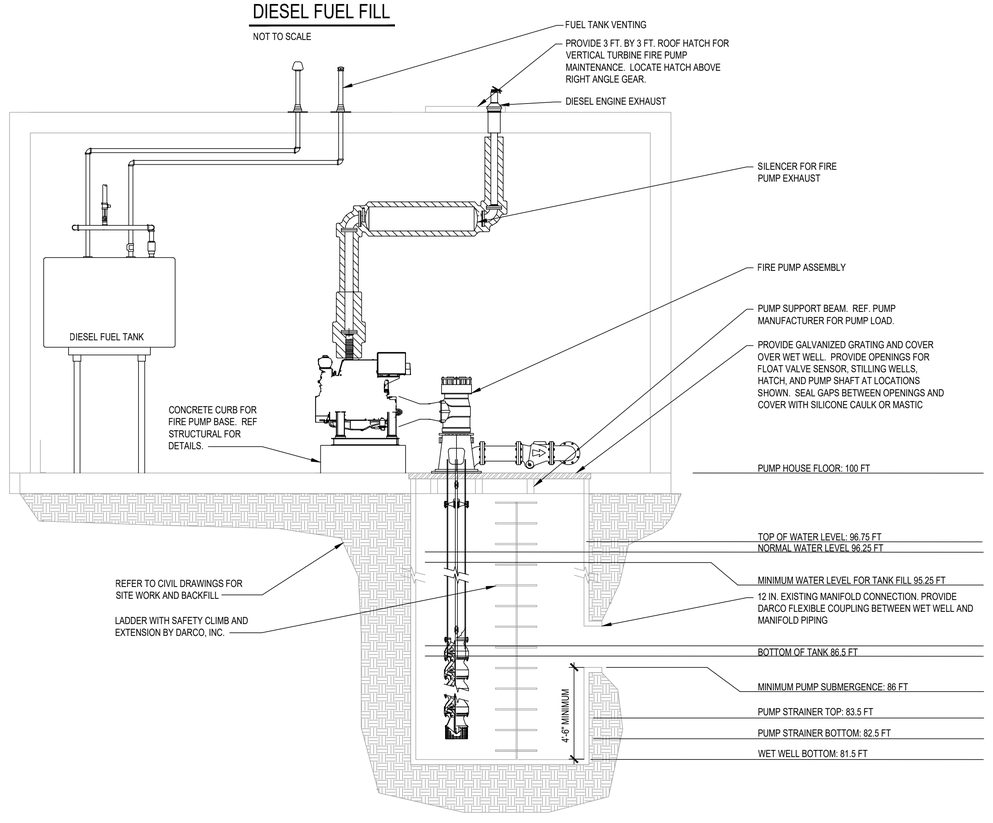
EXTERIOR VISUAL LEVEL ALARM SHALL ILLUMINATE INDICATOR LIGHTS WHEN TANK LEVEL DROPS BELOW 95% FULL AND BELOW 67% FULL SET POINTS FROM TANK LEVEL SWITCH. ADDITIONAL ALARM SUPERVISORY CONNECTION FROM TANK LEVEL SWITCH SHALL GENERATE A SUPERVISORY SIGNAL AT THE FIRE PUMP CONTROLLER WHEN FUEL LEVEL IS BELOW 67% FULL.



CONTRACTOR TO VERIFY TANK TIGHTNESS TESTING PER MANUFACTURER'S RECOMMENDED PRACTICES BEFORE FILLING. ALL PIPING AND COMPONENTS SHALL BE SUITABLE FOR USE WITH DIESEL FUEL. CONTRACTOR TO VERIFY OVERFILL PREVENTION VALVE FLOAT MECHANISM IS FULLY OPERATIONAL AND FLOAT FREELY MOVES INSIDE TANK.

DIESEL FUEL FILL

NOT TO SCALE



1 FP103 PREFABRICATED PUMP HOUSE FIRE PLAN

NOT TO SCALE

2 FP103 EXISTING PUMP HOUSE FIRE PLAN

NOT TO SCALE

100% CD

PROFESSIONAL FIRE PROTECTION ENGINEER
WILLIAM B SMITH
E-14915
STATE OF NEBRASKA
12-15-2022

ENGINEER OF RECORD:
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JLK CHECKED
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FIRE PUMP - FIRE PROTECTION
EDUCATION CENTER FIRE SERVICE
HOMESTEAD NATIONAL MONUMENT OF AMERICA
8523 NE-4
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DRAWING NO. 368 / 80056
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SHEET **22** OF **31**

SPECIFICATIONS 21 13 13 FIRE SPRINKLER SYSTEMS

SECTION 211313 - FIRE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

B. FURNISH ALL LABOR, MATERIALS, TOOLS, EQUIPMENT AND RELATED ITEMS REQUIRED FOR THE COMPLETE DESIGN AND INSTALLATION OF AUTOMATIC SPRINKLER SYSTEM.

C. ALL AREAS OF THE BUILDING SHALL BE PROTECTED BY WET AUTOMATIC FIRE SPRINKLERS. THE SYSTEM SHALL BE HYDRAULICALLY CALCULATED. DENSITY SHALL BE IN ACCORDANCE WITH NFPA 13 UNLESS SPECIAL CIRCUMSTANCES SUCH AS STACKING HEIGHTS OR MATERIALS TO BE STORED CAUSE OTHER CHAPTERS OF THE NFPA TO BE REQUIRED. FOLLOW THOSE CHAPTERS FOR THE APPROPRIATE SPRINKLER REQUIREMENTS.

1.2 SUMMARY

A. SECTION INCLUDES:

1. PIPES, FITTINGS, AND SPECIALTIES.
2. HANGERS AND SLEEVES.
3. FIRE PROTECTION VALVES:
   a. DRY VALVE
   b. ELECTRONICALLY SUPERVISED INDICATING CONTROL VALVES.
   c. CHECK VALVES.
   d. GLOBE VALVES.
   e. BALL VALVES.
   f. ANGLE VALVES.
4. TEST CONNECTIONS, MAIN DRAINS AND AUXILIARY DRAINS.
5. FIRE DEPARTMENT CONNECTIONS.
6. SPRINKLERS.
7. ALARM DEVICES.
8. PRESSURE GAGES.
9. SIGNS.
10. CORROSION MANAGEMENT PRODUCTS.
11. DESCRIPTION OF WORK

B. PROVIDE ALL REQUIRED LABOR, MATERIALS, EQUIPMENT, TESTING AND SERVICES NECESSARY FOR A COMPLETE AND OPERATIONAL WET PIPE FIRE PROTECTION SYSTEM FOR THE BUILDING AS HEREINAFTER DESCRIBED AND AS SHOWN ON THE ENGINEERING DRAWINGS.

C. WORK SHALL BEGIN AT THE FLANGE LOCATED AT THE SPIGOT INSIDE THE BUILDING AND SHALL INCLUDE THE FOLLOWING:

1. WET PIPE FIRE SPRINKLER SYSTEM FOR THE ENTIRE BUILDING.
2. DRY PIPE FIRE SPRINKLER SYSTEM FOR THE ATTIC.
3. COORDINATION OF WORK AND SCHEDULES WITH OTHER TRADES.

D. IT IS INTENDED THAT THE ENGINEERING DRAWINGS AND SPECIFICATION SHALL DESCRIBE AND PROVIDE FOR A WORKING INSTALLATION COMPLETE IN EVERY DETAIL AND ALL ITEMS NECESSARY FOR SUCH COMPLETE INSTALLATION SHALL BE PROVIDED WHETHER OR NOT SPECIFICALLY MENTIONED HEREIN OR SHOWN ON THE ENGINEERING DRAWINGS.

1.3 DEFINITIONS

A. STANDARD PRESSURE SPRINKLER PIPING: LISTED FOR 175 PSI MINIMUM WORKING PRESSURE.

1.4 SYSTEM DESCRIPTION

A. FIRE SPRINKLER SYSTEM DESIGN CRITERIA SHALL BE STRICTLY PER THIS SPECIFICATION.

B. FIRE SPRINKLER SYSTEM TO PROVIDE FIRE PROTECTION FOR THE ENTIRE BUILDING.

C. INTERFACE FIRE SPRINKLER SYSTEM WITH BUILDING FIRE AND SMOKE ALARM SYSTEMS.

D. MUSEUM, OFFICE AREAS, BREAKROOM, RESTROOMS (LIGHT HAZARD WET PIPE FIRE SPRINKLER SYSTEM):

- DENSITY - 0.10 GPM/SQ FT
- OPERATING AREA - 945 SQ FT (AREA REDUCED WITH QUICK RESPONSE AREA REDUCTION FOR 12 FT MAXIMUM CEILING.)
- TEMPERATURE CLASSIFICATION / NOMINAL K-FACTOR / RESPONSE TYPE - INT / 5.6 / QR
- HOSE STREAM ALLOWANCE - 100 GPM
- DURATION - 0.5 HOUR

E. ATTIC (LIGHT HAZARD DRY PIPE FIRE SPRINKLER SYSTEM IN COMBUSTIBLE ATTIC WITH MEMBERS 4'-0" O.C. AND 4 IN 12 PITCH):

- DENSITY - 0.10 GPM/SQ FT
- OPERATING AREA - PER THE ATTIC SPRINKLER CUT SHEET, CALCULATE THE SEVEN (7) MOST DEMANDING BACK-TO-BACK SPRINKLERS ALONG WITH TWO (2) STANDARD SPRAY UPRIGHTS. BACK-TO-BACK SPRINKLERS TO DISCHARGE A MINIMUM 22.6 PSI AND 38 GPM FOR A ROOF SPAN LESS THAN 60' (51' ACTUAL).
- TEMPERATURE CLASSIFICATION / NOMINAL K-FACTOR / RESPONSE TYPE -
  - ATTIC: INT / 8.0 / QR
  - SSU: INT / 5.6 / QR
- HOSE STREAM ALLOWANCE: 100 GPM
- DURATION: 30 MINUTES

F. SPRINKLER SPACING SHALL BE AS SHOWN ON THE ENGINEERING DRAWINGS.

1. ACOUSTICAL TILE - LOCATE SPRINKLERS IN ACCORDANCE WITH THE ENGINEERING DRAWINGS. NOT MORE THAN A 3 IN. (76 MM) RADIUS TOLERANCE ABOUT THE POINT IDENTIFIED BY DIMENSION WILL BE ACCEPTED. WHERE ROWS OF SPRINKLERS ARE PROVIDED WITHIN THE SAME CEILING PLANE, ANY PART OF THE TOLERANCE USED FOR ONE SPRINKLER SHALL BE THE SAME FOR ALL OTHERS IN THAT SAME ROW.
2. HARD CEILINGS - LOCATE SPRINKLERS IN ACCORDANCE WITH THE ENGINEERING DRAWINGS. SPRINKLERS SHALL BE IN LINE WITH LIGHT FIXTURES AND OTHER SPRINKLERS WHERE INDICATED ON THE DRAWINGS. COORDINATE CLOSELY WITH THE ELECTRICAL CONTRACTOR.
3. UNFINISHED AREAS - LOCATE SPRINKLERS AS SHOWN ON THE ENGINEERING DRAWINGS.

G. PROVIDE FIRE DEPARTMENT CONNECTION AS INDICATED ON THE ENGINEERING DRAWINGS.

H. PROVIDE ALL NECESSARY OFFSETS, RAISES OR DROPS IN MAIN OR BRANCH LINE PIPING AND AUXILIARY DRAINS REQUIRED BY BUILDING CONDITIONS WHETHER OR NOT SHOWN ON THE ENGINEERING DRAWINGS.

I. EXAMINE THE JOB CONDITIONS AND VERIFY ALL MEASUREMENTS, DISTANCES, ELEVATIONS, CLEARANCES, PIPE SIZES, ETC.

J. IT IS UNDERSTOOD, UNLESS SPECIFICALLY INDICATED OTHERWISE, THAT THE PIPE SIZES AS SHOWN ON THE ENGINEERING DRAWINGS WILL BE USED.

1.5 PERFORMANCE REQUIREMENTS

A. STANDARD PRESSURE PIPING SYSTEM COMPONENT: LISTED FOR 175 PSI MINIMUM WORKING PRESSURE.

B. WATER SUPPLY:

THE FIRE PROTECTION WATER SUPPLY WILL BE PROVIDED BY A VERTICAL TURBINE FIRE PUMP DRAWING SUCTION FROM A 20,000 GALLON UNDERGROUND CISTERN. THE CISTERN IS AUTOMATICALLY REFILLED BY AN ONSITE WELL. MINIMUM TANK REFILL SHALL BE CAPABLE OF 20,000 GALLON FILL TIME IN 8 HRS. THE WATER SUPPLY SHALL BE CONSIDERED EFFECTIVE AT THE FIRE PUMP DISCHARGE FLANGE. THE APPROXIMATE WATER SUPPLY ELEVATION IS EVEN WITH THE FINISH FLOOR.

A FIRE BOOSTER PUMP WILL BE PROVIDED TO SUPPLEMENT SYSTEM PRESSURE. THE FIRE PUMP IS RATED AT 100 PSI AT 500 GPM FLOWING. THE SELECTED FIRE PUMP SHALL NOT EXCEED 120% OF RATED PRESSURE AT CHURN OR DROP BELOW 65% OF RATED PRESSURE AT 150% CAPACITY. THE ESTIMATED FIRE PUMP CURVE IS BEST REPRESENTED BY THE FOLLOWING COORDINATES.

CHURN:	110 PSI	AT	0 GPM
RATED:	100 PSI	AT	500 GPM
150%:	65 PSI	AT	750 GPM

THE ABOVE WATER SUPPLY COORDINATES DO NOT INCLUDE THE REQUIRED 10 PSI SAFETY FACTOR THAT SHALL BE ENFORCED. NO SUBSTITUTIONS OF WATER SUPPLY DATA OR ITS EFFECTIVE POINT WILL BE ALLOWED.

1.6 SUBMITTALS

A. THE ENGINEERING DRAWINGS HAVE BEEN PREPARED USING AUTOCAD. THE HYDRAULIC CALCULATIONS HAVE BEEN PREPARED USING HYDRACALC. THESE DOCUMENTS WILL BE MADE AVAILABLE TO THE SUCCESSFUL FIRE SPRINKLER CONTRACTOR IN EITHER ELECTRONIC FORM OR HARD COPY. UTILIZATION OF THESE DOCUMENTS FOR THE DEVELOPMENT OF SHOP DRAWINGS AND SUBMITTALS DOES NOT RELIEVE THE FIRE SPRINKLER CONTRACTOR FROM ANY OF HIS RESPONSIBILITIES REQUIRED HEREIN.

B. SUBMITTALS SHALL BE IN ACCORDANCE WITH REQUIREMENTS OF THE GENERAL CONDITIONS OF THE CONTRACT.

C. PRODUCT LITERATURE: FOR ALL WET PIPE SPRINKLER SYSTEM EQUIPMENT.

1. LITERATURE SHALL CLEARLY IDENTIFY EXACTLY WHAT COMPONENTS ARE BEING PROVIDED AND SHALL INCLUDE: FINISH, SIZE, TYPE, ETC. LITERATURE WHICH IS NOT CLEARLY IDENTIFIED WILL BE REJECTED.

D. SHOP DRAWINGS:

1. DRAWINGS MUST BE COMPREHENSIVE OF ENTIRE PROJECT, DEMONSTRATING COORDINATION WITH OTHER DISCIPLINES, COMPLETE IN ALL DETAIL AND THE SAME SCALE AS THE ENGINEERING DRAWINGS.
2. HYDRAULIC CALCULATIONS (CALCULATIONS SHALL INCLUDE PEAKING INFORMATION).

E. FIELD TEST REPORTS AND CERTIFICATES: INDICATE TEST RESULTS FOR COMPLIANCE WITH PERFORMANCE REQUIREMENTS AND AS DESCRIBED IN NFPA 13. INCLUDE "CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR ABOVEGROUND PIPING."

F. FIELD QUALITY CONTROL REPORTS.

G. CCI WILL REVIEW THIS SUBMITTAL FOR CONSISTENCY WITH CCI'S CONSTRUCTION DOCUMENTS.

H. AFTER THE SATISFACTORY REVIEW BY CCI, PROVIDE SUBMITTALS TO THE AUTHORITY HAVING JURISDICTION (AHJ) AND THE INSURANCE UNDERWRITER FOR APPROVAL.

I. THE FIRE SPRINKLER CONTRACTOR SHALL BE RESPONSIBLE FOR RESPONDING, IN WRITING, TO ANY COMMENTS FROM THE AHJ OR THE INSURANCE UNDERWRITER WITHIN TEN (10) WORKING DAYS AFTER THE RECEIPT OF THEIR COMMENTS. COPIES OF THE RESPONSE SHALL BE SENT TO THE GENERAL CONTRACTOR AND CCI.

J. PROVIDE AS-BUILT DOCUMENTS IN ACCORDANCE WITH REQUIREMENTS OF THE GENERAL CONDITIONS OF THE CONTRACT.

K. PROVIDE OPERATING AND MAINTENANCE INSTRUCTIONS TO THE OWNER IN ACCORDANCE WITH REQUIREMENTS OF THE GENERAL CONDITIONS OF THE CONTRACT AND NFPA 13.

1.7 QUALITY ASSURANCE

A. INSTALLER QUALIFICATIONS:

1. INSTALLER'S RESPONSIBILITIES INCLUDE PREPARING SHOP DRAWING SUBMITTAL, FABRICATING, AND INSTALLING SPRINKLER SYSTEMS. BASE CALCULATIONS ON WATER SUPPLY COORDINATES PROVIDED HEREIN.
   a. INSTALLER SHALL BE STATE AND LOCALLY LICENSED.
   b. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.

B. REFERENCES: FIRE SPRINKLER SYSTEM EQUIPMENT, SPECIALTIES, ACCESSORIES, INSTALLATION, AND TESTING SHALL COMPLY WITH ALL APPLICABLE CODES AND REFERENCED DESIGN STANDARDS:

1. 2021 INTERNATIONAL BUILDING CODE
2. 2021 INTERNATIONAL FIRE CODE
3. NFPA 13, SPRINKLER SYSTEMS - 2022 EDITION.

C. EQUIPMENT AND COMPONENTS SHALL BE UL LISTED FOR FIRE PROTECTION SYSTEMS INSTALLATION.

D. ALL FIRE SPRINKLER SYSTEM COMPONENTS SHALL BE INSTALLED FREE OF ANY RUST, CORROSION OR VISIBLE DAMAGE. ALL ITEMS NOT COMPLYING WITH THIS REQUIREMENT SHALL BE REPLACED WITHOUT COST TO THE OWNER.

1.8 COORDINATION

A. COORDINATE LAYOUT AND INSTALLATION OF SPRINKLERS WITH OTHER CONSTRUCTION THAT PENETRATES CEILINGS, INCLUDING LIGHT FIXTURES, HVAC EQUIPMENT, AND PARTITION ASSEMBLIES.

B. COORDINATE INSTALLATION OF SYSTEM WITH ALL OTHER DISCIPLINES.

1.9 EXTRA MATERIALS

A. FURNISH EXTRA MATERIALS THAT MATCH PRODUCTS INSTALLED AND THAT ARE PACKAGED WITH PROTECTIVE COVERING FOR STORAGE AND IDENTIFIED WITH LABELS DESCRIBING CONTENTS.

B. PROVIDE AT THE RISER ONE (1) TWELVE (12) HEAD SPARE SPRINKLER CABINETS STOCKED WITH SPRINKLERS AND ESCUTCHEON ASSEMBLIES PROPORTIONATE TO THOSE PROVIDED IN THE BUILDING AND ALL NECESSARY SPRINKLER WRENCHES AS REQUIRED BY NFPA 13.

1.10 REGULATORY REQUIREMENTS

A. ALL WORK SHALL MEET THE REQUIREMENTS OF SECTION 1.8.

B. THE FIRE SPRINKLER CONTRACTOR SHALL NOT PURSUE ANY APPROVALS OR INTERPRETATIONS OF CCI'S CONSTRUCTION DOCUMENTS EXCEPT THROUGH CCI.

C. SPRINKLER PIPING SHALL NOT BE CONCEALED WHERE IT IS INACCESSIBLE UNLESS IT IS FIRST INSPECTED AND ACCEPTED BY A REPRESENTATIVE OF THE AUTHORITY HAVING JURISDICTION.

D. ANY WORK PERFORMED PRIOR TO THE SATISFACTORY REVIEW BY CCI AND APPROVAL BY THE AUTHORITY HAVING JURISDICTION AND THE INSURANCE UNDERWRITER, WILL BE SOLELY AT THE FIRE SPRINKLER CONTRACTOR'S RISK.

E. THE SYSTEM WILL NOT BE ACCEPTABLE UNTIL FINAL TESTING AND RECEIPT OF THE CONTRACTOR'S MATERIAL AND TEST CERTIFICATE HAS BEEN OBTAINED.

1.11 WARRANTY

A. REPAIR ALL DEFECTIVE WORKMANSHIP OR REPLACE ALL DEFECTIVE MATERIALS FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER. WORKMANSHIP OR EQUIPMENT FOUND TO BE DEFECTIVE DURING THAT PERIOD SHALL BE REPLACED WITHOUT COST TO THE OWNER.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. PER LOCAL REQUIREMENTS AND NFPA 13. ALL PIPE SHALL HAVE A CORROSION RESISTANCE RATIO (CRR) EQUAL TO OR GREATER THAN 1.00. REFER TO THE CURRENT UL FIRE PROTECTION EQUIPMENT DIRECTORY - STEEL SPRINKLER PIPE FOR ACCEPTABLE MANUFACTURERS, SIZES, AND JOINING METHODS.

B. THE ENGINEER'S HYDRAULIC CALCULATIONS ANTICIPATES THAT ALL GROOVED WET PIPE SYSTEM RISERS, FEED AND CROSS MAINS, AND BRANCH LINES SHALL HAVE HYDRAULIC CHARACTERISTICS EQUAL TO OR GREATER THAN SCHEDULE 10 PIPE.

C. ALL THREADED PIPING SHALL BE SCHEDULE 40 PIPE.

D. ALL 1 IN. SHALL BE SCHEDULE 40 PIPE.

E. ALL PIPING IN DRY SYSTEMS SHALL BE SCHEDULE 40 PIPE.

F. FITTINGS SHALL BE SCREWED OR FLANGED BLACK CAST IRON OR APPROVED EQUAL SUCH AS MECHANICAL, GROOVED OR WELDED CONNECTIONS.

G. PRESSURE RATING: 175 PSI MINIMUM.

2.2 JOINING OF PIPE AND FITTINGS

A. ALL PIPE SHALL BE JOINED IN ACCORDANCE WITH NFPA 13 AND MANUFACTURERS RECOMMENDATIONS.

B. WHERE GROOVED FITTINGS AND COUPLINGS ARE USED TOGETHER THEY SHALL BE OF THE SAME MANUFACTURER.

C. BUSHINGS SHALL NOT BE USED.

D. FLEXIBLE COUPLINGS SHALL BE IDENTIFIED ON THE SHOP DRAWINGS.

2.3 HANGERS

A. ALL HANGERS TO BE OF APPROVED MATERIALS AND SPACED IN ACCORDANCE WITH NFPA 13 AND THE PIPING MANUFACTURER'S SPECIFICATIONS.

B. THE SECTION MODULUS REQUIRED BY NFPA 13 SHALL BE PROVIDED FOR ALL TRAPEZE MEMBERS SUPPORTING PIPING.

2.4 LISTED FIRE PROTECTION VALVES

A. GENERAL REQUIREMENTS:

1. PRESSURE RATING: 175 PSI MINIMUM.

B. INDICATING BUTTERFLY VALVES:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. GRUVLOCK.
   b. NIBCO.
   c. TYCO.
   d. VICTAULIC.
   e. VIKING.
2. BODY MATERIAL: CAST IRON.
3. SUPERVISORY SWITCH.

C. CHECK VALVES:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. MILWAUKEE VALVE.
   b. MUELLER CO.
   c. NIBCO.
   d. STOCKHAM.
   e. TYCO.
   f. UNITED BRASS WORKS.
   g. VICTAULIC.
2. TYPE: SWING CHECK OR WAFER.
3. BODY MATERIAL: CAST IRON.

D. OS&Y GATE VALVES:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. MILWAUKEE VALVE.
   b. MUELLER CO.
   c. NIBCO.
   d. STOCKHAM.
   e. VIKING.
2. BODY MATERIAL: CAST IRON.
3. SUPERVISORY SWITCH.
4. TRIM AND DRAIN VALVES

E. GENERAL REQUIREMENTS:

1. PRESSURE RATING: 175 PSI MINIMUM.

F. ANGLE VALVES:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. MILWAUKEE VALVE.
   b. NIBCO.
   c. UNITED BRASS WORKS.
   d. BALL VALVES:
2. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. MILWAUKEE VALVE.
   b. NIBCO.
   c. UNITED BRASS WORKS.
   d. VICTAULIC.
   e. GLOBE VALVES:
3. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. CRANE.
   b. MILWAUKEE VALVE.
   c. NIBCO.

2.5 SPECIALTY VALVES

A. GENERAL REQUIREMENTS:

1. PRESSURE RATING 175 PSI MINIMUM.
2. BODY MATERIAL: CAST IRON.

B. DRY VALVES:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. RELIABLE.
   b. TYCO.
   c. VICTAULIC.
   d. VIKING.
2. DESIGN: FOR HORIZONTAL OR VERTICAL INSTALLATION.
3. INCLUDE TRIM SETS FOR BYPASS, DRAIN, ELECTRICAL SPRINKLER ALARM SWITCH, PRESSURE GAGES.

C. AUTOMATIC (BALL DRIP) DRAIN VALVES:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. NIBCO.
   b. RELIABLE.
   c. TYCO.
2. TYPE: AUTOMATIC DRAINING, BALL CHECK.
3. SIZE: NPS 3/4.
4. FIRE DEPARTMENT CONNECTIONS

D. EXPOSED STANDARD WALL MOUNT TYPE FIRE DEPARTMENT CONNECTION:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. CROKER.
   b. ELKHART BRASS.
   c. POTTER ROEMER.
2. PRESSURE RATING: 175 PSI MINIMUM.
3. BODY MATERIAL: CORROSION RESISTANT METAL.
4. INLETS: BRASS WITH THREADS ACCORDING TO NFPA 1963 AND MATCHING LOCAL FIRE DEPARTMENT SIZES AND THREADS. INCLUDE EXTENSION PIPE NIPPLES, BRASS LUGGED SWIVEL CONNECTIONS, AND CHECK DEVICES OR CLAPPERS.
5. CAPS: BRASS, LUGGED TYPE, WITH GASKET AND CHAIN OF SAME FINISH.
6. CONNECTIONS: TWO NPS 2½ INLETS AND ONE NPS 4 OUTLET.
7. FINISH: ROUGH BRASS OR BRONZE.
8. ESCUTCHEON PLATE MARKING: SIMILAR TO "AUTO SPKR" OF SAME FINISH.
9. SPRINKLER SPECIALTY PIPE FITTINGS

E. GENERAL REQUIREMENTS:

1. PRESSURE RATING: 175 PSI MINIMUM.

F. FLOW DETECTION AND ALARM TEST DRAIN ASSEMBLIES:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. AGF MANUFACTURING INC. - MODEL 1011 WITH PRESSURE RELIEF.
2. SIZE: 2 IN.
3. INLET AND OUTLET: THREADED.

G. SPRINKLER TEST FITTINGS:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. AGF MANUFACTURING INC.
   b. TYCO.
   c. VICTAULIC.
   d. VIKING.
2. BODY MATERIAL: CAST OR DUCTILE IRON HOUSING WITH SIGHT GLASS.
3. SIZE: SAME AS CONNECTED PIPING.
4. INLET AND OUTLET: THREADED.
5. SPRINKLERS

H. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

1. GLOBE.
2. RELIABLE.
3. TYCO.
4. VICTAULIC.
5. VIKING.

I. GENERAL REQUIREMENTS:

1. PRESSURE RATING: 175 PSI MINIMUM.
2. ONLY SPRINKLERS MANUFACTURED AFTER JANUARY 1, 2017 WILL BE ACCEPTED FOR USE.
3. ONLY SPRINKLERS MANUFACTURED UTILIZING BELLEVILLE SPRING SEALS WILL BE ACCEPTABLE FOR USE.

J. SPRINKLER TYPES:

1. WHITE RECESSED - GLASS BULB QUICK RESPONSE RECESSED SPRINKLER WITH MATCHING RECESSED ESCUTCHEON.
2. BRASS UPRIGHT - GLASS BULB QUICK RESPONSE UPRIGHT SPRINKLER.
3. ATTIC DUAL DIRECTIONAL SPRINKLER - GLASS BULB SPECIAL APPLICATION SPRINKLER.
4. DRY WHITE RECESSED - GLASS BULB QUICK RESPONSE RECESSED SPRINKLER WITH MATCHING RECESSED ESCUTCHEON.

K. SPRINKLER ESCUTCHEONS: MATERIALS, TYPES, AND FINISHES SHALL MATCH SPRINKLERS.

1. ESCUTCHEONS SHALL BE LISTED FOR USE WITH THE SPRINKLER IT IS INSTALLED WITH.

L. SPRINKLER GUARDS:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. GLOBE.
   b. RELIABLE.
   c. TYCO.
   d. VICTAULIC.
   e. VIKING.
2. TYPE: WIRE CAGE WITH FASTENING DEVICE FOR ATTACHING TO SPRINKLER.
3. ALARM DEVICES

M. ALARM DEVICE TYPES SHALL MATCH PIPING AND EQUIPMENT CONNECTIONS.

N. WATERFLOW SWITCHES - VANE TYPE:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. GUARDIAN.
   b. POTTER ELECTRIC.
   c. SYSTEM SENSOR.
2. WATERFLOW DETECTOR: ELECTRICALLY SUPERVISED.
3. COMPONENTS: TWO SINGLE-POLE, DOUBLE-THROW CIRCUIT SWITCHES FOR ISOLATED ALARM AND AUXILIARY CONTACTS, 24-VOLT D.C. OR 110-VOLT A.C.; COMPLETE WITH FACTORY SET, FIELD-ADJUSTABLE RETARD ELEMENT TO PREVENT FALSE SIGNALS AND TAMPERPROOF COVER; CORROSION RESISTANT COMPONENTS IN WATERWAY; DUST TIGHT CONSTRUCTION.
4. TYPE: PADDLE OPERATED.
5. PRESSURE RATING: 175 PSI MINIMUM.
6. DESIGN INSTALLATION: HORIZONTAL OR VERTICAL.
7. SIGNALS WATERFLOW THAT EQUALS OR EXCEEDS 10 GPM.
8. 0 TO 60 SECONDS ADJUSTABLE RANGE.
9. DETECTOR SHALL BE FURNISHED AND INSTALLED BY THE FIRE SPRINKLER CONTRACTOR AND WIRED COMPLETE BY THE FIRE ALARM CONTRACTOR.

O. VALVE SUPERVISORY SWITCHES:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. GUARDIAN.
   b. POTTER ELECTRIC.
   c. SYSTEM SENSOR.
2. TYPE: ELECTRICALLY SUPERVISED.
3. COMPONENTS: SINGLE-POLE, DOUBLE-THROW SWITCH WITH NORMALLY CLOSED CONTACTS; 24-VOLT D.C. OR 110-VOLT A.C.; TAMPER PROOF COVER; DUST TIGHT CONSTRUCTION.
4. DESIGN: SIGNALS THAT CONTROLLED VALVE IS IN OTHER THAN FULLY OPEN POSITION.
5. THE SUPERVISORY SWITCH SHALL BE FURNISHED AND INSTALLED BY THE FIRE SPRINKLER CONTRACTOR AND WIRED COMPLETE BY THE FIRE ALARM CONTRACTOR.
6. PRESSURE GAGES

P. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

1. AMETEK; U.S. GAUGE DIVISION.
2. BRECCO CORPORATION.
3. WIKA INSTRUMENT CORPORATION.

Q. DIAL SIZE: 3½ TO 4½-INCH DIAMETER.

R. PRESSURE GAGE RANGE: 0 TO 250 PSI MINIMUM.

S. WATER SYSTEM PIPING GAGE: INCLUDE "WATER" OR "AIR/WATER" LABEL ON DIAL FACE.

2.6 SIGNS

A. APPROVED ENAMELED METAL SIGNS SHALL BE SECURELY ATTACHED AT ALL MAIN DRAINS, AUXILIARY DRAINS, ALARM TEST CONNECTIONS AND CONTROL VALVES.

B. PROVIDE A PERMANENTLY ATTACHED PLACARD INDICATING HYDRAULIC DESIGN INFORMATION IN ACCORDANCE WITH NFPA 13 AND PLACED ON THE RISER. A MOCK-UP OF PLACARD SHALL BE INCLUDED WITH EQUIPMENT LITERATURE.

C. PROVIDE A PERMANENTLY ATTACHED PLACARD INDICATING GENERAL INFORMATION IN ACCORDANCE WITH NFPA 13 AND PLACED ON THE RISER. A MOCK-UP OF PLACARD SHALL BE INCLUDED WITH EQUIPMENT LITERATURE.

2.7 CORROSION MANAGEMENT

A. MANUAL AIR VENTS

1. PROVIDE MANUAL AIR VENTS; 175 PSI RATED WORKING PRESSURE WHERE INDICATED ON DRAWINGS MOUNTED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

B. PRE-ENGINEERED NITROGEN GENERATION SYSTEM - DRY SYSTEM

1. THE FIRE SPRINKLER CONTRACTOR SHALL FURNISH AND INSTALL A PRE-ENGINEERED NITROGEN GENERATION SYSTEM AT THE INSTALL PER MANUFACTURER'S INSTRUCTIONS.
2. THE PRE-ENGINEERED NITROGEN GENERATION SYSTEM SHALL BE EQUIPPED WITH OIL-LESS AIR COMPRESSOR CAPABLE OF ACHIEVING SYSTEM PRESSURE WITHIN 30 MINUTES IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA 13, STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS.
3. THE PRE-ENGINEERED NITROGEN GENERATION SYSTEM SHALL BE FACTORY CALIBRATED TO ACHIEVE A NITROGEN CONCENTRATION OF 98% OR GREATER AND MAINTAIN THAT CONCENTRATION WITHIN THE SYSTEM CONTINUOUSLY.
4. THE PRE-ENGINEERED NITROGEN GENERATION SYSTEM SHALL HAVE AN AUTOMATIC CONDENSATE DRAIN ON THE AIR COMPRESSOR TANK.
5. THE FIRE SPRINKLER CONTRACTOR SHALL FURNISH AND INSTALL AN AIR MAINTENANCE DEVICE EQUAL TO VICTAULIC SERIES 757.
6. CONDENSATE DISCHARGE FROM ½ IN. DRAIN CONNECTION ON PRE-ENGINEERED NITROGEN GENERATION SYSTEM SHALL BE PIPED TO EXISTING 2 IN. DRAIN WITH A 1 IN. PIPE. PROVIDE 1 IN. CHECK VALVE IN VERTICAL SECTION OF DRAIN.
7. THE PRE-ENGINEERED NITROGEN GENERATION SYSTEM SHALL HAVE A DEDICATED UNSWITCHED POWER SOURCE SIZED AS DIRECTED BY THE MANUFACTURER. THE POWER SOURCE MUST BE COORDINATED WITH THE AVAILABLE POWER SUPPLY.
8. PROVIDE INSTRUCTION AND TRAINING TO SITE ENGINEERS ONCE COMMISSIONING HAS BEEN COMPLETED.
9. ACCEPTABLE MANUFACTURERS:
   a. ENGINEERED CORROSION SOLUTIONS
   b. ORR FIRE PROTECTION SYSTEMS
   c. POTTER ELECTRIC

PART 3 - EXECUTION

3.1 COORDINATION WITH OTHER TRADES

A. COORDINATE CLOSELY WITH ALL OTHER TRADES TO EXPEDITE CONSTRUCTION AND AVOID INTERFERENCE.

3.2 SERVICE ENTRANCE PIPING

A. CONNECT SPRINKLER PIPING TO FIRE WATER SERVICE PIPING TO BUILDING.

3.3 SYSTEM INSTALLATION

A. DEVIATIONS FROM ENGINEERING DOCUMENTS REQUIRE PRIOR WRITTEN APPROVAL FROM THE ENGINEER OF RECORD.

B. PIPING STANDARD: COMPLY WITH REQUIREMENTS IN NFPA 13 FOR INSTALLATION OF SPRINKLER PIPING.

C. INSTALL TEST CONNECTIONS IN SPRINKLER SYSTEM PIPING AS REQUIRED.

D. AUXILIARY DRAINS CONSISTING OF PLUGS, OR GLOBE VALVES AND PLUGS WHERE CAPACITY OF TRAPPED PIPE SECTION EXCEEDS 5 GALLONS, SHALL BE PROVIDED TO DRAIN ALL POINTS IN THE SYSTEM THAT CANNOT BE DRAINED BACK TO MAIN RISER.

E. INSTALL AUTOMATIC (BALL DRIP) DRAIN VALVE AT EACH CHECK VALVE FOR FIRE DEPARTMENT CONNECTION, OR ON PIPING BETWEEN FIRE DEPARTMENT CONNECTION AND CHECK VALVE. INSTALL DRAIN PIPING TO EXTERIOR.

F. INSTALL ALARM DEVICES IN PIPING SYSTEMS.

G. INSTALL HANGERS AND SUPPORTS FOR SPRINKLER SYSTEM PIPING ACCORDING TO NFPA 13.

H. INSTALL PRESSURE GAGES WHERE REQUIRED BY NFPA 13. INCLUDE PRESSURE GAGES WITH CONNECTION NOT LESS THAN NPS ¼ AND WITH SOFT METAL SEATED GLOBE VALVE, ARRANGED FOR DRAINING PIPE BETWEEN GAGE AND VALVE. INSTALL GAGES TO PERMIT REMOVAL, AND INSTALL WHERE THEY WILL NOT BE SUBJECT TO FREEZING.

I. SLEEVES SHALL BE PROVIDED FOR PIPING PASSING THROUGH CONCRETE SLABS, CONCRETE OR MASONRY WALLS AND PARTITIONS, THROUGH FLOORS, CEILINGS, WALLS, OR PARTITIONS OF OTHER BUILDING MATERIALS. WATERTIGHT SLEEVES CAULKED WITH MASTIC OR LEAD SHALL BE PROVIDED FOR FLOOR SLABS AND WALLS ON OR BELOW GRADE. STANDARD PIPE OR GALVANIZED SHEET METAL SLEEVES SHALL BE INSTALLED IN ABOVE GRADE CONSTRUCTION AS MAY BE REQUIRED. THE SLEEVES SHALL BE OF SUFFICIENT DIAMETER TO PASS PIPE LINES WITH COUPLINGS OR WITH INSULATION OR ANNULAR AREA FOR CAULKING WHERE REQUIRED.

J. ESCUTCHEONS SHALL BE APPROVED FLOOR AND CEILING PLATES MADE OF STEEL OR BRASS, PLAIN OR CHROMIUM PLATE FINISH AND SHALL BE INSTALLED AROUND ALL EXPOSED PIPING PASSING THROUGH A FINISHED FLOOR, WALL OR CEILING. THE PLATES SHALL BE OF SUFFICIENT OUTSIDE DIAMETER TO COVER THE SLEEVE OPENING AND SHALL BE PROVIDED WITH SPRINGS OR SET SCREWS TO INSURE THEM FITTING SNUGLY AROUND THE PIPE.

K. SPRINKLER PIPES SHALL NOT BE ROUTED OVER THE DOOR TRACKS IN THE SERVICE BAYS.

3.4 IDENTIFICATION

A. INSTALL LABELING AND PIPE MARKERS ON EQUIPMENT AND PIPING ACCORDING TO REQUIREMENTS IN NFPA 13 AND THE LOCAL AHJS.

3.5 FIELD QUALITY CONTROL

A. PERFORM TESTS AND INSPECTIONS.

B. TESTS AND INSPECTIONS:

1. LEAK TEST: AFTER INSTALLATION, HYDROSTATICALLY TEST ENTIRE SYSTEM AND TEST FOR LEAKS BY CHARGING SYSTEM TO 200 PSI IN ACCORDANCE WITH NFPA 13. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST.
2. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.
3. FLUSH, TEST, AND INSPECT SPRINKLER SYSTEMS ACCORDING TO NFPA 13, "SYSTEMS ACCEPTANCE" CHAPTER.
4. COORDINATE WITH FIRE ALARM TESTS. OPERATE AS REQUIRED.
5. VERIFY THAT EQUIPMENT HOSE THREADS ARE SAME AS LOCAL FIRE DEPARTMENT EQUIPMENT.

C. TESTS SHALL BE WITNESSED BY THE AUTHORITY HAVING JURISDICTION, AND OWNER'S AUTHORIZED AGENT.

D. PRELIMINARY TESTING PROCEDURES SHALL BE CONDUCTED AS MENTIONED ABOVE TO ASSURE PROPER OPERATION WHEN THE FINAL TESTING IS PERFORMED.

E. THE CONTRACTOR'S MATERIAL AND TEST CERTIFICATES AS SHOWN IN NFPA 13 MUST BE COMPLETED AND SUBMITTED TO THE ENGINEER BEFORE FINAL ACCEPTANCE MAY BE GIVEN.

3.6 CLEANING

A. REMOVE AND REPLACE SPRINKLERS WITH PAINT, OTHER THAN FACTORY FINISH, INCLUDING OVERSPRAY.

3.7 DEMONSTRATION

A. TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN FIRE SPRINKLER SYSTEM COMPONENTS.

B. AFTER COMPLETION OF ALL INSTALLATION, TESTS, ETC. AND PRIOR TO THE OPENING DATE, THE SPRINKLER CONTRACTOR SHALL INSTRUCT THE OWNER IN THE OPERATION OF THE SPRINKLER SYSTEM. PROVIDE WRITTEN OPERATING INSTRUCTIONS AND MOUNT ON WALL IN A FRAME WITH GLASS FRONT. INCLUDE THE FOLLOWING SO THAT THE OWNER:

1. WILL IMMEDIATELY RECOGNIZE THE MAIN VALVES ARE IN OPEN OR CLOSED POSITION.
2. WILL KNOW HOW TO DRAIN THE SYSTEM.
3. WILL KNOW HOW TO RESET THE ALARM SYSTEM.
4. WILL KNOW NOW TO MAKE COMPLETE WEEKLY INSPECTION.
5. WILL KNOW HOW TO MAINTAIN THE SYSTEM IN ACCORDANCE WITH NFPA 13 AND 25.

END OF SECTION 211313

100% CD

PROFESSIONAL FIRE PROTECTION ENGINEER — WILLIAM B. SMITH E-14915 — STATE OF NEBRASKA — 12-15-2022

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		JLK	CHECKED
		12/15/2022	DATE

TITLE OF SHEET
SPECIFICATIONS - FIRE PROTECTION
EDUCATION CENTER FIRE SERVICE
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ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **FP104**
DRAWING NO. 368 / 80056
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SPECIFICATIONS 21 31 13 DIESEL ENGINE DRIVE FIRE PUMPS

SECTION 213113 - DIESEL ENGINE DRIVE FIRE PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

B. SUMMARY

C. SECTION INCLUDES:

1. VERTICAL TURBINE FIRE PUMPS.
2. FIRE PUMP ACCESSORIES AND SPECIALTIES.

1.2 DESCRIPTION OF WORK

A. PROVIDE ALL REQUIRED LABOR, MATERIALS, EQUIPMENT, TESTING AND SERVICES NECESSARY FOR A COMPLETE AND OPERATIONAL FIRE PUMP FOR THE BUILDING AND SITE AS HEREINAFTER DESCRIBED AND AS SHOWN ON THE ENGINEERING DRAWINGS.

B. WORK SHALL BEGIN AT THE UNDERGROUND FLANGE AND SHALL INCLUDE THE FOLLOWING:

1. DIESEL ENGINE DRIVE FIRE PUMP AND ACCESSORIES.
2. COORDINATION OF WORK AND SCHEDULES WITH OTHER TRADES.
3. IT IS INTENDED THAT THE ENGINEERING DRAWINGS AND SPECIFICATION SHALL DESCRIBE AND PROVIDE FOR A WORKING INSTALLATION COMPLETE IN EVERY DETAIL AND ALL ITEMS NECESSARY FOR SUCH COMPLETE INSTALLATION SHALL BE PROVIDED WHETHER OR NOT SPECIFICALLY MENTIONED HEREIN OR SHOWN ON THE ENGINEERING DRAWINGS.

C. PERFORMANCE REQUIREMENTS

D. SEISMIC PERFORMANCE: FIRE PUMPS SHALL WITHSTAND THE EFFECTS OF EARTHQUAKE MOTIONS DETERMINED ACCORDING TO NFPA 13 AND NFPA 20.

1. THE TERM "WITHSTAND" MEANS "THE UNIT WILL REMAIN IN PLACE WITHOUT SEPARATION OF ANY PARTS FROM THE DEVICE WHEN SUBJECTED TO THE SEISMIC FORCES SPECIFIED."
2. PUMP EQUIPMENT, ACCESSORY, AND SPECIALTY PRESSURE RATING: 175 PSI MINIMUM.

E. SUBMITTALS

F. THE ENGINEERING DRAWINGS HAVE BEEN PREPARED USING AUTOCAD. THESE DOCUMENTS WILL BE MADE AVAILABLE TO THE SUCCESSFUL FIRE SPRINKLER CONTRACTOR IN EITHER ELECTRONIC FORM OR HARD COPY. UTILIZATION OF THESE DOCUMENTS FOR THE DEVELOPMENT OF SHOP DRAWINGS AND SUBMITTALS DOES NOT RELIEVE THE FIRE SPRINKLER CONTRACTOR FROM ANY OF HIS RESPONSIBILITIES REQUIRED HEREIN.

G. SUBMITTALS SHALL BE IN ACCORDANCE WITH REQUIREMENTS OF THE GENERAL CONDITIONS OF THE CONTRACT.

H. PRODUCT LITERATURE: FOR FIRE PUMP EQUIPMENT.

1. LITERATURE SHALL CLEARLY IDENTIFY EXACTLY WHAT COMPONENTS ARE BEING PROVIDED AND SHALL INCLUDE: RATED CAPACITIES, OPERATING CHARACTERISTICS, PERFORMANCE CURVES, ELECTRICAL CHARACTERISTICS AND ACCESSORIES. LITERATURE WHICH IS NOT CLEARLY IDENTIFIED WILL BE REJECTED.
2. SHOP DRAWINGS:
3. DRAWINGS MUST BE COMPREHENSIVE WITH FIRE PUMP, ENGINE, AND ACCESSORIES, COMPLETE IN ALL DETAIL.
4. WIRING DIAGRAMS FOR POWER, SIGNAL AND CONTROL WIRING.
5. FIELD TEST REPORTS AND CERTIFICATES: INDICATE TEST RESULTS FOR COMPLIANCE WITH PERFORMANCE REQUIREMENTS AND AS DESCRIBES IN NFPA 13 AND NFPA 20.

I. FIELD QUALITY CONTROL REPORTS.

J. COMPLETE SHOP DRAWINGS AND INFORMATION ON THE FIRE PUMP, ENGINE, AND ACCESSORIES MUST SE SUBMITTED TO AND ACCEPTED BY THE ENGINEER OF RECORD PRIOR TO PURCHASE AND INSTALLATION.

K. CCI WILL REVIEW THIS SUBMITTAL FOR CONSISTENCY WITH CCI'S CONSTRUCTION DOCUMENTS.

L. AFTER THE SATISFACTORY REVIEW BY CCI, PROVIDE SUBMITTALS TO THE AUTHORITY HAVING JURISDICTION (AHJ) AND THE INSURANCE UNDERWRITER FOR APPROVAL.

M. THE FIRE SPRINKLER CONTRACTOR SHALL BE RESPONSIBLE FOR RESPONDING, IN WRITING, TO ANY COMMENTS FROM THE AHJ OR THE INSURANCE UNDERWRITER WITHIN TEN (10) WORKING DAYS AFTER THE RECEIPT OF THEIR COMMENTS. COPIES OF THE RESPONSE SHALL BE SENT TO THE GENERAL CONTRACTOR AND CCI.

N. PROVIDE RECORD DOCUMENTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL CONDITIONS OF THE CONTRACT.

O. PROVIDE OPERATING AND MAINTENANCE INSTRUCTIONS TO THE OWNER IN ACCORDANCE WITH REQUIREMENTS OF THE GENERAL CONDITIONS OF THE CONTRACT.

P. QUALITY ASSURANCE

Q. INSTALLER QUALIFICATIONS:

1. INSTALLER'S RESPONSIBILITIES INCLUDE PREPARING SHOP DRAWING SUBMITTAL, FABRICATING, AND INSTALLING FIRE PUMP, MOTOR AND ACCESSORIES AND PROVIDING PROFESSIONAL ENGINEERING SERVICES NEEDED TO ASSUME ENGINEERING RESPONSIBILITY.
   a. INSTALLER SHALL BE STATE AND LOCALLY LICENSED.

R. ELECTRICAL COMPONENTS, DEVICES AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.

S. REFERENCES: FIRE PUMP, ENGINE, ACCESSORIES, INSTALLATION AND TESTING SHALL COMPLY WITH ALL APPLICABLE DESIGN STANDARDS:

1. NFPA 20, FIRE PUMP - 2022 EDITION.
2. NFPA 13, FIRE SPRINKLERS - 2022 EDITION.
3. EQUIPMENT AND COMPONENTS SHALL BE UL LISTED FOR FIRE PROTECTION SYSTEMS INSTALLATION.

T. ALL COMPONENTS SHALL BE INSTALLED FREE OF ANY RUST, CORROSION OR VISIBLE DAMAGE. ALL ITEMS NOT COMPLYING WITH THIS REQUIREMENT SHALL BE REPLACED WITHOUT COST TO THE OWNER.

U. COORDINATION

V. COORDINATE SIZES AND LOCATIONS OF CONCRETE BASES WITH GENERAL CONTRACTOR.

W. COORDINATE POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR.

X. REGULATORY REQUIREMENTS

Y. ALL WORK SHALL MEET THE REQUIREMENTS OF SECTION 1.6.

Z. THE FIRE SPRINKLER CONTRACTOR SHALL NOT PURSUE ANY APPROVALS OR INTERPRETATIONS OF CCI'S CONSTRUCTION DOCUMENTS EXCEPT THROUGH CCI.

AA. ANY WORK PERFORMED PRIOR TO THE SATISFACTORY REVIEW BY CCI AND APPROVAL BY THE AUTHORITY HAVING JURISDICTION AND THE INSURANCE UNDERWRITER, WILL BE SOLELY AT THE FIRE SPRINKLER CONTRACTOR'S RISK.

BB. THE FIRE PUMP WILL NOT BE ACCEPTABLE UNTIL FINAL TESTING AND RECEIPT OF THE FIRE PUMP ACCEPTANCE FORM HAS BEEN OBTAINED.

CC. WARRANTY

DD. REPAIR ALL DEFECTIVE WORKMANSHIP OR REPLACE ALL DEFECTIVE MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER. WORKMANSHIP OR EQUIPMENT FOUND TO BE DEFECTIVE DURING THAT PERIOD SHALL BE REPLACED WITHOUT COST TO THE OWNER.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR CENTRIFUGAL FIRE PUMPS

A. UL LISTED.

B. DESCRIPTION: FACTORY ASSEMBLED AND TESTED FIRE PUMP AND DRIVER UNIT.

C. BASE: FABRICATED AND ATTACHED TO FIRE PUMP AND DRIVER UNIT.

D. FINISH: RED PAINT APPLIED TO FACTORY ASSEMBLED AND TESTED UNIT BEFORE SHIPPING.

E. VERTICAL TURBINE FIRE PUMPS

F. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

1. AURORA.
2. FAIRBANKS MORSE.
3. PATTERSON.
4. PEERLESS.
5. ITT A-C.
6. PUMP:
7. CASING: VERTICAL TURBINE WITH CAST IRON WITH FLANGE CONNECTIONS.
8. COLUMN PIPING, LINESHAFT, BOWL ASSEMBLY AND STRAINER SAE 1045 STEEL
9. IMPELLER: BRONZE, STATICALLY AND DYNAMICALLY BALANCED, AND KEYED TO SHAFT.
10. WEAR RINGS: REPLACEABLE BRONZE.
11. MOUNTING: PUMP AND DRIVER SHAFTS ARE HORIZONTAL, WITH PUMP AND DRIVER ON SAME BASE.
12. COUPLING: FLEXIBLE AND CAPABLE OF ABSORBING TORSIONAL VIBRATION AND SHAFT MISALIGNMENT. INCLUDE METAL COUPLING GUARD.

G. DRIVER:

1. TYPE: DIESEL ENGINE.
2. EMERGENCY MANUAL OPERATOR: FACTORY WIRED FOR STARTING AND OPERATING STANDBY ENGINE IN CASE OF MALFUNCTION IN MAIN CONTROLLER OR WIRING.
3. ENGINE COOLING SYSTEM: FACTORY INSTALLED WATER PIPING, VALVES, STRAINER, PRESSURE REGULATOR, HEAT EXCHANGER, COOLANT PUMP, BYPASS PIPING, AND FITTINGS.
4. DUAL BATTERIES: LEAD ACID STORAGE TYPE WITH 100 PERCENT STANDBY RESERVE CAPACITY ON RACK WITH TRICKLE CHARGER.
5. FUEL SYSTEM: COMPLY WITH NFPA 20.
   a. FUEL STORAGE TANK: SIZE INDICATED BUT NOT LESS THAN REQUIRED BY NFPA 20. INCLUDE FLOOR LEGS, DIRECT READING LEVEL GAGE, AND SECONDARY CONTAINMENT TANK WITH CAPACITY AT LEAST EQUAL TO FUEL STORAGE TANK.
   b. EXHAUST SYSTEM: TYPE E OR S, SCHEDULE 40, BLACK STEEL PIPE; WELD TYPE PIPE FITTINGS; STEEL FLANGES; AND NONMETALLIC GASKETS. FABRICATE DOUBLE-WALL, VENTILATED THIMBLE FROM STEEL PIPE.
   c. EXHAUST CONNECTOR: FLEXIBLE TYPE.
   d. EXHAUST SILENCER: CRITICAL TYPE.
6. ENGINE JACKET WATER HEATER: FACTORY INSTALLED ELECTRIC ELEMENTS.

E. CAPACITIES AND CHARACTERISTICS:

1. RATED CAPACITY: 500 GPM.
2. TOTAL RATED HEAD: 100 PSI.
3. INLET FLANGE: CLASS 125
4. OUTLET FLANGE: CLASS 125
5. ENGINE HORSEPOWER: 75.
6. ENGINE SPEED: 1770 RPM.
7. FUEL TANK CAPACITY: 120 GAL.
8. PUMP START/STOP, PRESSURE SWITCH SETTING: PER NFPA 20.

2.2 CONTROLLERS FOR DIESEL DRIVE FIRE PUMPS

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

1. EATON ELECTRICAL INC.; CUTLER-HAMMER BUSINESS UNIT.
2. FIRETROL.
3. JOSLYN CLARK.
4. MASTER CONTROL.
5. METRON.
6. GENERAL REQUIREMENTS FOR CONTROLLERS:
7. LISTED FOR DIESEL ENGINE DRIVER FOR FIRE PUMP SERVICE.
8. COMBINED AUTOMATIC AND NONAUTOMATIC OPERATION.
9. FACTORY ASSEMBLED, WIRED, AND TESTED.
10. METHOD OF STARTING:
11. WATER PRESSURE SWITCH ACTUATED.
    a. WATER PRESSURE ACTUATED SWITCH AND PRESSURE TRANSDUCER WITH INDEPENDENT HIGH AND LOW CALIBRATED ADJUSTMENTS RESPONSIVE TO WATER PRESSURE IN FIRE SUPPRESSION PIPING.
    b. SEVEN DAY SYSTEM PRESSURE RECORDER, ELECTRIC AC DRIVEN, WITH SPRING BACKUP.
    c. PROGRAMMABLE MINIMUM RUN TIME RELAY TO PREVENT SHORT CYCLING.
    d. PROGRAMMABLE TIMER FOR WEEKLY TESTS.
    e. DUAL, REDUNDANT DC-VOLTAGE BATTERY UNITS, WITH AUTOMATIC CHANGEOVER; CHARGERS.
12. EMERGENCY CONTROL: BYPASSES ALL AUTOMATIC CONTROL CIRCUITS DURING MANUAL STARTING AND RUNNING.
13. METHOD OF STOPPING: AUTOMATIC AND NONAUTOMATIC SHUTDOWN AFTER AUTOMATIC STARTING.

B. DOOR MOUNTED OPERATOR INTERFACE AND CONTROLS:

1. MONITOR, DISPLAY, AND CONTROL DEVICES, ALARMS, FUNCTIONS, AND OPERATIONS LISTED IN NFPA 20 AS REQUIRED FOR DRIVERS AND CONTROLLER TYPES USED.
2. BATTERY CHARGER SYSTEM:
3. BUILT-IN, INDEPENDENT, DUAL BATTERY CHARGERS WITH AUTOMATIC CHANGEOVER;

2.3 FIRE PUMP ACCESSORIES AND SPECIALTIES

A. AUTOMATIC AIR RELEASE VALVES: COMPLY WITH NFPA 20 FOR INSTALLATION IN FIRE PUMP CASING.

B. CIRCULATION RELIEF VALVES: BRASS, SPRING LOADED; FOR INSTALLATION IN PUMP DISCHARGE PIPING.

C. INLET FITTING: ECCENTRIC TAPERED REDUCER AT PUMP SUCTION INLET.

D. OUTLET FITTING: CONCENTRIC TAPERED REDUCER AT PUMP DISCHARGE OUTLET.

E. TEST HEADER:

1. EXPOSED STANDARD WALL MOUNT TYPE TEST HEADER.
2. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   a. CROKER.
   b. ELKHART BRASS.
   c. POTTER ROEMER.
   d. PRESSURE RATING: 175 PSI MINIMUM.
3. BODY MATERIAL: CORROSION RESISTANT METAL.
4. INLETS: BRASS WITH THREADS ACCORDING TO NFPA 1963 AND MATCHING LOCAL FIRE DEPARTMENT SIZES AND THREADS.
5. FINISH POLISHED CHROME PLATED.
6. CAPS: LUGGED TYPE WITH GASKET AND CHAIN OF SAME FINISH.
7. NUMBER OF OUTLETS: TWO.
8. ESCUTCHEON PLATE MARKINGS: SIMILAR TO "PUMP TEST CONNECTION" OF SAME FINISH.
9. INLET SIZE: NPS 4
10. SEVEN (7) DAY PRESSURE RECORDING DEVICE.

PART 3 - EXECUTION

3.1 COORDINATION WITH OTHER TRADES

A. COORDINATE CLOSELY WITH ALL OTHER TRADES TO EXPEDITE CONSTRUCTION AND AVOID INTERFERENCE.

B. EXAMINATION

C. EXAMINE EQUIPMENT BASES AND ANCHORAGE PROVISIONS, WITH INSTALLER PRESENT, FOR COMPLIANCE WITH REQUIREMENTS AND FOR CONDITIONS AFFECTING PERFORMANCE OF FIRE PUMPS.

D. EXAMINE ROUGH-IN FOR FIRE SUPPRESSION PIPING SYSTEMS TO VERIFY ACTUAL LOCATIONS OF PIPING CONNECTIONS BEFORE FIRE PUMP INSTALLATION.

E. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

F. INSTALLATION

G. FIRE PUMP INSTALLATION STANDARDS: COMPLY WITH NFPA 20 FOR INSTALLATION OF FIRE PUMPS, RELIEF VALVES, AND RELATED COMPONENTS.

H. EQUIPMENT MOUNTING: INSTALL FIRE PUMPS ON CONCRETE BASES. COMPLY WITH REQUIREMENTS FOR CONCRETE BASES SPECIFIED IN DIVISION 03.

1. INSTALL DOWEL RODS TO CONNECT CONCRETE BASE TO CONCRETE FLOOR. UNLESS OTHERWISE INDICATED, INSTALL DOWEL RODS ON 18 INCH CENTERS AROUND THE FULL PERIMETER OF CONCRETE BASE.
2. FOR SUPPORTED EQUIPMENT, INSTALL EPOXY COATED ANCHOR BOLTS THAT EXTEND THROUGH CONCRETE BASE AND ANCHOR INTO STRUCTURAL CONCRETE FLOOR.
3. PLACE AND SECURE ANCHORAGE DEVICES. USE SETTING DRAWINGS, TEMPLATES, DIAGRAMS, INSTRUCTIONS, AND DIRECTIONS FURNISHED WITH ITEMS TO BE EMBEDDED.
4. INSTALL ANCHOR BOLTS TO ELEVATIONS REQUIRED FOR PROPER ATTACHMENT TO SUPPORTED EQUIPMENT.
5. SUPPORT PIPING AND PUMPS SEPARATELY SO WEIGHT OF PIPING DOES NOT REST ON PUMPS.

I. INSTALL PRESSURE GAGES ON FIRE PUMP SUCTION AND DISCHARGE FLANGE PRESSURE GAGE TAPPINGS. COMPLY WITH REQUIREMENTS FOR PRESSURE GAGES SPECIFIED IN DIVISION 21 SECTION "FIRE SPRINKLER/STANDPIPE SYSTEMS."

J. INSTALL PIPING HANGERS AND SUPPORTS, ANCHORS, VALVES, GAGES, AND EQUIPMENT SUPPORTS ACCORDING TO NFPA 20.

F. ELECTRICAL WIRING: INSTALL ELECTRICAL DEVICES FURNISHED BY EQUIPMENT MANUFACTURERS BUT NOT FACTORY MOUNTED. FURNISH COPIES OF MANUFACTURERS' WIRING DIAGRAM SUBMITTALS TO ELECTRICAL INSTALLER.

G. INSTALL FUEL SYSTEM WITH FUEL LEVEL MONITOR AT REMOTE FILL STATION ACCORDING TO NFPA 20.

H. INSTALL WATER SUPPLY AND DRAIN PIPING FOR DIESEL ENGINE HEAT EXCHANGERS. EXTEND DRAIN PIPING FROM HEAT EXCHANGERS TO POINT OF DISPOSAL.

I. INSTALL EXHAUST SYSTEM PIPING FOR DIESEL ENGINES. EXTEND TO POINT OF TERMINATION OUTSIDE STRUCTURE (COORDINATE TERMINATION POINT WITH OWNER AND LOCAL CODES). INSTALL PIPE AND FITTINGS WITH WELDED JOINTS; INSTALL COMPONENTS HAVING FLANGED CONNECTIONS WITH GASKETED JOINTS.

J. INSTALL CONDENSATE DRAIN PIPING FOR DIESEL ENGINE EXHAUST SYSTEM. EXTEND DRAIN PIPING FROM LOW POINTS OF EXHAUST SYSTEM TO CONDENSATE TRAPS AND TO POINT OF DISPOSAL.

3.2 ALIGNMENT

A. ALIGN SPLIT CASE PUMP AND DRIVER SHAFTS AFTER COMPLETE UNIT HAS BEEN LEVELED ON CONCRETE BASE, GROUT HAS SET, AND ANCHOR BOLTS HAVE BEEN TIGHTENED.

B. AFTER ALIGNMENT IS CORRECT, TIGHTEN ANCHOR BOLTS EVENLY. FILL BASEPLATE COMPLETELY WITH GROUT. WITH METAL BLOCKS AND SHIMS OR WEDGES IN PLACE. TIGHTEN ANCHOR BOLTS AFTER GROUT HAS HARDENED. CHECK ALIGNMENT AND MAKE REQUIRED CORRECTIONS.

C. ALIGN PIPING CONNECTIONS.

D. CONNECTIONS

E. COMPLY WITH REQUIREMENTS FOR PIPING AND VALVES SPECIFIED IN DIVISION 21 SECTION "FIRE SPRINKLER SYSTEMS." DRAWINGS INDICATE GENERAL ARRANGEMENT OF PIPING, FITTINGS, AND SPECIALTIES.

F. INSTALL PIPING ADJACENT TO PUMPS AND EQUIPMENT TO ALLOW SERVICE AND MAINTENANCE.

G. CONNECT FIRE PUMPS TO THEIR CONTROLLERS.

H. IDENTIFICATION

I. IDENTIFY SYSTEM COMPONENTS. COMPLY WITH REQUIREMENTS FOR FIRE PUMP MARKING ACCORDING TO NFPA 20 AND THE LOCAL AHJS.

J. FIELD QUALITY CONTROL

K. TEST EACH FIRE PUMP WITH ITS CONTROLLER AS A UNIT. COMPLY WITH REQUIREMENTS FOR ELECTRIC DRIVER FIRE PUMP CONTROLLERS SPECIFIED WITHIN."

L. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, TEST, AND ADJUST COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS.

M. PERFORM TESTS AND INSPECTIONS.

1. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING.
2. TESTS AND INSPECTIONS:
3. AFTER INSTALLING COMPONENTS, ASSEMBLIES, AND EQUIPMENT INCLUDING CONTROLLER, TEST FOR COMPLIANCE WITH REQUIREMENTS.
4. TEST ACCORDING TO NFPA 20 FOR ACCEPTANCE AND PERFORMANCE TESTING.
5. LEAK TEST: AFTER INSTALLATION, CHARGE SYSTEM AND TEST FOR LEAKS. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST.
6. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.
7. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.
8. COMPONENTS, ASSEMBLIES, AND EQUIPMENT WILL BE CONSIDERED DEFECTIVE IF THEY DO NOT PASS TESTS AND INSPECTIONS.

N. PREPARE TEST AND INSPECTION REPORTS. USE FORM RECOMMENDED BY NFPA 20 TO DOCUMENT RESULTS.

O. FURNISH FIRE HOSES IN NUMBER, SIZE, AND LENGTH REQUIRED TO REACH STORM DRAIN OR OTHER ACCEPTABLE LOCATION TO DISPOSE OF FIRE PUMP TEST WATER. HOSES ARE FOR TESTS ONLY AND DO NOT CONVEY TO OWNER.

P. STARTUP SERVICE

Q. PERFORM STARTUP SERVICE.

1. COMPLETE INSTALLATION AND STARTUP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.

3.3 DEMONSTRATION

A. TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN FIRE PUMPS.

END OF SECTION 213113

100% CD

WILLIAM B. SMITH E-14915 PROFESSIONAL FIRE PROTECTION ENGINEER STATE OF NEBRASKA
12-15-2022

ENGINEER OF RECORD:
WILLIAM B. SMITH, PE
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JLK	DESIGNED
JLK	DRAWN
JLK	CHECKED
12/15/2022	DATE

TITLE OF SHEET
SPECIFICATIONS - FIRE PROTECTION
EDUCATION CENTER FIRE SERVICE
HOMESTEAD NATIONAL MONUMENT OF AMERICA
8523 NE-4
BEATRICE, NE 68310

ARCH/ENG PROJ # 07310.024	DRAWING NO. 368 80056
SUB SHEET NO. **FP105**	PMIS / PKG. NO. **207662**
	SHEET **24** OF **31**

SYMBOL LEGEND

LIGHTING

- LUMINAIRE
- WALL MOUNTED LUMINAIRE
- WALL MOUNTED LUMINAIRE
- RECESSED LUMINAIRE
- SURFACE MOUNTED LUMINAIRE
- PENDANT MOUNTED LUMINAIRE
- STRIP / INDUSTRIAL LUMINAIRE
- WALL MOUNTED STRIP LUMINAIRE
- LUMINAIRE - NIGHT LIGHTING
- LUMINAIRE - EMERGENCY SYSTEM
- WALL WASH LUMINAIRE
- EMERGENCY BATTERY PACK LUMINAIRE
- REMOTE EMERGENCY HEAD
- TRACK LIGHTING
- EXIT LIGHT - WALL MOUNT WITH DIRECTIONAL ARROWS AS INDICATED, FILLED-IN QUARTERS INDICATE ILLUMINATION SIDES
- EXIT LIGHT - CEILING OR PENDANT MOUNT WITH DIRECTIONAL ARROWS AS INDICATED, FILLED-IN QUARTERS INDICATE ILLUMINATION SIDES
- EMERGENCY EXIT LIGHT COMBO
- POLE MOUNTED SITE LUMINAIRE
- CEILING FAN
- PHOTOCELL
- OCCUPANCY SENSOR
- ROOM CONTROLLER
- POWER PACK

WIRING DEVICES - SWITCHES

- S SINGLE POLE SWITCH
- S_2 TWO POLE SWITCH
- S_3 THREE-WAY SWITCH
- S_4 FOUR-WAY SWITCH
- S_D DIMMER SWITCH
- S_K KEY OPERATED SWITCH
- S_P SINGLE POLE SWITCH WITH PILOT
- S_{TE} THERMAL ELEMENT SWITCH
- S_T TIMER SWITCH
- S_{FT} FUSIBLE SWITCH (FUSETRON)
- S_X LOW VOLTAGE MOMENTARY CONTACT SWITCH

WIRING DEVICES - RECEPTACLES

- SIMPLEX RECEPTACLE
- DUPLEX RECEPTACLE
- QUADRUPLEX RECEPTACLE
- EMERGENCY RECEPTACLE
- CONTROLLED RECEPTACLE
- SPECIAL PURPOSE RECEPTACLE, NEMA CONFIGURATION NOTED
- PLUG-IN STRIP - LENGTH AND QUANTITY OF OUTLETS AS SHOWN
- POWER POLE
- DROP CORD RECEPTACLE ASSEMBLY

CONDUIT AND BOXES

- JUNCTION BOX - CEILING MOUNT
- JUNCTION BOX - WALL MOUNT
- FB FLOOR BOX
- FP FLOOR POKE-THROUGH DEVICE
- WB WALL AV BOX
- CONDUIT DOWN
- CONDUIT UP
- INDICATES BUSHED CONDUIT

POWER EQUIPMENT

- SAFETY SWITCH
- COMBINATION STARTER SAFETY SWITCH
- R RELAY - CONTROL AS NOTED
- M MOTOR CONNECTION
- PUSHBUTTON STATION
- M METER SOCKET

PANELS AND CABINETS

- BRANCH CIRCUIT PANEL
- DISTRIBUTION PANEL
- SWITCHBOARD, SWITCHGEAR, MCC
- EQUIPMENT OR TERMINAL CABINET
- T DRY TYPE TRANSFORMER

FIRE ALARM SYSTEM

- F MANUAL PULL STATION
- FS STROBE
- F HORN
- F HORN STROBE
- FS SPEAKER
- FS SPEAKER STROBE
- DH MAGNETIC DOOR HOLDER
- S SMOKE DETECTOR
- H HEAT DETECTOR
- S DUCT SMOKE DETECTOR
- FS FLOW SWITCH
- TS SPRINKLER TAMPER SWITCH
- PS POST INDICATING VALVE SWITCH
- REMOTE INDICATOR LIGHT

VOICE AND DATA

- VOICE OUTLET
- DATA OUTLET
- VOICE/DATA OUTLET
- WIRELESS ACCESS POINT

SOUND, TELEVISION, AND SECURITY

- SPEAKER
- HORN (PA, PUBLIC ADDRESS)
- IC INTERCOM SPEAKER STATION
- SVC VOLUME CONTROL STATION
- M MICROPHONE JACK
- TV TELEVISION OUTLET
- CCTV CAMERA
- MS MOTION SENSOR

NURSE CALL

- N BEDSIDE STATION
- N_2 DOUBLE BED BEDSIDE STATION
- N_E EMERGENCY PULL STATION
- N_S STAFF STATION
- N_D DUTY STATION
- N_P PILLOW SPEAKER
- N DOME LIGHT
- N_M MASTER STATION

POWER DISTRIBUTION ONE LINE

- G EMERGENCY GENERATOR
- FUSE
- DISCONNECT SWITCH
- FUSED DISCONNECT SWITCH
- DRAW OUT VACUUM CIRCUIT BREAKER
- PLUG-IN OR DRAWOUT CONNECTOR
- CIRCUIT BREAKER
- THERMAL OVERLOAD RELAY
- K1 KIRK KEY INTERLOCK
- LIGHTNING SURGE ARRESTOR
- A AMMETER
- V VOLTMETER
- TRANSFORMER
- X:Y CURRENT TRANSFORMER - (RATIO)

SYMBOL NOTES:

"C" INDICATES CEILING MOUNTED
"F" INDICATES FLOOR MOUNTED
"S" INDICATES SURFACE MOUNTED
"G" INDICATES GROUND FAULT INTERRUPTING
"IG" INDICATES ISOLATED GROUND
"AC" INDICATES MOUNTING 6" ABOVE COUNTERTOP OR BACKSPLASH
"WP" INDICATES WEATHERPROOF
"XP" INDICATES EXPLOSION PROOF
"U" INDICATES USB CHARGER
"R" INDICATES EXISTING DEVICE REMOVED AND RELOCATED
LOWER CASE LETTER BY SWITCHES AND FIXTURES INDICATE ASSOCIATED UNIT FOR SWITCHING

ABBREVIATIONS

ACSR	ALUMINUM CONDUCTOR STEEL REINFORCED	MAX	MAXIMUM
AFF	ABOVE FINISH FLOOR	MECH	MECHANICAL
AIC	AMPS INTERRUPTING CAPACITY (SYM RMS)	MCCB	MOLDED CASE CIRCUIT BREAKER
AL	ALUMINUM	MFR	MANUFACTURER
ALT	ALTERNATE	MG	MOTOR GENERATOR
AMP	AMPERE	MH	MANHOLE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	MIN	MINIMUM
APPROX	APPROXIMATE	MISC	MISCELLANEOUS
AUTO	AUTOMATIC	N	NORTH
AVG	AVERAGE	NC	NORMALLY CLOSED
AWG	GAUGE	NEC	NATIONAL ELECTRICAL CODE
L	ANGLE	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
BKR	BREAKER	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
C OR CL	CENTER LINE		
C OR CND	CONDUIT (ELECTRICAL SHEETS)	NIC	NOT IN CONTRACT
CKT	CIRCUIT	NO	NORMALLY OPEN
CLG	CEILING	NO	NUMBER
COL	COLUMN	NTS	NOT TO SCALE
CONC	CONCRETE		
CONF	CONFERENCE	OCPD	OVERCURRENT PROTECTIVE DEVICE
CPT	CONTROL POWER TRANSFORMER	OD	OUTSIDE DIAMETER
CUH	CABINET UNIT HEATER	OH	OVERHEAD
		OPNG	OPENING
DC	DIRECT CURRENT		
DEG	DEGREE	PH	PHASE
DEMO	DEMOLITION	PIV	POST INDICATING VALVE
DIA	DIAMETER	PNL	PANEL
DIM	DIMENSION	PSI	POUNDS PER SQUARE IN.
DISC	DISCONNECT		
DIST	DISTRIBUTION	QTY	QUANTITY
DN	DOWN		
DWG	DRAWING	REC	RECEPTACLE
		REFR	REFRIGERATOR
E	EAST	REINF	REINFORCEMENT
EA	EACH	REQD	REQUIRED
EL OR ELEV	ELEVATION - GRADE OR BUILDING	RFI	RADIO FREQUENCY INTERFERENCE
ELEC	ELECTRIC OR ELECTRICAL	S	SOUTH
ELEV	ELEVATOR	SCHED	SCHEDULE
EMD	ESTIMATED MAXIMUM DEMAND	SCCR	SHORT CIRCUIT CURRENT RATING
EMI	ELECTROMAGNETIC INTERFERENCE	SF	SQUARE FOOT (FEET)
ENCL	ENCLOSURE	SPD	SURGE PROTECTIVE DEVICE
EQUIP	EQUIPMENT	SPDT	SINGLE POLE, DOUBLE THROW
EST	ESTIMATE	SPEC	SPECIFICATIONS
EWC	ELECTRIC WATER COOLER	SPKR	SPEAKER
EXIST	EXISTING	SQ	SQUARE
EXP	EXPOSED	STD	STANDARD
EXT	EXTERIOR	STL	STEEL
		SW	SWITCH
FA	FIRE ALARM	SWBD	SWITCH BOARD
FAAP	FIRE ALARM ANNUNCIATOR PANEL	SYM	SYMMETRICAL
FACP	FIRE ALARM CONTROL PANEL	TEL	TELEPHONE
FAEP	FIRE ALARM EXTENDER PANEL	TEMP	TEMPERATURE
FLA	FULL LOAD AMPS	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
FLEX	FLEXIBLE	TYP	TYPICAL
FLUOR	FLUORESCENT	UG	UNDERGROUND
		UH	UNIT HEATER
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	UL	UNDERWRITERS LABORATORIES
GFI	GROUND FAULT CIRCUIT INTERRUPTER	UPS	UNINTERRUPTIBLE POWER SYSTEM
HP	HORSE POWER	VFD	VARIABLE FREQUENCY DRIVE
HR	HOUR	VFC	VARIABLE FREQUENCY CONTROLLER
HTG	HEATING		
HTR	HEATER	W	WEST
HZ	HERTZ	W/	WITH
ID	INSIDE DIAMETER	W/O	WITHOUT
IES	ILLUMINATING ENGINEERING SOCIETY	WHM	WATTHOUR METER
IN	INCH	WT	WEIGHT
INSUL	INSULATION	XFMR	TRANSFORMER
INT	INTERIOR		
KCMIL KCM	KILO CIRCULAR MIL		
KV	KILOVOLTS		
KVA	KILOVOLT AMPERES		
KVAR	KILOVOLT AMPERES REACTIVE		
KW	KILOWATT		
LBS	POUNDS		
LRA	LOCKED ROTOR AMPS		
LTG	LIGHTING		

REFERENCE LEGEND

ROOM NUMBER
ROOM NAME — ROOM NAME DESIGNATION
101 — ROOM NUMBER DESIGNATION
150 SF — ROOM AREA DESIGNATION

EQUIPMENT NUMBER
XXXX — EQUIPMENT NUMBER

REFERENCE DEMOLITION NOTE
DX — DEMOLITION DESIGNATION

REFERENCE NOTE
X — REFERENCE DESIGNATION

PLAN DETAIL
X — DETAIL NUMBER
XX-XX — SHEET NUMBER

SECTION/ DETAIL
X — SECTION/DETAIL NUMBER
XX-XX — SHEET NUMBER
SIM
INDICATES DIRECTION OF VIEW

NEW COLUMN
X — LETTER INDICATES NEW COLUMN LINE

EXISTING COLUMN
X — LETTER INDICATES EXISTING COLUMN LINE

MATCHLINE
AREA A
AREA B

LEVEL
NAME
ELEVATION
LEVEL CALLOUT DESIGNATION
ELEVATION DESIGNATION

TITLE MARKER
GRAPHIC AREA FOR DRAWING
1 VIEW NAME
SCALE: 1/8" = 1'-0"
DETAIL NUMBER
TITLE
SCALE OF THE DRAWING

NORTH ARROW
NORTH
PLAN NORTH
TRUE NORTH

GENERAL NOTES

A. DRAWINGS DO NOT SHOW TOTAL NUMBER OF CONDUCTORS FOR CIRCUITS REQUIRED. PROVIDE THE NUMBER OF CONDUCTORS NEEDED TO COMPLETE INSTALLATION OF SPECIFIC EQUIPMENT FURNISHED. A GREEN GROUND CONDUCTOR, SIZED PER NEC, SHALL ALSO BE INCLUDED IN EACH CIRCUIT. ADJUST CONDUCTOR SIZES AS NEEDED TO LIMIT VOLTAGE DROP TO LEVELS RECOMMENDED BY NEC. THE CONTRACTOR SHALL ALSO COORDINATE INSPECTIONS WITH THE AHJ.

B. ALL CIRCUITS SHALL HAVE SEPARATE NEUTRAL WIRES BUT CAN SHARE AN INSULATED GREEN GROUND WIRE IN MINIMUM 3/4" EMT CONDUIT.

C. NO BOXES SHALL BE MOUNTED BACK TO BACK.

D. CONTRACTOR TO SEAL ALL PENETRATIONS THROUGH FIRE OR FIRE/SMOKE RATED WALLS AND FLOORS.

E. ALL RACEWAYS SHALL BE SEALED AS REQUIRED BY NEC AND NFPA.

F. CABLE AND CONDUIT SHALL NOT INTERFERE WITH EQUIPMENT ACCESS.

G. ALL CABLING ABOVE CEILING SHALL BE PROPERLY SUPPORTED (NOT FROM CEILING SYSTEM).

H. CONTRACTOR SHALL COORDINATE FINAL PANEL DIRECTORIES WITH OWNER.

GEN. LIGHTING NOTES

A. COORDINATE LOCATION OF SWITCHES AND MOUNTING HEIGHTS WITH EQUIPMENT LAYOUTS PRIOR TO ROUGH-IN.

B. ALL AREAS SHALL BE MANUAL-ON / AUTOMATIC-OFF UNLESS NOTED OTHERWISE.

C. THE LIGHTING SUBMITTAL SHALL BE PREPARED AND SUBMITTED BY AN AUTHORIZED FACTORY REPRESENTATIVE OR THE SUBMITTAL SHALL BE REJECTED.

GEN. POWER & AUX SYSTEMS NOTES

A. ALL DEVICES SHOWN SHALL BE MOUNTED AT 18" A.F.F. UNLESS INDICATED OTHERWISE.

B. EACH LOW VOLTAGE CABLE SHALL HAVE INDIVIDUAL RUN BACK TO TERMINATION POINT. LEAVE 10' OF COILED CABLE AT TERMINATION POINT LOCATION. DATA CABLING SHALL BE (1) CAT 6A TO EACH DEVICE.

C. ALL AUXILIARY CABLE ABOVE CEILING SHALL BE PLENUM RATED WHERE REQUIRED.

D. PROVIDE 120 VOLT POWER CIRCUIT(S) FOR AUXILIARY SYSTEMS AS REQUIRED FOR COMPLETE AND OPERATIONAL SYSTEMS.

E. PROVIDE NEW FIRE ALARM DEVICES AT LOCATIONS SHOWN, AND CONNECT TO EXISTING FIRE ALARM SYSTEM. ALL NEW FIRE ALARM DEVICES MUST BE UL LISTED AND LABELED FOR USE WITH THE EXISTING FIRE ALARM PANEL AND APPROVED BY THE FIRE ALARM PANEL MANUFACTURER. COORDINATE DEVICE MODEL AND INSTALLATION WITH EXISTING CONDITIONS. VERIFY FIRE ALARM HORN/STROBE SPACING REQUIREMENTS WITH MANUFACTURER AND NFPA REQUIREMENTS, AND ADD ADDITIONAL HORN/STROBE UNITS AS NEEDED.

REF. NOTES (X)

PROJECT ELECTRICAL REFERENCED NOTES

1 PROVIDE UNDERGROUND CONDUIT TO 'UTILITY BUILDING NO. 2' FOR NEW LOAD CENTER CONNECTION. FIELD VERIFY EXISTING PANEL CAPACITY AND ADJUST CIRCUIT BREAKER POSITIONING TO ACCOMMODATE A NEW 2-POLE CIRCUIT BREAKER. SEE SHEET E501 FOR ADDITIONAL INFORMATION.

2 UNDERGROUND CONDUIT PROVIDED BY OTHERS. FIELD VERIFY EXISTING FIRE ALARM PANEL CAPACITY AND COMPATIBILITY TO NEW FIRE PUMP/FIRE PUMP CONTROLLER.

3 PENDANT MOUNT LUMINAIRE AT +8'-6" AFF TO THE BOTTOM OF THE LUMINAIRE.

4 PROVIDE GREENHECK SE1-8-426-D EXHAUST FAN, WITH 120V CONNECTION AND 1/40 HP MOTOR. FAN TO HAVE BACKDRAFT DAMPER AND WEATHERHOOD. MOUNT FAN AT MINIMUM +60" AFF.

5 12" X 18" RUSKIN ELF6375DX FINISH TO MATCH EXTERIOR COLOR OF BUILDING. PROVIDE MOTORIZED DAMPER ON BACK OF LOUVER AND INTERLOCK WITH EXHAUST FAN AND THERMOSTAT TO OPEN WHEN EXHAUST FAN IS ENERGIZED. MOUNT AT +48" AFF.

7 ALL ELECTRICAL EQUIPMENT, BOXES, AND CONDUIT TO BE SURFACE MOUNTED.

ELECTRICAL SHEET LIST

PROFESSIONAL ELECTRICAL ENGINEER — JONATHAN EDWARD FANT — E-15743 — STATE OF NEBRASKA
12/15/2022

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DATE	INITIAL

PREPARED	
DJL	DESIGNED
DJL	DRAWN
JEF	CHECKED
12/15/2022	DATE

TITLE OF SHEET
ELECTRICAL INFO SHEET
NPS -Home Education Center Fire Suppression
Homestead National Historic Park
8523 NE-4
Beatrice, NE 68310

ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **E 00**
DRAWING NO. 368 / 80056
PMIS **207662**
SHEET **25** OF **31**

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SECTION 260500

COMMON RESULTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Sections Included: Refer to Table of Contents.

1.3 REFERENCES

A. National Electrical Contractors Association (NECA).

B. National Electrical Manufacturer's Association (NEMA).

C. National Electrical Testing Association (NETA).

D. National Fire Protection Association (NFPA).

1. NFPA 70 – National Electrical Code.

1.4 DEFINITIONS

A. See info sheet.

1.5 ACTION SUBMITTALS

A. Product Data: For each of the following products.

1. Lighting Control Devices.
2. Panelboards and Circuit Breakers.
3. Wiring Devices.
4. Enclosed Switches.
5. Surge Protection.
6. Lighting.

B. Shop Drawings: For each of the following products.

1. Lighting Control Devices.
2. Panelboards and Circuit Breakers.
3. Enclosed Switches.
4. Surge Protection.

C. Submittals shall be grouped and submitted by spec section or they will be rejected.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each of the following products.

1. Lighting Control Devices.
2. Panelboards and Circuit Breakers.
3. Wiring Devices.
4. Fuses.
5. Enclosed Switches.
6. Surge Protection.
7. Lighting.

B. A single submittal containing all O&M data submitted under Section 260500 "Common Results" preferred.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lighting Control Relays: Equal to 10 percent of amount installed for each size indicated, but no fewer than 1.
2. Keys: Two spares for each type of panelboard cabinet lock.
3. Circuit Breakers Including GFCI Types: Two spares for each panelboard.
4. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
5. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.
6. Control Power Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.
7. Indicating Lights: Two of each type and color installed.
8. Auxiliary Contacts: Furnish one spare(s) for each size and type of magnetic controller installed.
9. Power Contacts: Furnish three spares for each size and type of magnetic contactor installed.
10. Output Circuit Breakers: One for every 10 of each type and rating, but no fewer than 1 of each type each inverter.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store equipment indoors in clean, dry space with uniform temperature to prevent condensation. Protect controllers from exposure to dirt, fumes, water, corrosive substances, and physical damage.

1.9 FIELD CONDITIONS

A. Environmental Limitations:

1. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
   a. Ambient Temperature: Not exceeding 23 deg F to plus 104 deg F.
   b. Altitude: Not exceeding 6600 feet.

B. Where ambient temperature to which fuses are directly exposed is less than 40 deg F or more than 100 deg F, apply manufacturer's ambient temperature adjustment factors to fuse ratings.

C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Owner no fewer than seven days in advance of proposed interruption of electric service.
2. Do not proceed with interruption of electric service without Owner's written permission.
3. Comply with NFPA 70E.

1.10 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace the following products that fail in materials or workmanship within a period of one year from date of substantial completion.

1. Panelboards and Circuit Breakers.
2. Enclosed Switches.

B. Special Warranty: Manufacturer's standard form in which Manufacturer agrees to repair or replace the following products that fail in materials or workmanship within specified warranty period from date of Final Completion. Full warranty shall apply for the entire warranty period.

1. Lighting Control Devices: Two years.
2. Surge Protection: Five years.
3. Lighting: Five years.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Source Limitations: Obtain electrical gear, components, and accessories, within same product category, from single manufacturer.

B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

D. Comply with NFPA 70.

2.2 EQUIPMENT MANUFACTURERS

A. Applies to the following products:

1. Panelboards and Circuit Breakers.
2. Enclosed Switches.
3. Surge Protection.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB/GE.
2. Eaton.
3. Siemens.
4. Square D.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with the following standards for application and installation requirements, except where requirements on drawings or specifications are stricter:

1. NECA 1.
2. NEMA 250.
3. NFPA 70.

3.2 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

A. Provide enclosures at installed locations with the following environmental ratings.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 3R.
3. Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

3.3 FIELD QUALITY CONTROL

A. Perform standard NETA ATS tests and inspections for the following products:

1. Low-Voltage Power and Control Conductors and Cables.
2. Grounding and Bonding.
3. Panelboards.
4. Circuit Breakers (including GFCI).
5. Enclosed Switches.
6. Surge Protection.

B. Perform optional NETA ATS tests and inspections for the following products:

1. Low-Voltage Power and Control Conductors and Cables.
2. Panelboards.
3. Circuit Breakers (including GFCI).

C. Perform the following tests and inspections for wiring devices:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault-current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

D. Perform the following tests and inspections for lighting:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

E. Products will be considered defective if they do not pass tests and inspections.

F. Prepare test and inspection reports to record the following:

1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

3.4 STARTUP SERVICE

A. Complete startup checks according to manufacturer's written instructions for the following products:

1. Surge Protection.
2. Lighting.
   a. Charge emergency power units and batteries minimum of one hour and depress switch to conduct short-duration test.
   b. Charge emergency power units and batteries minimum of 24 hours and conduct one-hour discharge test.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain the following products:

1. Surge Protection.

3.6 SIGNS

A. Warning signs: Baked-Enamel Signs.

B. Warning signs shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

3.7 LABELS

1. Equipment Labels: Laminated acrylic sign.
2. Equipment to Be Labeled:
   a. Panelboards.
   b. Enclosures and electrical cabinets.

END OF SECTION

SECTION 260519

LOW-VOLTAGE POWER AND CONTROL CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.
2. Fire-alarm wire and cable.
3. Connectors, splices, and terminations rated 600 V and less.

PART2 - PRODUCTS

2.1 - COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Standards:

1. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors. Minimum sizes as follows:

1. Power Circuits: No. 12 AWG.
2. Class 1 remote-control and signal circuits; No 14 AWG.
3. Class 2 low-energy, remote-control, and signal circuits; No. 16 AWG.
4. Class 3 low-energy, remote-control, alarm, and signal circuits; No 12 AWG.

D. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

E. VFD Cable: Southwire 45440 or approved by Belden.

2.2 FIRE-ALARM WIRE AND CABLE

A. Signaling Line Circuits: Twisted, shielded pair, not less than size as recommended by system manufacturer.

B. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.

1. Low-Voltage Circuits: No. 16 AWG, minimum, in pathway.
2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.

2.3 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated.

B. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper.
2. Type: Two hole with long barrels.
3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Copper: Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger. No. 12 AWG minimum.

B. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type XHHW-2, single conductors in raceway.

B. Feeders and Branch Circuits: Type THHN/THWN-2, single conductors in raceway.

C. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

D. Fire-alarm circuits and equipment control wiring associated with fire-alarm system shall be installed in a dedicated pathway system. This system shall not be used for any other wire or cable.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

B. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

3.4 INSTALLATION OF FIRE-ALARM WIRING

A. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with fire-alarm system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

B. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes; cabinets; or equipment enclosures where circuit connections are made.

C. Color-Coding: Color-code fire-alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire-alarm system junction boxes and covers red.

3.5 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

END OF SECTION

SECTION 260526

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes grounding and bonding systems and equipment.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Comply with UL 467 for grounding and bonding materials and equipment

2.2 CONDUCTORS

A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

C. Grounding Bus: As shown on drawings.

2.3 CONNECTORS

A. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

B. Bus-Bar Connectors: Compression type, copper, long-barrel, two-bolt connection to ground bus bar.

C. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.

D. Cable-to-Cable Connectors: Compression type, copper or copper alloy.

E. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.

F. Conduit Hubs: Mechanical type, terminal with threaded hub.

G. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.

H. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.

I Water Pipe Clamps:

1. Mechanical type, two pieces with stainless-steel bolts.
   a. Material: Bronze.
   b. Listed for direct burial.

2.4 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 5/8 by 96 inches.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
2. Use exothermic welds for all below-grade connections.
3. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

C. Bonding Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

D. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.

E. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

END OF SECTION

SECTION 260529

HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel slotted support systems.
2. Conduit and cable support devices.
3. Support for conductors in vertical conduit.
4. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.

1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
2. Material for Channel, Fittings, and Accessories: Galvanized steel.
3. Channel Width: 1-5/8 inches.

B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.

D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F 3125/F 3125M,Grade A325.
5. Toggle Bolts: All-steel springhead type.
6. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

A. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT and GRC as required by NFPA 70. Minimum rod size shall be 1/2 inch in diameter.

B. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

A. Raceway Support Methods: In addition to methods described in NECA 1, EMT and GRC may be supported by openings through structure members, according to NFPA 70.

B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 260533

ABOVEGROUND RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Boxes, enclosures, and cabinets.

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JONATHAN EDWARD FANT — E-15743 — PROFESSIONAL ELECTRICAL ENGINEER — STATE OF NEBRASKA

12/15/2022

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TITLE OF SHEET
ELECTRICAL SPECIFICATIONS
NPS -Home Education Center Fire Suppression
Homestead National Historic Park
8523 NE-4
Beatrice, NE 68310

ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **E 01**
DRAWING NO. 368 / 80056
PMIS **207662**
SHEET **26** OF **31**

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

1. GRC: Comply with ANSI C80.1 and UL 6.
2. EMT: Comply with ANSI C80.3 and UL 797.
3. FMC: Comply with UL 1; zinc-coated steel.
4. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:

1. Comply with NEMA FB 1 and UL 514B.
2. Fittings, General: Listed and labeled for type of conduit, location, and use.
3. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
4. Fittings for EMT:
   a. Material: Steel.
   b. Type: Setscrew or compression.

C. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

D. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.

E. Paddle Fan Outlet Boxes: Nonadjustable, designed for attachment of paddle fan weighing 70 lb.

F. Floor Boxes and Poke-Thru Devices: As specified on drawings.

G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.

I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

J. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.

K. Gangable boxes are prohibited.

L. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Fiberglass.
3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Underground Conduit: Comply with Section 260543 "Underground Raceways and Boxes".
2. All Others: GRC.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Damp, Wet, or Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
   a. Loading dock.
   b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
   c. Mechanical rooms.
2. All Others: EMT or GRC.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.

C. Embedded in Slab: Comply with Section 260543 "Underground Raceways and Boxes.

D. Minimum Raceway Size: 3/4-inch trade size.

E. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. GRC: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

3.2 INSTALLATION

A. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.

B. Do not fasten conduits onto the bottom side of a metal deck roof.

C. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

D. Complete raceway installation before starting conductor installation.

E. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.

F. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.

G. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

H. Support conduit within 12 inches of enclosures to which attached.

I. Stub-Ups to Above Recessed Ceilings:

1. Use EMT, IMC, or RMC for raceways.
2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

K. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

L. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

M. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

N. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

O. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

P. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

Q. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where an underground service raceway enters a building or structure.
3. Conduit extending from interior to exterior of building.
4. Conduit extending into pressurized duct and equipment.
5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
6. Where otherwise required by NFPA 70.

R. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 36 inches of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

S. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

T. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.

U. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

V. Locate boxes so that cover or plate will not span different building finishes.

W. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

X. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

Y. Set metal floor boxes level and flush with finished floor surface.

3.3 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 260543

UNDERGROUND RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Nonmetallic conduits and fittings.
2. Polymer concrete handholes and boxes with polymer concrete cover.

PART 2 - PRODUCTS

2.1 NONMETALLIC CONDUITS AND FITTINGS

A. Nonmetallic Conduit:

1. RNC: Type EPC-80-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

B. Nonmetallic Fittings:

1. Fittings RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
2. Solvents and Adhesives: As recommended by conduit manufacturer.

2.2 POLYMER CONCRETE HANDHOLES AND BOXES WITH POLYMER CONCRETE COVER

A. Description: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.

B. Standard: Comply with SCTE 77. Comply with tier requirements in "Underground Enclosure Application" Article.

C. Color: Gray.

D. Configuration: Units shall be designed for flush burial and have open bottom unless otherwise indicated.

E. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.

F. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.

G. Cover Legend: Molded lettering, as indicated for each service.

H. Handholes 12 inches wide by 24 inches long and larger shall have factory-installed inserts for cable racks and pulling-in irons.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate layout and installation of underground conduits, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Architect if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.

3.2 RACEWAY APPLICATION

A. RNC unless otherwise indicated on drawings. VFD circuits between VFD and motor to be GRC only.

B. Stub-ups: GRC.

C. Minimum Raceway Size: 1-inch trade size.

3.3 UNDERGROUND ENCLOSURE APPLICATION

A. Handholes and Boxes for 600 V and Less:

1. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.
2. Units in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Polymer concrete units, SCTE 77, Tier 8 structural load rating.
3. Cover design load shall not exceed the design load of the handhole or box.

3.4 UNDERGROUND RACEWAY INSTALLATION

A. Where indicated on Drawings, install conduits, spacers, and accessories as shown.

B. Joints: Use solvent-cemented joints in duct and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent duct do not lie in same plane.

C. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.

D. Pulling Cord: Install 200-lbf-test nylon cord in empty ducts.

E. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Arrange raceways to keep a minimum of 2 inches of concrete cover in all directions.
4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
5. Change from RNC to GRC before rising above floor.

3.5 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. As shown on drawings.

3.6 CLEANING

A. Clean and lubricant underground raceways.

END OF SECTION

SECTION 260544

SLEEVES AND SLEEVE SEALS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:

1. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. Sleeves for Rectangular Openings:

1. Material: Galvanized sheet steel.
2. Minimum Metal Thickness:
   a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
   b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Stainless steel.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

2.4 GROUT

A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.

B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

A. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
   a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.
   b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
3. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches above finished floor level. Install sleeves during erection of floors.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

C. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

D. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

E. Underground, Exterior-Wall and Floor Penetrations: Install Sleeve-Seal System and Fitting.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION

SECTION 260553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Color and legend requirements for raceways, conductors, and warning labels and signs.
2. Labels.
3. Tapes and stencils.
4. Signs.
5. Paint for identification.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with ASME A13.1 and IEEE C2.

B. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

C. Comply with ANSI Z535.4 for safety signs and labels.

D. Comply with NFPA 70E requirements for arc-flash warning labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

A. Raceways and Cables Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage.

B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder, and branch-circuit conductors.

1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
2. Colors for 208/120-V Circuits:
   a. Phase A: Black.
   b. Phase B: Red.
   c. Phase C: Blue.
   d. Neutral: White with phase tracer.
3. Colors for 240-V Circuits:
   a. Phase A: Black.
   b. Phase B: Red.
   c. Neutral: White with phase tracer.
4. Colors for 480/277-V Circuits:
   a. Phase A: Brown.
   b. Phase B: Orange.
   c. Phase C: Yellow.
   d. Neutral: Gray with phase tracer.
5. Color for Equipment Grounds: Green.

2.3 LABELS

A. Self-Adhesive Wraparound Labels: Preprinted, 3-mil-thick, vinyl flexible label with acrylic pressure-sensitive adhesive.

1. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
2. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.

B. Self-Adhesive Labels: Polyester, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

1. Minimum Nominal Size:
   a. 1-1/2 by 6 inches for raceway and conductors.
   b. 3-1/2 by 5 inches for equipment.

2.4 TAPES AND STENCILS

A. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.

B. Tape and Stencil: 4-inch-wide black stripes on 10-inch centers placed diagonally over yellow background and are 12 inches wide. Stop stripes at legends.

C. Underground-Line Warning Tape:

1. Tape:
   a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
   b. Printing on tape shall be permanent and shall not be damaged by burial operations.
   c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
2. Color and Printing:
   a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
   b. Inscriptions for Red-Colored Tapes: Per project.
   c. Inscriptions for Orange-Colored Tapes: Per project.

2.5 SIGNS

A. Baked-Enamel Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal Size: 7 by 10 inches.

B. Laminated Acrylic or Melamine Plastic Signs:

1. Engraved legend.
2. Thickness:
   a. For signs up to 20 sq. in., minimum 1/16 inch thick.
   b. For signs larger than 20 sq. in., 1/8 inch thick.
   c. Engraved legend with black letters on white face.
   d. Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.
   e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 PREPARATION

A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

B. Install identifying devices before installing acoustical ceilings and similar concealment.

C. Verify identity of each item before installing identification products.

D. Apply identification devices to surfaces that require finish after completing finish work.

E. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.

F. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit.

1. Secure tight to surface of conductor, cable, or raceway.

G. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

H. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.

I. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.

J. Self-Adhesive Labels:

1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.

K. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.

1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.

L. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.

M. Underground Line Warning Tape: As shown on drawings.

N. Baked-Enamel Signs and Laminated Acrylic Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.

3.3 IDENTIFICATION SCHEDULE

A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.

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JONATHAN EDWARD FANT
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Homestead National Historic Park
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Beatrice, NE 68310

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SUB SHEET NO.	E 02
DRAWING NO.	368 / 80056
PMIS	207662
SHEET	27 OF 31

B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.

C. Accessible Raceways, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

D. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage.

E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use self-adhesive wraparound labels or self-adhesive vinyl tape to identify the phase.

1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

F. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive wraparound labels with the conductor or cable designation, origin, and destination.

G. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive wraparound labels with the conductor designation.

H. Auxiliary Electrical Systems Conductor Identification: Self-adhesive wraparound labels that is uniform and consistent with system used by manufacturer for factory-installed connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

I. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.

J. Workspace Indication: Apply tape and stencil to finished surfaces. Show working clearances in the direction of access to live parts. Workspace shall comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

K. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.

L. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Baked-enamel warning signs.

1. Apply to exterior of door, cover, or other access.

2. For equipment with multiple power or control sources, apply to door or cover of equipment.

M. Arc Flash Warning Labeling: Self-adhesive labels.

N. Operating Instruction Signs: Baked-enamel warning signs.

END OF SECTION

SECTION 262416

PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Distribution panelboards (Power Panels).

2. Lighting and appliance branch-circuit panelboards (Branch Panels).

PART 2 - PRODUCTS

2.1 PANELBOARDS AND LOAD CENTERS COMMON REQUIREMENTS

A. Comply with NEMA PB 1.

B. Power Panels: NEMA PB 1, distribution type.

C. Branch Panels: NEMA PB 1, lighting and appliance branch-circuit type.

D. Enclosures: Flush and Surface-mounted, dead-front cabinets.

1. Height: 84 inches maximum.

2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.

3. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

4. Finishes:

a. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.

b. Back Boxes: Galvanized steel.

E. Mains: Circuit breaker or Lugs only.

F. Incoming Mains:

1. Main Breaker: Main lug interiors up to 400 amperes shall be field convertible to main breaker.

G. Branch Overcurrent Protective Devices:

1. Power Panels: Plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2. Branch Panels: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

H. Phase, Neutral, and Ground Buses:

1. Material: Tin-plated aluminum.

a. Plating shall run entire length of bus.

b. Bus shall be fully rated the entire length.

2. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.

3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.

4. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.

I. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Tin-plated aluminum or Hard-drawn copper, 98 percent conductivity.

2. Terminations shall allow use of 75 deg C rated conductors without derating.

3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.

4. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.

5. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.

6. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

7. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.

J. Service Equipment: Panelboards or load centers shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices.

K. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

1. Panelboards and overcurrent protective devices rated 240 V or less shall have short-circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.

2. Panelboards and overcurrent protective devices rated above 240 V and less than 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.

2.2 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers:

a. Inverse time-current element for low-level overloads.

b. Instantaneous magnetic trip element for short circuits.

c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

2. Electronic Trip Circuit Breakers:

a. RMS sensing.

b. Field-replaceable rating plug or electronic trip.

c. Digital display of settings, trip targets, and indicated metering displays.

d. Multi-button keypad to access programmable functions and monitored data.

e. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused the trip.

f. Integral test jack for connection to portable test set or laptop computer.

g. Field-Adjustable Settings: As shown on drawings.

3. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).

4. GFEP Circuit Breakers: Class B ground-fault protection (30-mA trip).

5. Arc-Fault Circuit Interrupter Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.

6. Subfeed Circuit Breakers: Vertically mounted.

7. MCCB Features and Accessories:

a. Standard frame sizes, trip ratings, and number of poles.

b. Breaker handle indicates tripped status.

c. UL listed for reverse connection without restrictive line or load ratings.

d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.

e. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

f. Rating Plugs: Three-pole breakers with ampere ratings greater than 150 amperes shall have interchangeable rating plugs or electronic adjustable trip units.

g. Multipole units enclosed in a single housing with a single handle.

h. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

2.3 IDENTIFICATION

A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.

B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.

C. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.

1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.

B. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.

C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.

D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Install panelboards and accessories according to NEMA PB 1.1.

C. Equipment Mounting:

1. Attach panelboard to the vertical finished or structural surface behind the panelboard.

D. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.

E. Mount top of trim 90 inches above finished floor unless otherwise indicated.

F. Mount panelboard cabinet plumb and rigid without distortion of box.

G. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

H. Mount surface-mounted panelboards to steel slotted supports. Orient steel slotted supports vertically.

I. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

2. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.

J. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.

K. Install filler plates in unused spaces.

L. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.

3.3 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as indicated.

END OF SECTION

SECTION 262726

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standard-grade receptacles, 125 V, 20 A.

2. GFCI receptacles, 125 V, 20 A.

3. Toggle switches, 120/277 V, 20 A.

4. Wall-box dimmers.

5. Wall plates.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

A. Comply with NEMA WD 1.

B. Device Color:

1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.

2. Wiring Devices Connected to Essential Electrical System: Red.

C. Wall Plate Color: For plastic covers, match device color.

2.2 STANDARD-GRADE RECEPTACLES, 125 V, 20 A

A. Tamper-Resistant Duplex Receptacles, 125 V, 20 A:

1. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle.

2. Configuration: NEMA WD 6, Configuration 5-20R.

3. Standards: Comply with UL 498 and FS W-C-596.

4. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" Article.

2.3 GFCI RECEPTACLES, 125 V, 20 A

A. Tamper-Resistant Duplex GFCI Receptacles, 125 V, 20 A:

1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle.

2. Configuration: NEMA WD 6, Configuration 5-20R.

3. Type: Non-feed through.

4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

5. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" Article.

B. Tamper- and Weather-Resistant, GFCI Duplex Receptacles, 125 V, 20 A:

1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.

2. Configuration: NEMA WD 6, Configuration 5-20R.

3. Type: Non-feed through.

4. Standards: Comply with UL 498 and UL 943 Class A.

5. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" and "Receptacles in Damp or Wet Locations" articles.

2.4 TOGGLE SWITCHES, 120/277 V, 20 A

A. Standards: Comply with UL 20 and FS W-S-896.

2.5 WALL-BOX DIMMERS

A. Description: As specified on drawings.

2.6 WALL PLATES

A. Single Source: Obtain wall plates from same manufacturer of wiring devices.

B. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.

2. Material for Finished Spaces: Smooth, high-impact Nylon or 0.035-inch-thick, satin-finished, Type 302 stainless steel.

3. Material for Unfinished Spaces: Galvanized steel.

4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.

2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.

3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.

2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.

3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.

4. Existing Conductors:

a. Cut back and pigtail, or replace all damaged conductors.

b. Straighten conductors that remain and remove corrosion and foreign matter.

c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.

2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.

3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.

4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.

5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.

6. Use a torque screwdriver when a torque is recommended or required by manufacturer.

7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.

8. Tighten unused terminal screws on the device.

9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the left.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.

2. Verify that dimmers used for fan-speed control are listed for that application.

3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device, listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 IDENTIFICATION

A. Identify each receptacle with panelboard identification and circuit number. Use machine printed, self-adhesive labels on face of plate, and durable wire markers or tags inside outlet boxes.

END OF SECTION

SECTION 262813

FUSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cartridge fuses rated 600 V ac and less for use in the following:

a. Control circuits.

b. Enclosed controllers.

c. Enclosed switches.

PART 2 - PRODUCTS

2.1 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

1. Type RK-1: 250 or 600-V, zero- to 600-A rating, 200 kAIC, time delay.

2. Type CC: 600-V, zero- to 30-A rating, 200 kAIC, time delay.

3. Type J: 600-V, zero- to 600-A rating, 200 kAIC, time delay.

4. Type L: 600-V, 601- to 6000-A rating, 200 kAIC, time delay.

B. Comply with NEMA FU 1 for cartridge fuses.

C. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.

B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.

C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.

D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

A. Cartridge Fuses:

1. Large Motor Branch (601-4000 A): Class L.

2. Elevator Branch Circuits: Class J.

3. Other Branch Circuits: Class RK1

4. Control Transformer Circuits: Class CC, time delay, control transformer duty.

5. Provide open-fuse indicator fuses or fuse covers with open fuse indication.

3.3 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

END OF SECTION

SECTION 262816

ENCLOSED SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fusible switches.

2. Nonfusible switches.

3. Accessories.

4. Enclosures.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

A. Type HD, Heavy Duty, Three Pole, Single Throw, 240 or 600-V ac: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

2.2 NONFUSIBLE SWITCHES

A. Type GD, General Duty, Three Pole, Single Throw, 240-V ac: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

B. Type HD, Heavy Duty, Three Pole, Single Throw, 600-V ac: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

2.3 Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.

2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.

3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

4. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact (s), arranged to activate before switch blades open. Contact rating - 120-V ac.

5. Lugs: Mechanical type, suitable for number, size, and conductor material.

6. Service-Rated Switches: Labeled for use as service equipment.

2.4 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

B. Enclosure Finish: The enclosure shall be finished with gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1); gray baked enamel paint, electrodeposited on cleaned, phosphatized galvannealed steel (NEMA 250 Types 3R, 12); a brush finish on Type 304 stainless steel (NEMA 250 Type 4-4X stainless steel); copper-free cast aluminum alloy (NEMA 250 Types 7, 9).

C. Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts. NEMA 250 Types 7 and 9 enclosures shall be provided with threaded conduit openings in both endwalls.

D. NEMA 250 Type 7/9 enclosures shall be furnished with a breather and drain kit to allow their use in outdoor and wet location applications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 INSTALLATION

A. Coordinate layout and installation of switches and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

C. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

D. Install fuses in fusible devices.

3.3 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION

SECTION 264313

SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes field-mounted SPDs for low-voltage (120 to 600 V) power distribution and control equipment.

PART 2 - PRODUCTS

2.1 PANEL SUPPRESSORS

A. Comply with UL 1449.

B. Comply with UL 1283.

C. SPDs: Type 2.

1. Include LED indicator lights for power and protection status.

2. Integral disconnect switch.

3. Internal thermal protection that disconnects the SPD before damaging intemal suppressor components.

4. Include Form-C contacts rated at 5 A and 250-V ac, one normally open and one normally closed, for remote monitoring of protection status.

5. Surge counter.

D. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per phase shall not be less than 150 kA. The peak surge current rating shall be the arithmetic sum of the ratings of the individual MOVs in a given mode.

E. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277 V or 208Y/120 V, three-phase, four-wire circuits shall not exceed the following:

1. Line to Neutral: 1200 V for 480Y/277 V or 700 V for 208Y/120 V.

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TITLE OF SHEET
ELECTRICAL SPECIFICATIONS
NPS -Home Education Center Fire Suppression
Homestead National Historic Park
8523 NE-4
Beatrice, NE 68310

ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **E 03**
DRAWING NO. 368 / 80056
PMIS **207662**
SHEET **28** OF **31**

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2. Line to Ground: 1200 V for 480Y/277 V or 700 V for 208Y/120 V.
3. Neutral to Ground: 1200 V for 480Y/277 V or 700 V for 208Y/120 V.
4. Line to Line: 2000 V for 480Y/277 V or 1200 V for 208Y/120 V

F. SCCR: Equal or exceed 200 kA.

G. Inominal Rating: 20 kA.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install SPDs with conductors between suppressor and points of attachment as short and straight as possible, and adjust circuit-breaker positions to achieve shortest and straightest leads. Do not splice and extend SPD leads unless specifically permitted by manufacturer. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.

B. Use crimped connectors and splices only. Wire nuts are unacceptable.

END OF SECTION

SECTION 265119

LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the following types of LED luminaires:
1. Luminaires.
2. Luminaire supports.

PART 2 - PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

A. As specified in luminaire schedule.

2.2 LUMINAIRE SUPPORT

A. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

B. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.

C. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

D. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.

C. Examine walls, roofs, canopy ceilings, and overhang ceilings for suitable conditions where luminaires will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install luminaires level, plumb, and square with ceilings, walls, and finished grade unless otherwise indicated.

B. Install lamps in each luminaire if replaceable.

C. Coordinate layout and installation of luminaires with other construction.

D. Supports:
1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping or replacing driver.
3. Provide support for luminaire without causing deflection of ceiling or wall.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

E. Flush-Mounted Luminaires:
1. Secured to outlet box.
2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
3. Trim ring flush with finished surface.

F. Wall-Mounted Luminaires:
1. Attached to structural members in walls or attached to a backing plate attached to wall structural members.
   a. 20 gauge: interior applications.
   b. 10 gauge: exterior applications.
2. Do not attach luminaires directly to gypsum board.

G. Suspended Luminaires:
1. Ceiling Mount:
   a. As specified in luminaire schedule.
2. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
3. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
4. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
5. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

H. Ceiling-Grid-Mounted Luminaires:
1. Secure to any required outlet box.
2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.

END OF SECTION

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12/15/2022 DATE

TITLE OF SHEET
ELECTRICAL SPECIFICATIONS
NPS -Home Education Center Fire Suppression
Homestead National Historic Park
8523 NE-4
Beatrice, NE 68310

ARCH/ENG PROJ # 07310.024
SUB SHEET NO. **E 04**
DRAWING NO. 368 / 80056
PMIS **207662**
SHEET **29** OF **31**

REF. NOTES (X):

1 PROVIDE UNDERGROUND CONDUIT TO 'UTILITY BUILDING NO. 2' FOR NEW LOAD CENTER CONNECTION. FIELD VERIFY EXISTING PANEL CAPACITY AND ADJUST CIRCUIT BREAKER POSITIONING TO ACCOMMODATE A NEW 2-POLE CIRCUIT BREAKER. SEE SHEET E501 FOR ADDITIONAL INFORMATION.

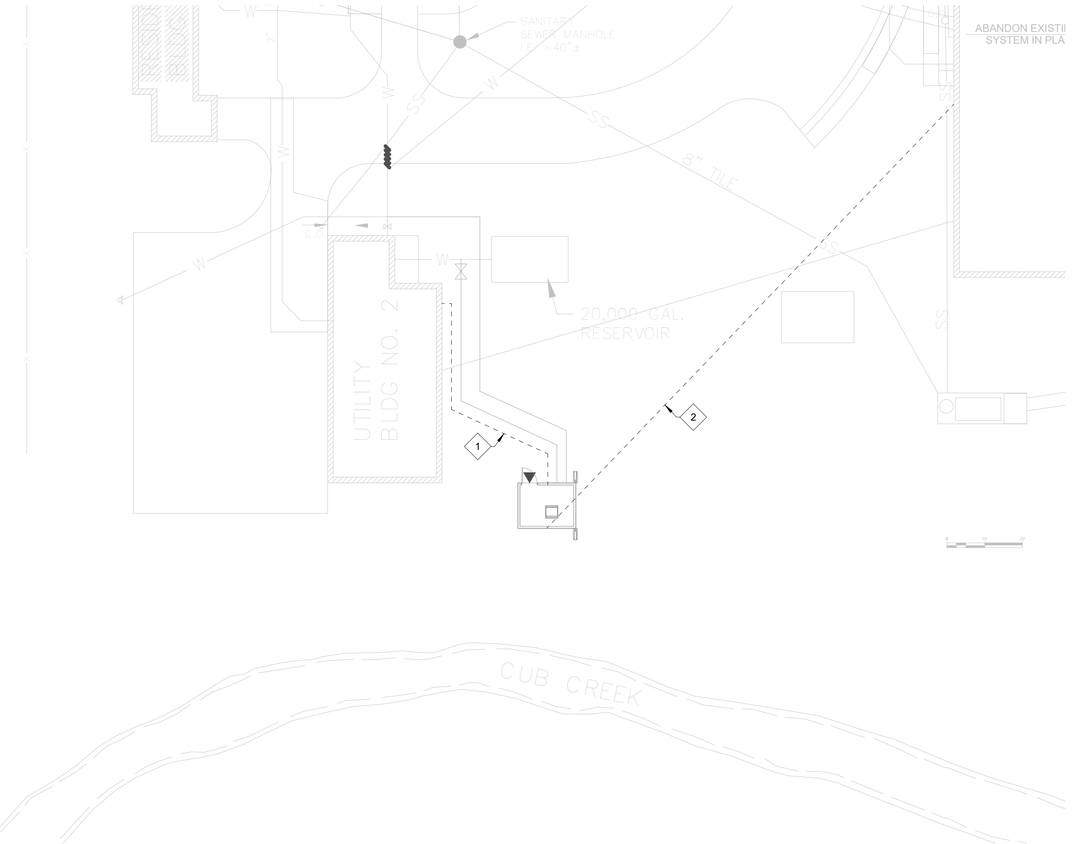
2 UNDERGROUND CONDUIT PROVIDED BY OTHERS. FIELD VERIFY EXISTING FIRE ALARM PANEL CAPACITY AND COMPATIBILITY TO NEW FIRE PUMP/FIRE PUMP CONTROLLER.

3 PENDANT MOUNT LUMINAIRE AT +8'-6" AFF TO THE BOTTOM OF THE LUMINAIRE.

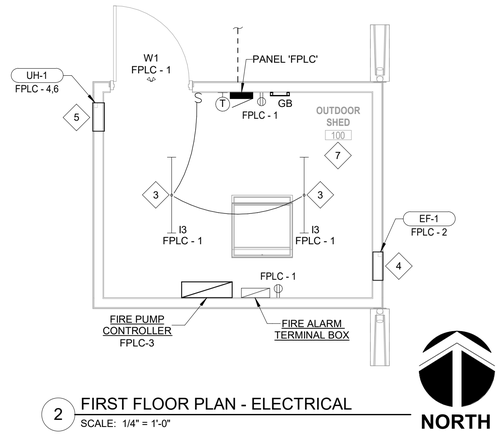
4 PROVIDE GREENHECK SE1-8-426-D EXHAUST FAN, WITH 120V CONNECTION AND 1/40 HP MOTOR. FAN TO HAVE BACKDRAFT DAMPER AND WEATHERHOOD. MOUNT FAN AT MINIMUM +60" AFF.

5 12" X 18" RUSKIN ELF6375DX FINISH TO MATCH EXTERIOR COLOR OF BUILDING. PROVIDE MOTORIZED DAMPER ON BACK OF LOUVER AND INTERLOCK WITH EXHAUST FAN AND THERMOSTAT TO OPEN WHEN EXHAUST FAN IS ENERGIZED. MOUNT AT +48" AFF.

7 ALL ELECTRICAL EQUIPMENT, BOXES, AND CONDUIT TO BE SURFACE MOUNTED.



1 SITE PLAN - ELECTRICAL
SCALE: 1" = 20'-0"



2 FIRST FLOOR PLAN - ELECTRICAL
SCALE: 1/4" = 1'-0"

Branch Panel: FPLC

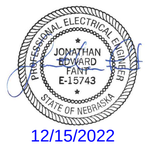
Location: OUTDOOR SHED 100 **Volts:** 208Y/120 **A.I.C. Rating:**
Supply From: **Phases:** 3 **MLO / MCB:** MCB
Mounting: SURFACE **Wires:** 4 **FCB / MCB Rating:** 60 A

CKT	Circuit Description	Trip	P	A		B		C		P	Trip	Circuit Description	CKT
1	LTG/REC - FIRE PUMP SHED	20 A	1	456	85					1	20 A	EQP_C - EF-1 - FIRE PUMP SHED	2
3	FIRE PUMP CONTROLLER	20 A	1			180	1000			2	20 A	EQP_C - UH-1 - FIRE PUMP SHED	4
5	SPARE	20 A	1					0	1000	--	--	--	6
		Total Load:		541 VA		1180 VA		1000 VA					
		Total Amps:		5 A		10 A		9 A					

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
LTG	96 VA	100.00%	96 VA	**Total Est. Demand:**	2541 VA
REC	360 VA	100.00%	360 VA	**Total Est. Demand Current (100% Rated):**	7 A
EQP_CONT	2085 VA	100.00%	2085 VA		
				Non-Cont. Current @ 100%:	1 A
				Continuous Current @ 125%:	8 A
				Total Est. Demand Current (80% Rated):	9 A

Legend:
FCB: Feeder Circuit Breaker
GFI: GFCI Circuit Breaker
LOCK: Lockable Circuit Breaker
MCB: Main Circuit Breaker
MCCB: Molded Case Circuit Breaker
MLO: Main Lug Only

Notes:



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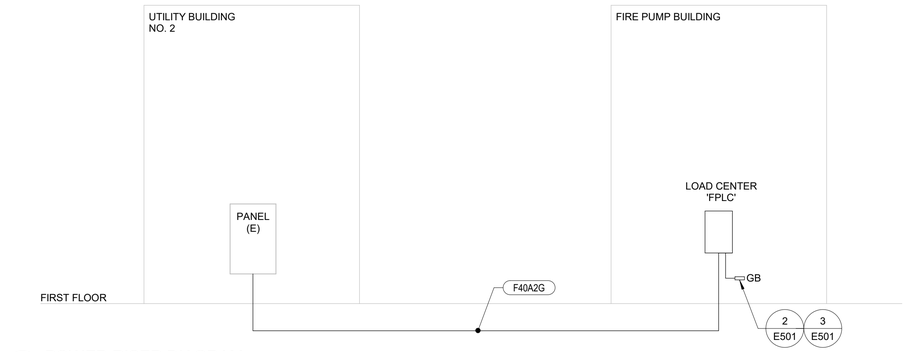
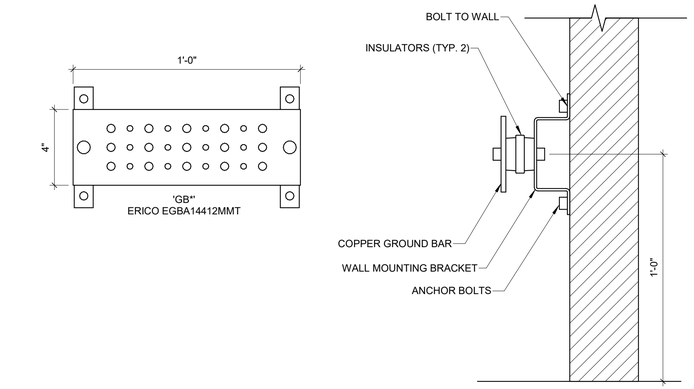


1 POWER RISER DIAGRAM
SCALE: NOT TO SCALE

FEEDER SCHEDULE (FXXXXXXX):

F40A2G	2#8, 1#10G - 3/4"C



2 GROUND BAR DETAIL
SCALE: NOT TO SCALE

EQUIPMENT SCHEDULE

DEVICE	DEVICE DESCRIPTION / SPEC NO	VOLTAGE	PH	KW	FLA	HP	STARTER / DISCONNECT TYPE	STARTER / DISCONNECT SIZE	STARTER / DISCONNECT FUSE	PLUG CONFIG	RECEPT CONFIG	FEEDER SIZE	NOTES
EF-1	EXHAUST FAN GREENHECK SE1-8-426-D	120 V	1	-	-	1/40	INT	-	-	-	-	F20A2G 2#12, 1#12G - 3/4"C	
UH-1	UNIT HEATER RUSKIN ELF6375DX	208 V	1	2.0	-	-	INT	-	-	-	-	F20A2G 2#12, 1#12G - 3/4"C	

GENERAL EQUIPMENT SCHEDULE NOTES:

A. THIS SCHEDULE DISPLAYS SIZING INFORMATION THAT IS GENERIC IN NATURE. SCHEDULE DOES NOT ITEMIZE ALL INSTANCES OF EQUIPMENT. CONTRACTOR SHALL REFER TO THE PLANS FOR FINAL QUANTITIES AND LOCATIONS.

B. MOUNT ALL DISCONNECTS AND STARTERS ON ASSOCIATED EQUIPMENT UNLESS SHOWN OTHERWISE. MAINTAIN WORKING CLEARANCES PER NEC; COORDINATE WITH MECHANICAL CONTRACTOR.

C. BCU = BOX COVER UNIT (COOPER #SSY / #STY OR EQUAL) WITH FUSE.

D. NFD OR FD = NON-FUSED OR FUSED DISCONNECT SWITCH.

E. CS/NFD, FD = COMBINATION STARTER/ NON OR FUSED DISCONNECT SWITCH.

F. INT = INTEGRAL DISCONNECT FURNISHED WITH EQUIPMENT.

G. FHPMC = FRACTIONAL HORSEPOWER MANUAL CONTROLLER.

H. IHPMC = INTEGRAL HORSEPOWER MANUAL CONTROLLER.

I. STE = THERMAL ELEMENT SWITCH. PROVIDE THERMAL UNIT.

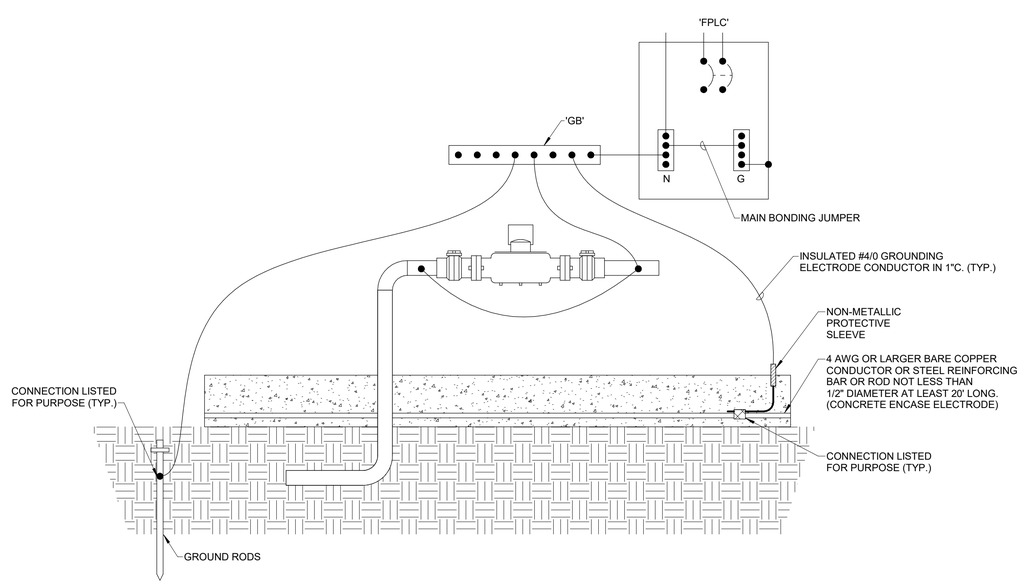
J. EXP = DEVICE TO BE EXPLOSION-PROOF.

K. ALL SWITCHES, DISCONNECTS, ETC SHALL BE LOCKABLE.

L. ALL SWITCHES, DISCONNECTS, ETC SHALL BE NEMA 3R WHERE REQUIRED.

M. PROVIDE FUSES AS SHOWN; REVISE SIZES PER ACTUAL NAMEPLATE DATA.

N. STARTER ACCESSORIES:STARTER ACCESSORIES:
1. CONTROL TRANSFORMER
2. H-O-A SWITCH
3. RED RUN LIGHT
4. 2 NO CONTACTS; 2 NC CONTACTS



3 SERVICE GROUNDING DETAIL
SCALE: NOT TO SCALE

LUMINAIRE SCHEDULE

TYPE NO	DESCRIPTION / SPEC NO	TOTAL WATTS	VOLT	MOUNTING	NOTES
I3	INDUSTRIAL STRIP LED - 4' - 5000 LUMEN - CLX LITHONIA CLX L48 5000LM SEF FDL MVOLT EZ1 40K 80CRI WH ZACVH	35 VA	MVOLT	SURFACE / CABLE	1
W1	EXTERIOR WALL SCONCE LITHONIA HGX LED 2RH ALO SWW2 120 PIR DDB	26 VA	120 V	WALL / SURFACE	

LUMINAIRE SCHEDULE NOTES:

1. VERIFY CABLE / CHAIN LENGTH AND ADJUST ACCORDINGLY.
2. SEE ARCHITECTURAL EXTERIOR BUILDING ELEVATIONS.

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