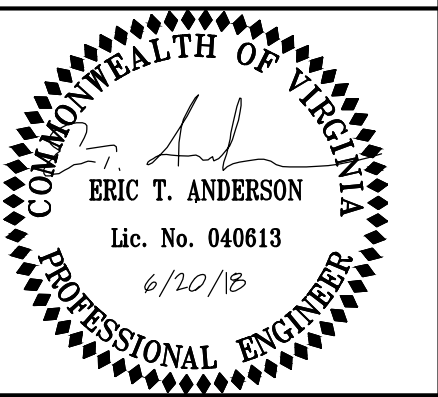


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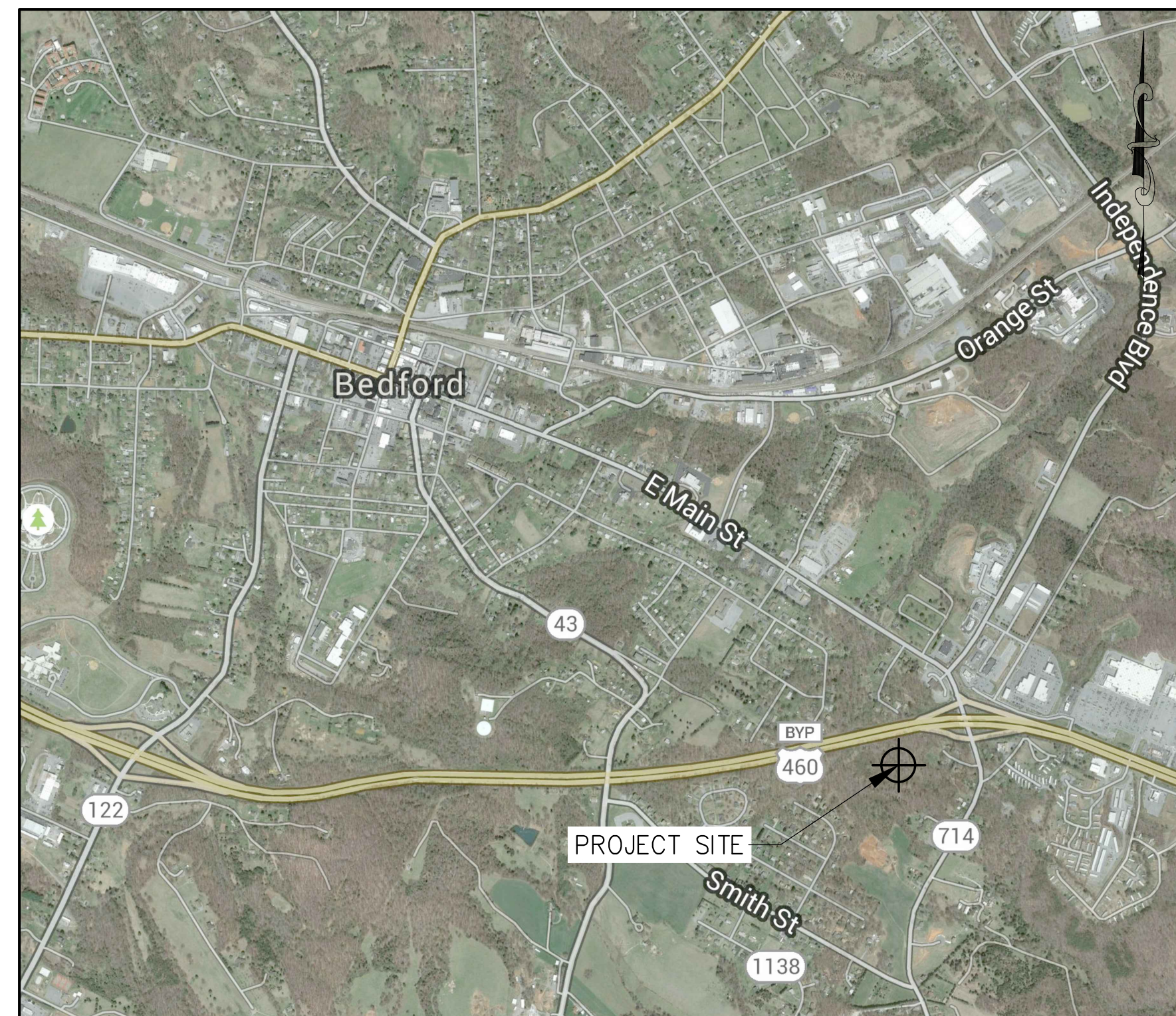
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**PREPARED BY:
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Know what's **below**.
Call before you dig.

LOCATION MAP
SCALE: N.T.S.

VICINITY MAP
SCALE: N.T.S.

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COVER SHEET

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| Designed By: ETA | Drawn By: CTB | Checked By: SMS |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

Drawing No.:

G-001

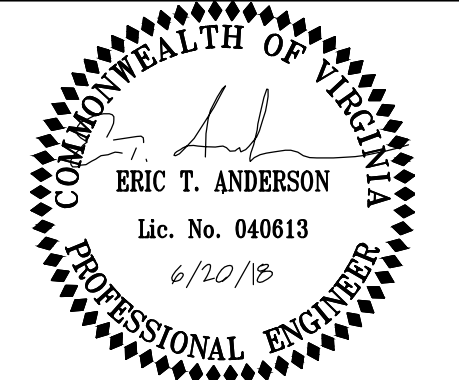
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| TABLE OF ABBREVIATIONS | | | |
|---|---|----------|---|
| AASHTO | AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTAION OFFICIALS | MISC | MISCELLANEOUS |
| ABS | PLASTIC PIPE | MON | MONUMENT |
| AC | ACRE | N | NORTH |
| ACCM | ASPHALT COATED CORRUGATED METAL | NAVAIDS | NAVIGATIONAL AIDS |
| AFF | ABOVE FINISHED FLOOR | NIC | NOT IN CONTRACT |
| ALT | ALTERNATE | NOTAM | NOTICE TO AIRMEN |
| ASZ | AIRPORT SAFETY ZONE | O/S | OFFSET |
| APPROX | APPROXIMATE | OFA | OBJECT FREE AREA |
| ASPH | ASPHALT | OFZ | OBSTACLE FREE ZONE |
| ATCT | AIR TRAFFIC CONTROL TOWER | OAR | OWNER'S AUTHORIZED REPRESENTATIVE |
| AWG | AMERICAN WIRE GAUGE | PL | PROPERTY LINE |
| BL | BASELINE | PC | POINT OF CURVATURE |
| BB | BOTTOM OF BANK OR BERM | PE | PERMANENT EASEMENT |
| BC | BOTTOM OF CURB | PERF | PERFORATED |
| BFE | BASEMENT FLOOR ELEVATION | PERP | PERPENDICULAR |
| BLDG | BUILDING | PP | POWER POLE, POWER PANEL |
| BM | BENCHMARK | PPM | PARTS PER MILLION |
| BOT | BOTTOM | PRC | POINT OF REVERSE CURVATURE |
| BRL | BUILDING RESTRICTION LINE | PSF | POUNDS PER SQUARE FOOT |
| BSMT | BASEMENT | PSI | POUNDS PER SQUARE INCH |
| BVC | BEGINNING OF VERTICAL CURVE | PT | POINT OR POINT OF TANGENCY |
| BW | BOTTOM OF WALL | PVC | POINT OF VERTICAL CURVATURE OR POLYVINYL CHLORIDE |
| C | CHORD | PVI | POINT OF VERTICAL INTERSECTION |
| CAP | CORRUGATED ALUMINIM PIPE | PVT | POINT OF VERTICAL TANGENCY |
| CB | CATCH BASIN | PWR | POWER |
| CF | CUBIC FOOT OR CUBIC FEET | R | RADIUS |
| CFM | CUBIC FEET PER MINUTE | RAD | RADIAL |
| CI | CURB INLET | RCCP | REINFORCED CONCRETE CULVERT PIPE |
| CIP | CAST IRON PIPE | RCP | REINFORCED CONCRETE PIPE |
| CL | CLASS OR CENTERLINE | RD | ROOF DRAIN |
| CMP | CORRUGATED METAL PIPE | REINF | REINFORCING |
| CO | CLEANOUT | REQD | REQUIRED |
| CONC | CONCRETE | ROW | RIGHT-OF-WAY |
| CR | COUNTRY ROAD | ROW W/A | RIGHT-OF-WAY WITH ACCESS |
| CSP | CORRUGATED STEEL PIPE | ROW WO/A | RIGHT-OF-WAY WITHOUT ACCESS |
| CTR | CENTER | RPM | REVOLUTIONS PER MINUTE |
| CULV | CULVERT | RR | RAILROAD |
| CV | CHECK VALVE | RSA | RUNWAY SAFETY AREA |
| CY | CUBIC YARD | RT | RIGHT |
| DI | DROP INLET | RW | RETAINING WALL |
| DIA | DIAMETER | RWY, R/W | RUNWAY |
| DIP | DUCTILE IRON PIPE | S | SOUTH |
| DWG | DRAWING | SCH | SCHEDULE |
| E | EAST | SF | SQUARE FOOT OR SQUARE FEET |
| EA | EACH | SH | STATE HIGHWAY |
| EJ | EXPANSION JOINT | SHT | SHEET |
| ELEC | ELECTRIC | SMH | SANITARY MANHOLE |
| ELEV | ELEVATION | SPECS | SPECIFICATIONS |
| EOP | EDGE OF PAVEMENT | SQ | SQUARE |
| FD | FLOOR DRAIN | STA | STATION OR STATIONARY |
| FDN | FOUNDATION | STMH | STORM MANHOLE |
| FFE | FINISHED FLOOR ELEVATION | STY | STORY |
| FT | FOOT OR FEET | SY | SQUARE YARD |
| GAL | GALLON | TAN | TANGENT |
| GPM | GALLONS PER MINUTE | TC | TOP OF CURB |
| GRD | GROUND OR GRADE | TE | TEMPORARY EASEMENT |
| GV | GATE VALVE | TEL | TELEPHONE |
| HDPE | HIGH DENSITY POLYETHELENE PIPE | TEMP | TEMPORARY |
| HORIZ | HORIZONTAL | TF | TOP OF FRAME |
| HP | HIGH POINT OR HORSE POWER | TRANS | TRANSFORMER OR TRANSVERSE |
| HPS | HIGH PRESSURE SODIUM | TSA | TAXIWAY SAFETY AREA |
| HR | HAND RAIL OR HOUR | TV | TELEVISION |
| HT | HEIGHT | TWY, T/W | TAXIWAY |
| HW | HEADWALL | TYP | TYPICAL |
| HYD | HYDRANT | UD, U/D | UNDERDRAIN |
| IN | INCH(ES) | U(ND)G | UNDERGROUND |
| IP(F) | IRON PIPE (FOUND) | UTIL | UTILITY |
| JB | JUNCTION BOX | VC | VERTICAL CURVE |
| LAT | LATITUDE | VCP | VITRIFIED CLAY PIPE |
| LB | POUND | VERT | VERTICAL |
| LF | LINEAR FOOT OR LINEAR FEET | VOL | VOLUME |
| LONG | LONGITUDE | W | WEST |
| LP | LAMP POST, LIGHT POLE, LIGHT PANEL OR LOW POINT | W/ | WITH |
| LT | LEFT | WF | WOOD FRAME |
| MFR | MANUFACTURER | W/O | WITHOUT |
| MH | MANHOLE | WW | WING WALL |
| MIN | MINIMUM | WWF | WELDED WIRE FABIC OR WOVEN WIRE FABRIC |
| NOTE: SOME ABBREVIATIONS MAY NOT HAVE BEEN USED | | | |

| LEGEND | |
|---------------------------|--------|
| DESCRIPTION | SYMBOL |
| FENCE | |
| 5' OR 10' CONTOUR LINE | |
| 1' OR 2' CONTOUR LINE | |
| SPOT ELEVATION | |
| DITCH OR SWALE | |
| EDGE OF STREAM OR RIVER | |
| LAKE OR POND | |
| PROPERTY LINE | |
| SILT FENCE | |
| GRADING LIMITS | |
| EDGE OF PAVEMENT | |
| CURB | |
| EDGE OF GRAVEL/DIRT ROAD | |
| EDGE OF WOODS | |
| BUILDING | |
| STORM SEWER | |
| SANITARY SEWER | |
| FORCE MAIN | |
| WATER LINE | |
| GAS LINE | |
| UNDERGROUND ELECTRIC | |
| UNDERGROUND TELEPHONE | |
| OVERHEAD TELEPHONE | |
| OVERHEAD ELECTRIC | |
| UNDERDRAIN | |
| GUIDE RAIL | |
| CLEANOUT | |
| END SECTION | |
| CATCH BASIN | |
| STORM MANHOLE | |
| HYDRANT | |
| WATER VALVE/CONTROL VALVE | |
| SPRINKLER HEAD | |
| SANITARY SEWER MANHOLE | |
| PULL BOX | |
| TELEPHONE PEDESTAL | |
| ELECTRIC BOX | |
| ELECTRIC MANHOLE | |
| LIGHT POLE, LAMP POST | |
| POWER POLE / UTILITY POLE | |

| LEGEND (CONTINUED) | |
|--|--------|
| DESCRIPTION | SYMBOL |
| SIGN - SINGLE FACED | |
| SIGN - DOUBLE FACED | |
| CONCRETE MONUMENT | |
| RIGHT-OF-WAY MONUMENT | |
| IRON ROD, PIN, OR PIPE | |
| BORING LOCATION | |
| CBR LOCATION | |
| TREES, SHRUBS, BUSHES | |
| DETAIL CALLOUT | |
| DETAIL IDENTIFICATION NO. | |
| NOTE: SOME FEATURES IN THE LEGEND MAY NOT HAVE BEEN USED | |

BEDFORD
REGIONAL WATER
AUTHORITY



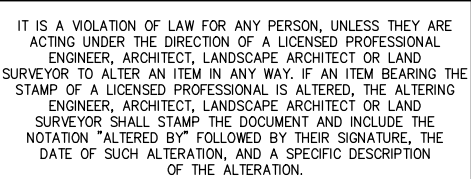
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ROUTE 460 PUMP STATION
BEDFORD, VA.

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| LEGEND & ABBREVIATIONS | | | |
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| Issue Date: | Project No: | Scale: | |
| 08/01/17 | 27872-3002 | AS SHOWN | |

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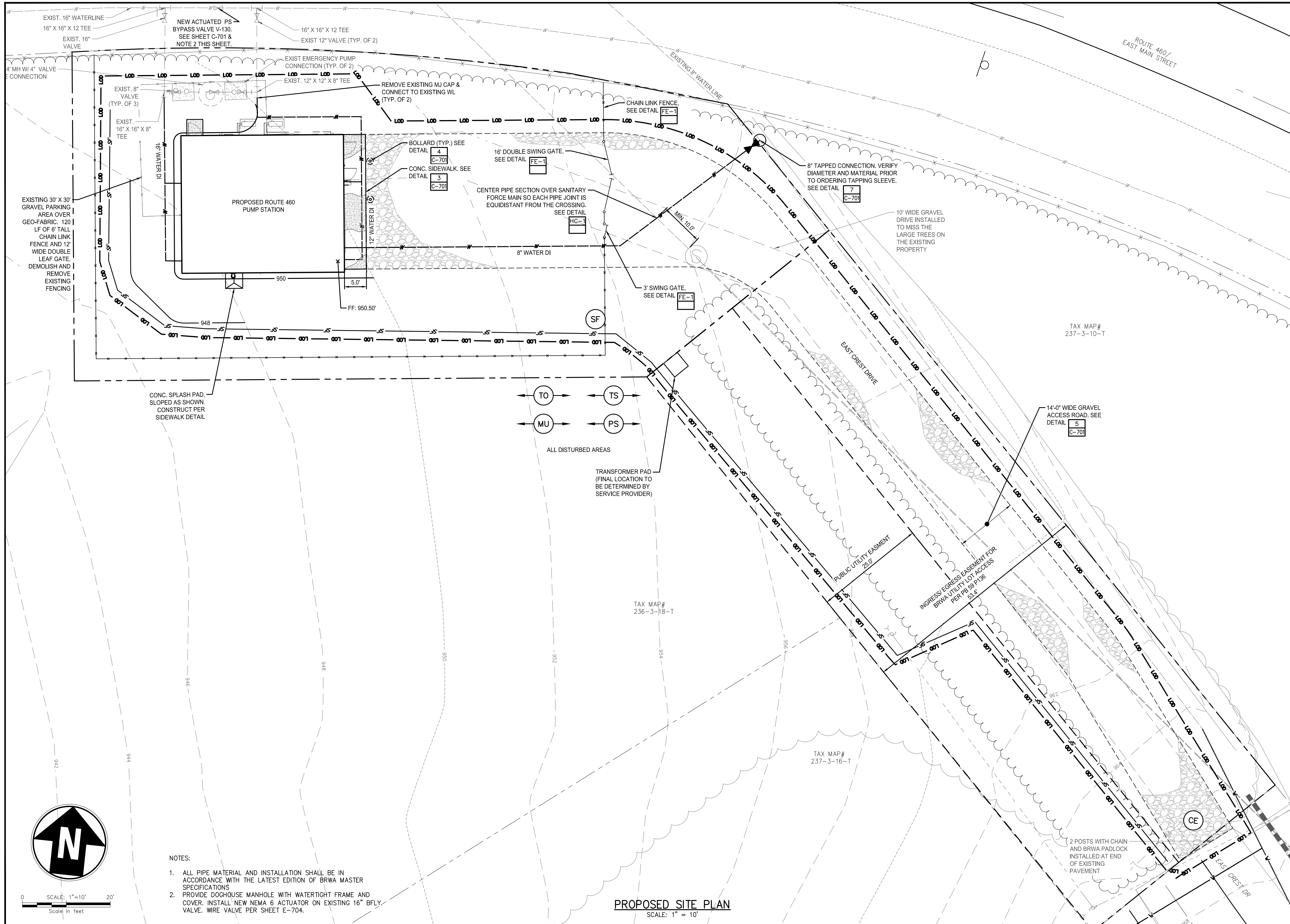


ROUTE 460 PUMP STATION
BEDFORD, VA.

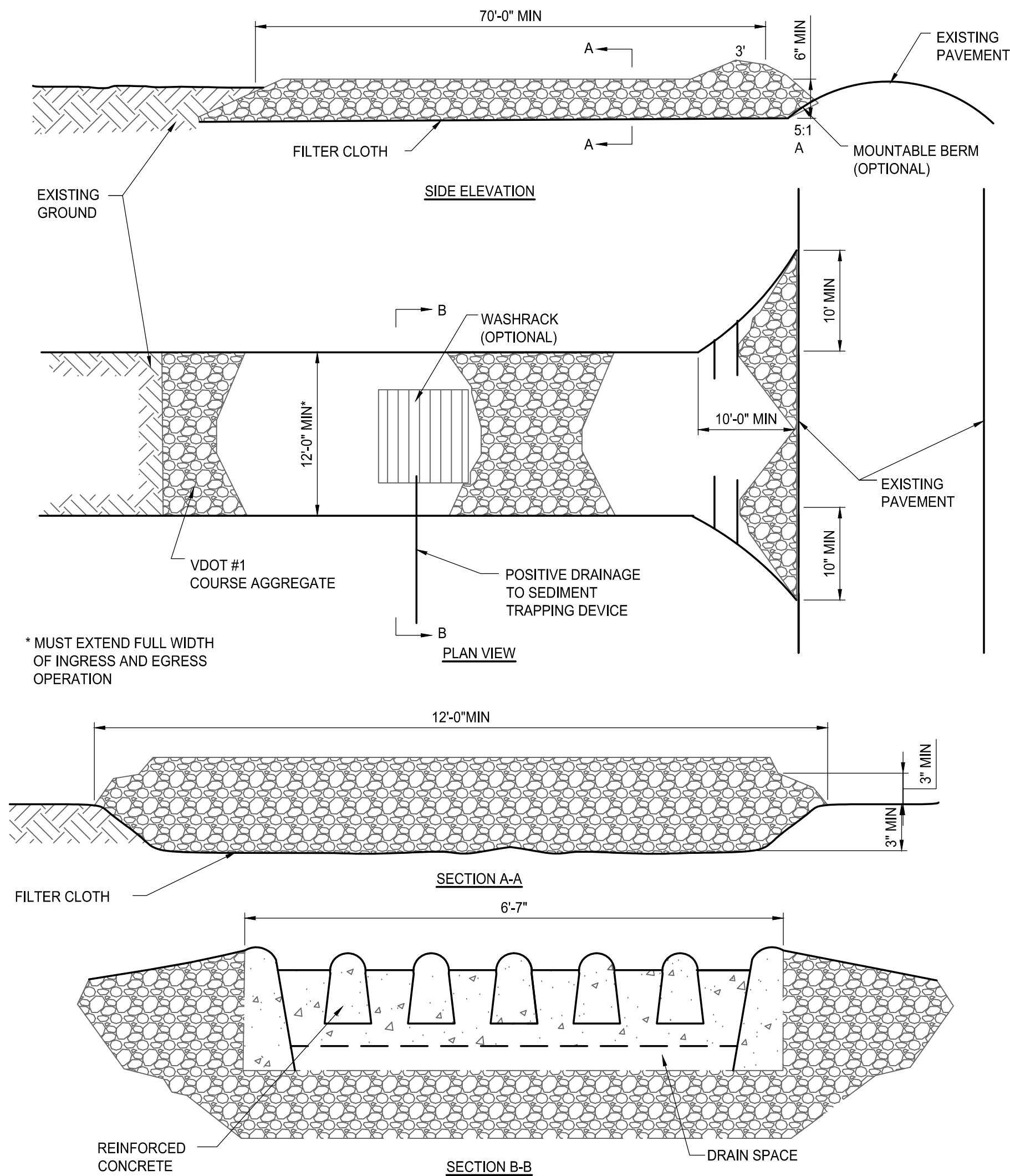
SITE PLAN

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| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

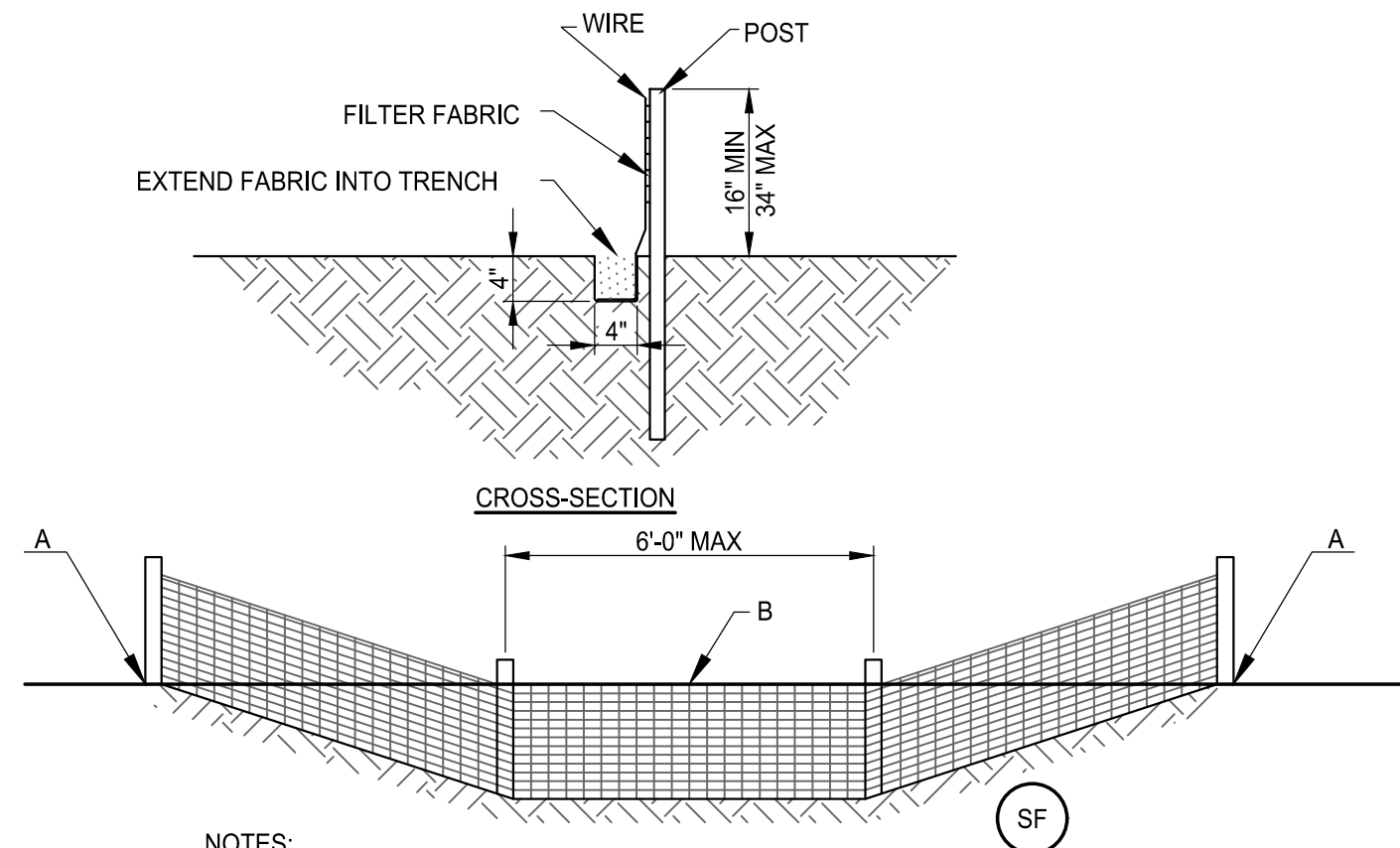
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1 **STONE CONSTRUCTION ENTRANCE**
NOT TO SCALE

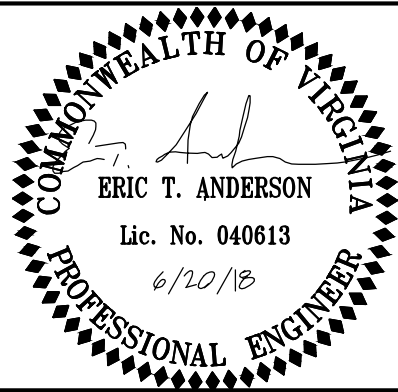


NOTES:

1. WHEN POINT B DROPS BELOW POINT A, USE EXTRA STRENGTH FILTER FABRIC WITH A MAXIMUM 3 FOOT SPACING OF POST.

2 **SILT FENCE DETAIL**
NOT TO SCALE

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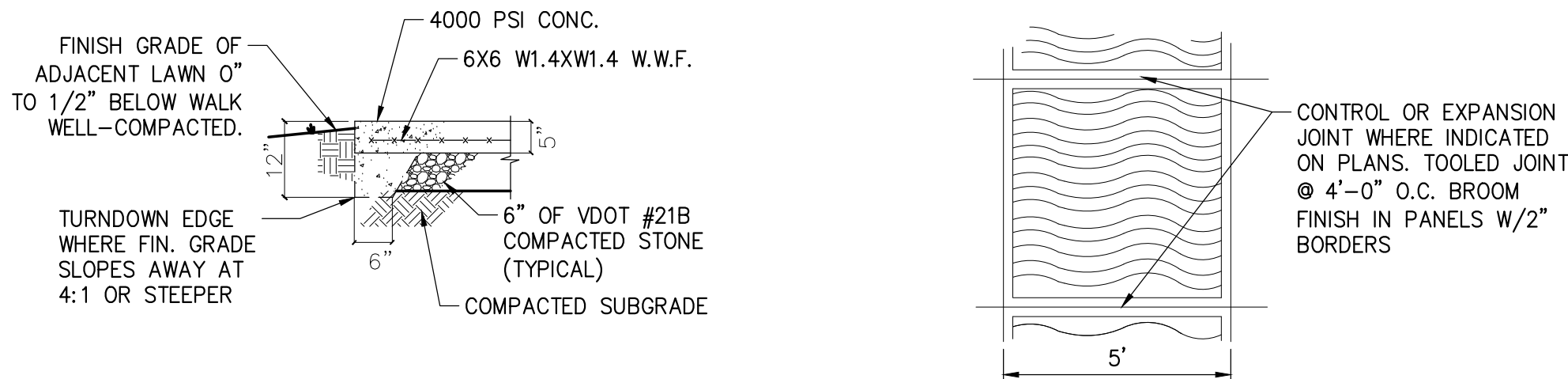
ROUTE 460 PUMP STATION
BEDFORD, VA.

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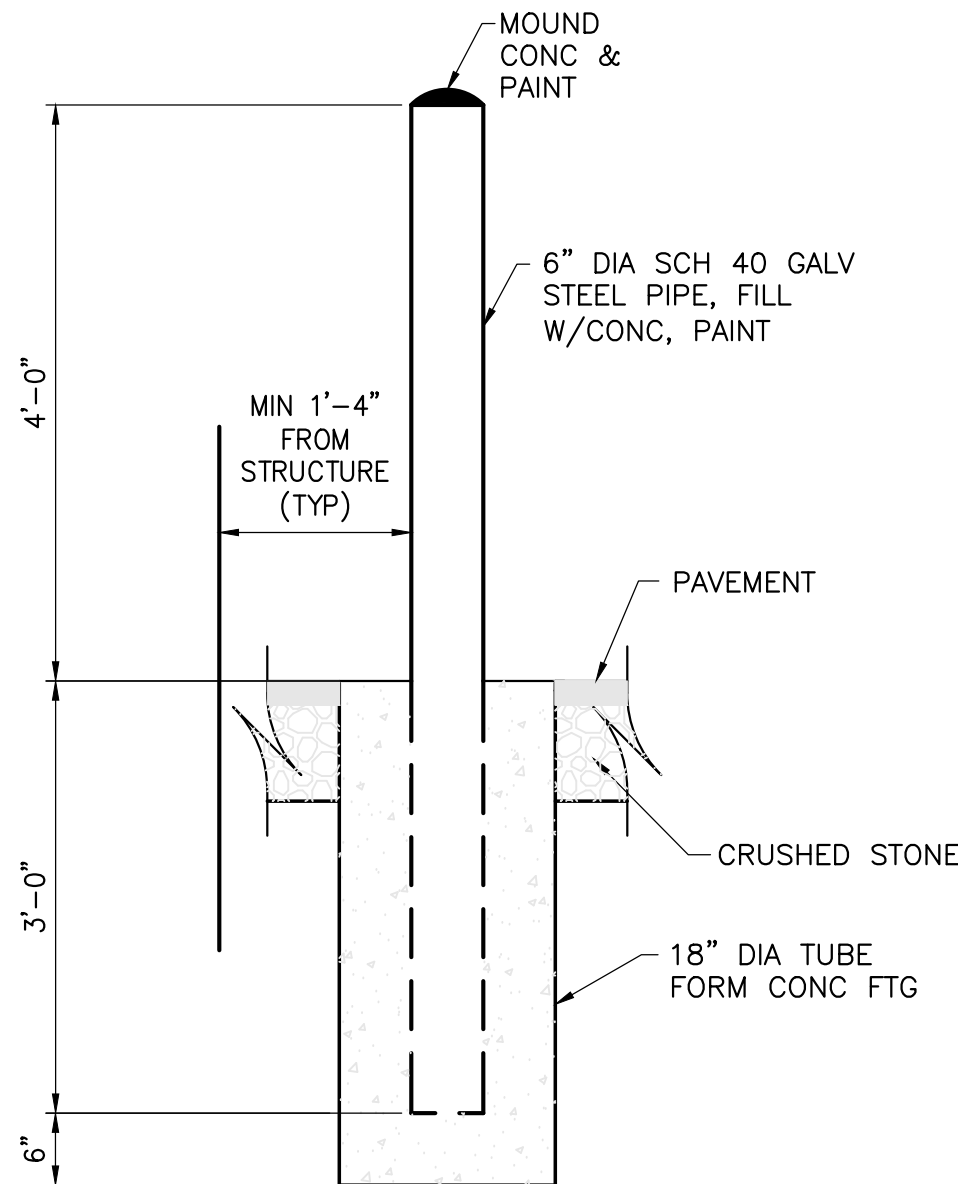
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DETAILS

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| Issue Date: | Project No: | Scale: |
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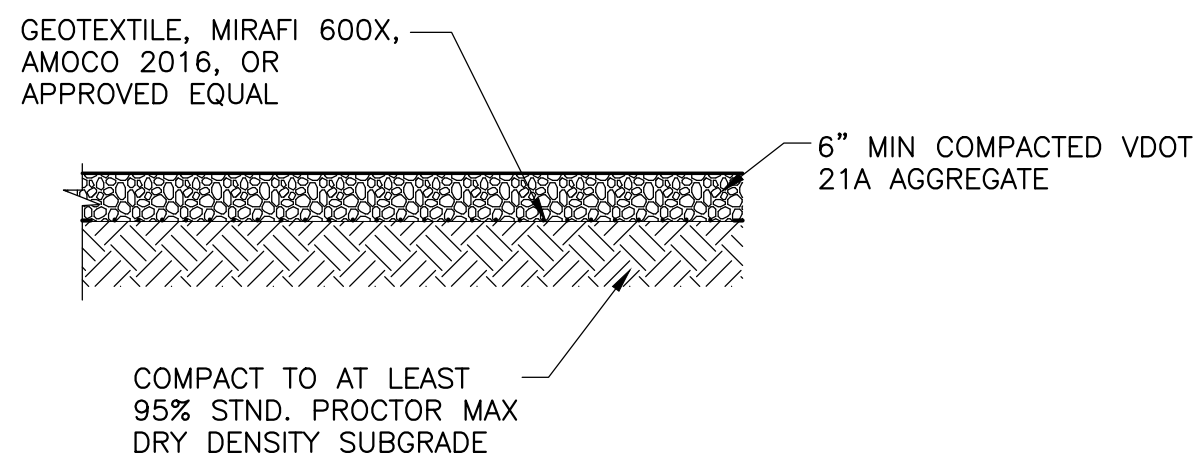
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3 TYPICAL SIDEWALK DETAIL
SCALE: 1/2" = 1'-0"

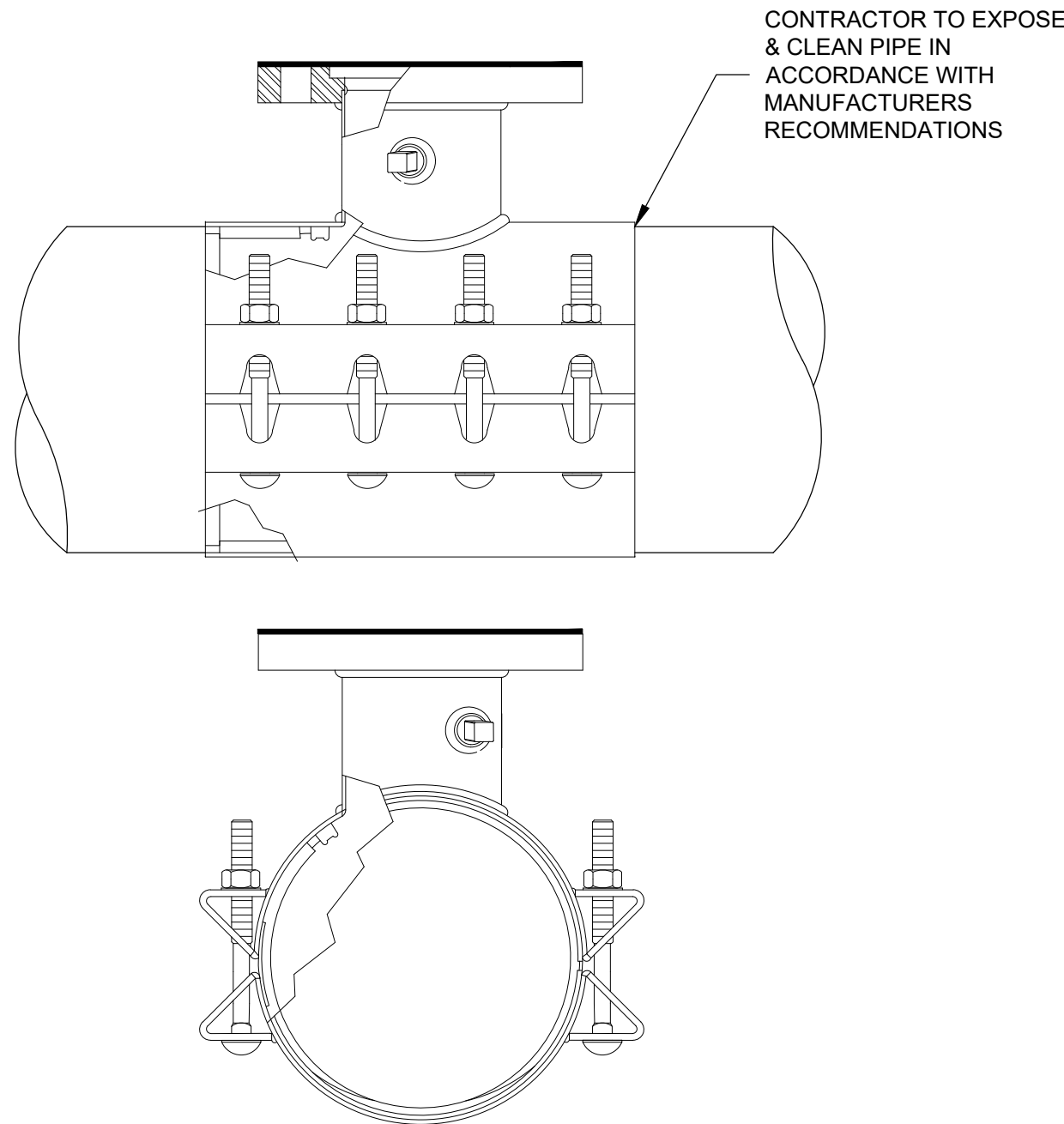


4 TYPICAL BOLLARD DETAIL
SCALE: 3/4" = 1'-0"

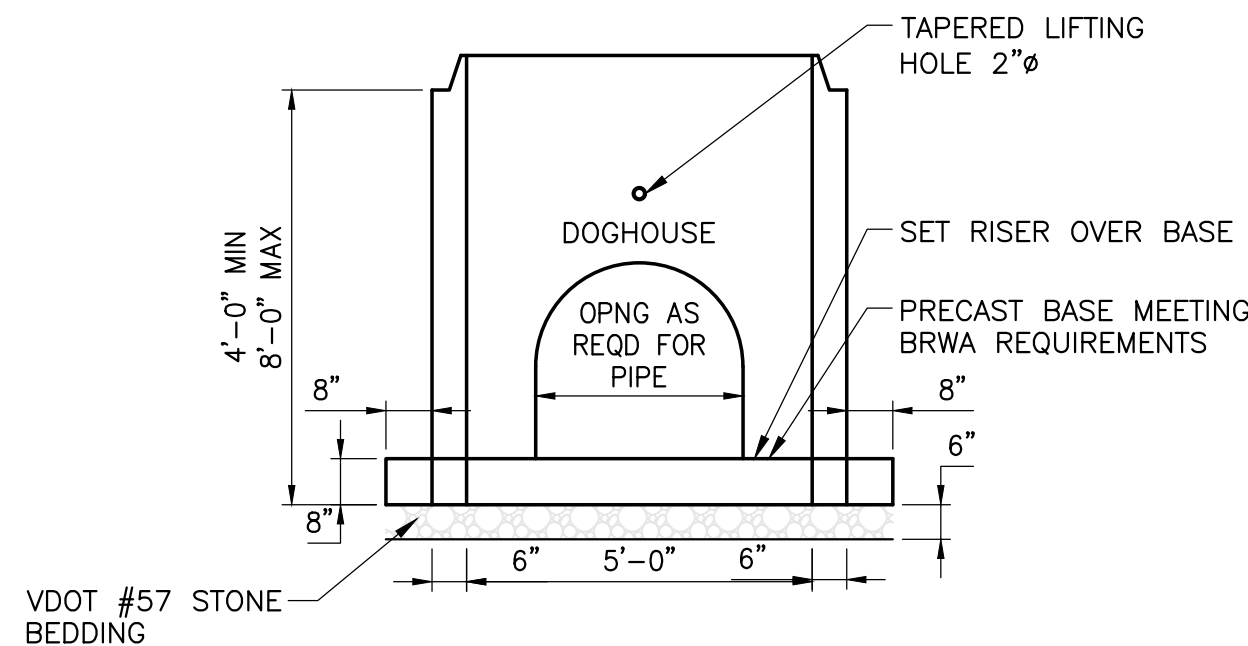


5 TYPICAL GRAVEL PAVING DETAIL
NOT TO SCALE

1. TAPPING SLEEVE SHALL BE POWERSEAL MODEL 3490 TYPE 304 STAINLESS STEEL WITH CARBON STEEL FLANGE, ROMAC'S MODEL SST III, FORD MODEL FTSS WITH CARBON STEEL FLANGE OR APPROVED EQUIVALENT. SLEEVE SHALL BE RATED AT 250 PSI WORKING PRESSURE AND MUST HAVE A TEST PLUG.
2. TAPPING VALVE SHALL BE AVK RESILIENT SEATED GATE VALVE SERIES 25 MJFL, MUELLER T-2360 RESILIENT WEDGE TAPPING VALVE WITH MJFL, OR AFC SERIES 2500 RESILIENT WEDGE TAPPING VALVE WITH MJFL. VALVE SHALL BE RATED AT 250 PSI.
3. TAPPING SLEEVE AND VALVE SHALL BE FULL PORT TO ACCEPT FULL SIZE SHELL CUTTER.
4. STEEL FLANGE SHALL MEET AWWA C207.
5. LEAVE TAPPING VALVE IN PLACE.

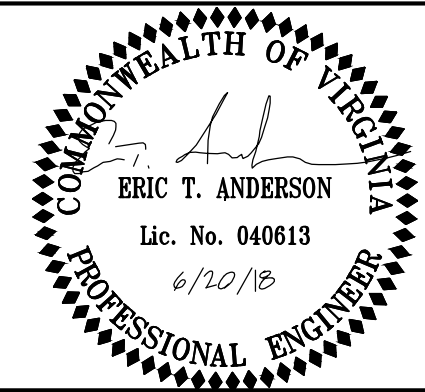


7 TAPPED CONNECTION
SCALE: N.T.S.



1. FOLLOW ALL BRWA STANDARD MANHOLE DETAILS FOR ALL SECTIONS EXCEPT THE BASE. FOLLOW ALL BRWAS REQUIREMENTS FOR MATERIALS AND INSTALLATION.
2. SEAL CONNECTION BETWEEN BASE & RISER AS NORMAL JOINT CONNECTION.
3. WRAP PIPE WITH A-LOK WATER STOP AND FIELD POUR 4000 PSI GROUT COLLAR AROUND PIPE.

8 DOGHOUSE MANHOLE BASE DETAIL
SCALE: N.T.S.



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BID ISSUE ETA CTB 06/20/18

CIVIL DETAILS

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| Designed By: ETA | Drawn By: CTB | Checked By: SMS |
| Issue Date: 08/01/17 | Project No.: 27872-3002 | Scale: AS SHOWN |

Drawing No.:

C-701

GENERAL NOTES:

- REFER TO THE PROJECT MANUAL FOR GOVERNING JOB REQUIREMENTS AND MATERIAL SPECIFICATIONS. THE FOLLOWING NOTES ARE SUPPLEMENTAL TO THE ABOVE REQUIREMENTS.
- DO NOT CHANGE THE SIZE OR SPACING OF STRUCTURAL ELEMENTS WITHOUT THE APPROVAL OF THE ENGINEER.
- DETAILS SHOWN ARE TYPICAL AND APPLY TO SIMILAR CONDITIONS UNLESS NOTED OTHERWISE.
- THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.
- BRACE AS REQUIRED FOR CONSTRUCTION AND WIND LOADS UNTIL ALL STRUCTURAL ELEMENTS NEEDED FOR STABILITY ARE INSTALLED.
- THE DESIGN IS BASED ON THE 2012 VIRGINIA UNIFORM STATEWIDE BUILDING CODE.
- CONTRACTOR SHALL DETERMINE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. HE/SHE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS/HER FAILURE TO LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES.
- INCORRECTLY FABRICATED, DAMAGED, OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE OWNER'S REPRESENTATIVE PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE PRE-APPROVAL BY THE ENGINEER.
- EACH CONTRACTOR SHALL COOPERATE WITH THE OWNER'S REPRESENTATIVE AND COORDINATE HIS/HER WORK WITH THE WORK OF OTHERS.
- VERIFY SIZE AND LOCATION OF OPENINGS PRIOR TO BEGINNING WORK. FOR DIMENSIONS NOT SHOWN, SEE MECHANICAL, ELECTRICAL, CIVIL AND ARCHITECTURAL DRAWINGS.
- VERIFY SIZE AND LOCATION OF EQUIPMENT PADS WITH MECHANICAL AND/OR ELECTRICAL CONTRACTOR AND EQUIPMENT MANUFACTURER.

FOUNDATION AND SOIL PREPARATION NOTES:

- THE FOUNDATION DESIGN IS BASED ON AN ALLOWABLE SOIL BEARING PRESSURE OF 2,500 POUNDS PER SQUARE FOOT. BEARING STATION CAPACITY FOR FOOTINGS SHALL BE VERIFIED IN FIELD BY THE GEOTECHNICAL ENGINEER BEFORE PLACING CONCRETE FOOTINGS.
- THE CONTRACTOR SHALL REVIEW THE REPORT AND BORING LOGS DURING THE BIDDING PHASE OF THE PROJECT.
- BOTTOM OF ALL FOOTINGS SHALL BE A MINIMUM OF 2'-0" BELOW FINAL FINISHED GRADE. ADJUST FOOTING ELEVATIONS AS REQUIRED TO MAINTAIN MINIMUM FROST COVER.
- PROVIDE POSITIVE DRAINAGE FOR ALL TRENCHES DURING CONSTRUCTION. DO NOT ALLOW ANY PONDING OF WATER DURING CONSTRUCTION.
- DO NOT PLACE FOOTINGS IN WATER OR ON FROZEN GROUND. DO NOT ALLOW GROUND BENEATH FOOTINGS TO FREEZE.
- BEAR ALL FOOTINGS ON COMPACTED STRUCTURAL FILL OR NATURAL RESIDUAL SOILS AS APPROVED BY THE GEOTECHNICAL ENGINEER. SOIL BEARING SURFACES, PREVIOUSLY ACCEPTED BY OWNER'S REPRESENTATIVE, WHICH ARE ALLOWED TO BECOME SATURATED, FROZEN OR DISTURBED SHALL BE REWORKED TO SATISFACTION OF OWNER'S REPRESENTATIVE.
- STRUCTURAL FILL AND SELECTED FILL: SOUND, DURABLE, SAND, GRAVEL, STONE, OR BLENDS OF THESE MATERIALS, FREE FROM ORGANIC, FROZEN OR OTHER DELETERIOUS MATERIALS, AND MEETING THE FOLLOWING GRADATION REQUIREMENTS:

| SIEVE | PERCENT PASSING | |
|---------|-----------------|-----|
| | 4" | 100 |
| NO. 40 | 0 - 70 | |
| NO. 200 | 0 - 10 | |

- FINES PASSING NO. 200 SHALL BE NON-PLASTIC.
- PARTICLE SIZE ANALYSIS SHALL SHOW NO GAP GRADING.

- THE SOIL BENEATH THE BUILDING, EXTERIOR EQUIPMENT CONCRETE SLABS, AND 5 FEET AROUND THE PERIMETER SHALL BE TREATED AS FOLLOWS:
 - STRIP THE AREA OF ALL VEGETATION.
 - PERFORM ALL CUT OPERATIONS.
 - THE NEXT 6 INCHES SHALL BE THOROUGHLY SCARIFIED, WITH WATER ADDED TO RAISE THE MOISTURE CONTENT TO AT LEAST 3 PERCENTAGE POINTS ABOVE OPTIMUM, AND RE-COMPACTED TO A DENSITY IN THE RANGE OF 95% TO 100% OF STANDARD PROCTOR. THE FIRST LIFT OF FILL SHALL BE PLACED ON THE COMPACTED SUBGRADE WITHIN EIGHT HOURS OF COMPLETING THE COMPACTION.
 - THE FILL REQUIRED TO RAISE THE BUILDING TO BENEATH THE FLOOR SLAB SHALL BE EITHER ON SITE FILL OR SELECT (STRUCTURAL) FILL. THE SELECT FILL SHALL HAVE A PLASTICITY INDEX BETWEEN 4 AND 12 AND A LIQUID LIMIT LESS THAN 40. PLACE ALL FILL (ON SITE OR SELECT) FILL IN 8-INCH LIFTS AND COMPACT TO AT LEAST 95% OF THE STANDARD PROCTOR DENSITY AT A MOISTURE CONTENT WITHIN -3 AND +3 PERCENTAGE POINTS OF OPTIMUM.
 - ALL SLABS-ON-GRADE SHALL BEAR ON A BASE COURSE OF CLEAN, COMPACTED CRUSHED STONE A MINIMUM OF 12" THICK. THE CRUSHED STONE SHALL BE VDOT NO. 57 AGGREGATE.
 - EACH LIFT SHALL BE TESTED FOR MOISTURE CONTENT AND IN PLACE DENSITY AT A RATE OF ONE TEST PER 3,000 SQUARE FEET (MINIMUM OF THREE PER LIFT).
 - REFER TO THE SPECIFICATIONS FOR ADDITIONAL SOIL PREPARATION NOTES.

CAST-IN-PLACE CONCRETE NOTES:

- CONCRETE FOR FOOTINGS, CHANNEL SLAB, AND CHANNEL WALLS SHALL HAVE A 28 DAY DESIGN COMPRESSIVE STRENGTH OF 4,500 PSI, TYPE A OR D WATER REDUCING AGENT AND A 4'-5" SLUMP. FLYASH SHALL NOT BE USED WITHOUT THE APPROVAL OF THE ENGINEER BEFORE BIDDING.
- CONCRETE FOR EXTERIOR EQUIPMENT PADS SHALL HAVE A 28 DAY DESIGN COMPRESSIVE STRENGTH OF 4,500 PSI, 20% OF CLASS F FLYASH MAY BE USED WITH THE APPROVAL OF THE ENGINEER AND THE CONCRETE FINISHER/CONTRACTOR BEFORE BIDDING. CONCRETE SHALL BE AIR ENTRAINED FOR SEVERE EXPOSURE PER ACI TABLE 4.2.1. TOLERANCE ON AIR CONTENT AS DELIVERED SHALL BE +/- 1.5 PERCENT.
- CONCRETE FOR THE CAST-IN-PLACE FLOOR SLAB SHALL HAVE A 28 DAY DESIGN COMPRESSIVE STRENGTH OF 3,000 PSI, MID OR HIGH RANGE WATER REDUCING AGENT AND A 5'-6" SLUMP. 20% OF CLASS F FLYASH MAY BE USED WITH THE APPROVAL OF THE ENGINEER AND THE CONCRETE FINISHER/CONTRACTOR BEFORE BIDDING.
- CONCRETE SHALL HAVE MAXIMUM WATER TO CEMENT RATIOS AS FOLLOWS:
 - 3,000 PSI CONCRETE: 0.52
 - 4,500 PSI CONCRETE: 0.42
- PLACEMENT OF CONCRETE SHALL BE IN CONFORMANCE WITH ACI 117-06 "SPECIFICATION FOR TOLERANCE FOR CONCRETE AND MATERIALS AND COMMENTARY".
- IF THE AIR TEMPERATURE IS GREATER THAN 90 DEGREES WITHIN 24 HOURS AFTER PLACEMENT, HOT WEATHER CONCRETE PROCEDURES SHALL BE USED. THE CONTRACTOR SHALL SUBMIT A PROCEDURE TO THE ENGINEER FOR APPROVAL. THESE PROCEDURES MAY INCLUDE THE FOLLOWING:
 - PLACING THE CONCRETE IN THE EARLY MORNING HOURS
 - THE USE OF EVAPORATION REDUCER (SEE BELOW)
 - THE USE OF MISTING AS A CURING METHOD
 - THE USE OF WET BLANKETS AS A CURING METHOD
 - THE USE OF A RETARDING ADMIXTURE (NOT PREFERABLE)
- FIVE (5) 4"x8" CONCRETE CYLINDERS SHALL BE MADE FOR EVERY 50 CUBIC YARDS OR EACH DAYS POUR, ONE (1) CYLINDER TO BE TESTED AT 7 DAYS, THREE (3) CYLINDERS TO BE TESTED AT 28 DAYS, AND ONE (1) CYLINDER TO HOLD. THE CONCRETE SLUMP, TEMPERATURE, AND AIR CONTENT SHALL BE MEASURED EVERY TIME A SET OF FOUR CYLINDERS IS MADE.
- ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE AMERICAN CONCRETE INSTITUTE STANDARDS "CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES AND COMMENTARY" (ACI 350), THE "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" (ACI 318) AND THE "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" (ACI 301). SPLICES IN REINFORCEMENT SHALL MEET CLASS B TENSION LAP REQUIREMENTS UNLESS NOTED OTHERWISE.

- COVER FOR ALL REINFORCEMENT SHALL MEET THE COVERAGE REQUIREMENTS AS SHOWN IN THE LATEST ACI 350, OR AS SHOWN ON THE DETAILS. COVER DIMENSIONS SHOWN ON THE DETAILS CONTROL OVER ACI.
- ANY CONCRETE TO BE PLACED FURTHER THAN 16 FEET FROM THE END OF A CONCRETE TRUCK SHALL BE PUMPED WITH A COMMERCIAL CONCRETE PUMPING TRUCK OR OTHER PLACEMENT METHOD APPROVED BY THE ENGINEER. THE CONCRETE TRUCK SHALL NOT BE ALLOWED TO DRIVE OVER THE SUBGRADE OR THE SLAB REINFORCEMENT.
- REINFORCING BILLET STEEL SHALL BE DOMESTIC DEFORMED BILLET STEEL CONFORMING TO ASTM A-615 GRADE 60, #4 REINFORCEMENT BARS AND SMALLER SHALL BE COLD BENT WHENEVER BENDING IS REQUIRED IN THE FIELD. REINFORCEMENT GREATER THAN A #4 BAR MAY NOT BE BENT IN THE FIELD WITHOUT APPROVAL OF THE ENGINEER.
- PROVIDE CORNER BARS IN STRIP FOOTINGS, THE SAME SIZE AND NUMBER AS CONTINUOUS REINFORCEMENT UNLESS NOTED OTHERWISE.
- WHERE REQUIRED, STEP NEW FOOTINGS UP OR DOWN IN RATIO OF TWO HORIZONTALS TO ONE VERTICAL TO JOIN EXISTING FOOTINGS. CAST STEPPED FOOTINGS MONOLITHICALLY.
- DOWEL CONCRETE WALLS AND PIERS INTO FOOTINGS WITH DOWELS THE SAME SIZE AND SPACING AS VERTICAL REINFORCEMENT. EXTEND DOWELS TO WITHIN 3' OF BOTTOM OF FOOTING, TERMINATED WITH ACI STD. 90 DEGREE HOOK, UNLESS NOTED OTHERWISE.
- PROVIDE A ROUGH CONCRETE SURFACE (1/4" MINIMUM AMPLITUDE) AT THE INTERSECTION OF CONCRETE WALLS, STEM WALLS, AND PILASTERS WITH THE TOP OF FOOTINGS. DO NOT PROVIDE A KEYWAY UNLESS SHOWN OR NOTED ON THE DRAWINGS
- PROVIDE 3/4" x 3/4" CHAMFER AT ALL EXPOSED CORNERS UNLESS NOTED OTHERWISE.
- NO HOLES OR OPENINGS ARE PERMITTED THROUGH CONCRETE SLABS EXCEPT AS FOLLOWS:
 - WHERE SHOWN AND AS DETAILED ON DRAWINGS.
 - MISCELLANEOUS HOLES THROUGH SLABS WHICH DO NOT DISPLACE MORE THAN ONE BAR. THESE DO NOT REQUIRE ADDITIONAL REINFORCEMENT.
- LOCATE ADDITIONAL CONSTRUCTION JOINTS REQUIRED TO FACILITATE CONSTRUCTION AS ACCEPTABLE TO ENGINEER. LOCATE WALL CONSTRUCTION JOINTS AT MASONRY CONTROL JOINTS WHERE POSSIBLE. PLACE REINFORCEMENT CONTINUOUSLY THROUGH JOINT. DETAIL JOINT AND SHOW ON SHOP DRAWINGS.
- CAST CONCRETE ON SLOPED SURFACES BEGINNING AT LOWEST ELEVATION AND CONTINUING MONOLITHICALLY TOWARD HIGHER ELEVATIONS UNTIL INTENDED POUR IS COMPLETED.
- REINFORCING BARS, BAR SUPPORTS, AND SPACERS SHALL BE DETAILED AND PROVIDED IN ACCORDANCE WITH THE LATEST ACI DETAILING MANUAL. USE WIRE-BAR SUPPORTS COMPLYING WITH CRSI SPECIFICATIONS. SUPPORTS SHALL NOT BE PLACED FURTHER THAN 4 FEET APART. DAYTON SUPERIOR PRODUCTS (800-745-3700) OR EQUAL UNLESS NOTED OTHERWISE IN THE SPECIFICATIONS:
 - AT SLABS-ON-GRADE: (SLAB THICKNESS MINUS 1 1/2 INCHES) HIGH. USE SUPPORTS WITH SAND PLATES OR HORIZONTAL RUNNERS WHERE BASE MATERIAL WILL NOT SUPPORT CHAIR LEGS. CONCRETE BLOCK OR CLAY MASONRY MAY NOT BE USED.
 - AT FOOTINGS: 3 IN. HIGH. USE SUPPORTS WITH SAND PLATES OR HORIZONTAL RUNNERS WHERE BASE MATERIAL WILL NOT SUPPORT CHAIR LEGS. CONCRETE BLOCK OR CLAY MASONRY MAY NOT BE USED.
 - FOR EXPOSED TO VIEW CONCRETE SURFACES WHERE LEGS OF SUPPORTS ARE IN CONTACT WITH THE FORMS, PROVIDE SUPPORTS WITH LEGS THAT ARE PLASTIC PROTECTED (CRSI, CLASS 1) OR STAINLESS STEEL PROTECTED (CRSI, CLASS 2).
- USE ONE OF THE FOLLOWING SEALERS ON ALL INTERIOR EXPOSED CONCRETE SURFACES WHICH DO NOT RECEIVE A STAIN, PAINT OR OTHER TYPE OF COATING:
 - SEAL HARD BY L&M
 - EUCO DIAMOND HARD BY EUCLID
- EVAPORATION REDUCERS SHALL BE USED AFTER EACH FINISHING OPERATION ON THE CAST IN PLACE CONCRETE FLOOR SLAB UNLESS PRIOR APPROVAL FROM THE ENGINEER HAS BEEN OBTAINED TO NOT USE. SEE SPECIFICATIONS FOR PRODUCT REQUIREMENTS.
- SAWCUTS IN CONCRETE SLABS ON GRADE SHALL BE MADE AS SOON AS THE CONCRETE IS OF SUFFICIENT STRENGTH TO SAW WITHOUT RAVELING THE AGGREGATE. ANY TIME LAPSE GREATER THAN 8 HOURS AFTER PLACING THE CONCRETE SHALL BE PERMITTED ONLY IF APPROVED BY THE ENGINEER. FILL ALL INTERIOR JOINTS WITH MM-80 JOINT COMPOUND.
- ADHESIVE ANCHORS WITH REBAR OR THREADED RODS SHALL BE AS NOTED BELOW. INSTALL ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS, WHICH INCLUDES CLEANING THE HOLE WITH AIR AND USING A MANUFACTURER APPROVED DISPENSING TOOL WITH MIXING NOZZLE.
 - INTO CONCRETE OR GROUTED CMU: HILTI HIT-HY 200, SIMPSON SET HIGH STRENGTH EPOXY-TIE ANCHORING ADHESIVE OR APPROVED EQUAL.
 - INTO NON-GROUTED CMU: HILTI HIT HY 20 OR APPROVED EQUAL.

- NO PIPING OR CONDUITS SHALL BE INSTALLED IN ANY CONCRETE WITHOUT THE APPROVAL OF THE ENGINEER.
- WATERSTOPS SHALL BE 6" PVC, CENTER BULB TYPE, SUCH AS GREENSTREAK STYLE 732. SEE SECTIONS FOR LOCATIONS.
- ALL DOWELS, ANCHOR BOLTS, EMBEDDED STEEL, ELECTRICAL CONDUITS, PIPE SLEEVES, PIPING, WATERSTOPS, INSERTS, GROUNDS, AND ALL OTHER EMBEDDED ITEMS AND FORMED DETAILS SHALL BE IN PLACE BEFORE START OF CONCRETE PLACEMENT. FOR EMBEDDED ITEMS AND REQUIRED DETAILS, SEE CIVIL, MECHANICAL, ELECTRICAL, AND ARCHITECTURAL DRAWINGS. VERIFY SIZE AND LOCATION OF ALL OPENINGS.
- ALL PIPING AND DUCT PENETRATIONS THROUGH NEW STRUCTURAL SLABS ARE TO BE SLEEVED OR CHASED. NO CORING OF SLAB IS PERMITTED. ALL PIPING THROUGH EXISTING STRUCTURAL SLABS MAY BE CORED IF APPROVED BY ENGINEER.
- THE VAPOR RETARDER INDICATED ON THE SECTIONS SHALL BE EITHER STEGO 10 MIL CLASS A VAPOR RETARDER OR VAPOR BLOCK 10 BY RAVEN INDUSTRIES. USE STEGO OR RAVEN TAPE ON ALL LAPS AND AROUND ALL PENETRATIONS.

STEEL NOTES:

- STRUCTURAL STEEL FABRICATION AND ERECTION SHALL CONFORM TO THE AISC MANUAL OF STEEL CONSTRUCTION.
- WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY.
- ANY CONNECTIONS WITHOUT WELD SYMBOLS SHALL BE AT A MINIMUM WELDED ALL AROUND WITH THE MINIMUM FILLET OR BUTT WELD SIZE.
- STRUCTURAL STEEL ANGLES, PLATES, ETC. SHALL CONFORM TO ASTM A36 REQUIREMENTS (36 KSI). STRUCTURAL STEEL W AND C SHAPES SHALL CONFORM TO ASTM A992 (50 KSI).
- DO NOT PLACE HOLES THROUGH STRUCTURAL STEEL MEMBERS EXCEPT AS SHOWN AND DETAILED ON STRUCTURAL DRAWINGS.

CONCRETE MASONRY UNIT (CMU) WALL NOTES:

- REFER TO THE ARCHITECTURAL DRAWINGS OR SPECIFICATIONS FOR TYPES OF MASONRY OTHER THAN CONCRETE MASONRY, SUCH AS BRICK. THESE NOTES DO NOT APPLY TO 4" VENEER CMU. IF THERE ARE ANY CONFLICTS BETWEEN THE WRITTEN SPECIFICATIONS AND THESE NOTES, THESE NOTES SHALL GOVERN.
- MORTAR SHALL CONFORM TO TABLE 1 OF ASTM C270, TYPE S. THE MORTAR MIX DESIGN (BY VOLUME) SHALL BE SUBMITTED TO THE ENGINEER BEFORE CONSTRUCTION BEGINS. HOLLOW CONCRETE MASONRY UNITS SHALL CONFORM TO ASTM C90 NORMAL WEIGHT SPECIFICATIONS WITH A MINIMUM COMPRESSIVE STRENGTH OF 2,800 PSI. THE SPECIFIED COMPRESSIVE STRENGTH, f_m, IS 2,000 PSI.
- COARSE CONCRETE GROUT SHALL CONFORM TO ASTM C476 WITH A MAXIMUM AGGREGATE SIZE OF 3/8" AND A SLUMP OF 8 TO 11 INCHES. GROUT MAY BE EITHER READY MIXED OR JOB MIXED, AND SHALL BE BASED ON A MIX DESIGN (BY VOLUME) APPROVED BY THE ENGINEER. THE AMOUNT OF COARSE AGGREGATE SHALL NOT EXCEED THE AMOUNT OF FINE AGGREGATE. EVIDENCE THAT THE MIX DESIGN SHOULD ACHIEVE A 28 DAY MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI SHALL BE PROVIDED TO THE ENGINEER. HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPRESSIVE STRENGTH.
- WHEN MIXING MORTAR AND GROUT, CONTAINERS OF KNOWN VOLUME SHALL BE USED. MEASUREMENT USING SHOVELS SHALL NOT BE ALLOWED. FOR GROUT, THE SAND AND PEA GRAVEL SHALL BE TAKEN FROM SEPARATE PILES, NOT FROM A PRE-BLENDED PILE. IF MEASUREMENT BY SHOVELING OR USE OF A PRE-BLENDED PILE IS DISCOVERED, THE ENGINEER MAY REQUIRE ALL WALLS BUILT SO FAR TO BE TESTED PER ASTM C 1314 BY CUTTING 3 MASONRY PRISMS AND 3 GROUT CORES OUT OF THE WALL FOR EVERY 5,000 SQUARE FEET OF WALL, AND MAY REQUIRE ANY AREA OF WALL TESTING BELOW 2,000 PSI TO BE REPLACED AT NO COST TO THE OWNER.

- THREE GROUT PRISMS SHALL BE MADE DURING THE FIRST DAY OF MASONRY WORK AND FOR EVERY 5,000 SF OF WALL (OR LESS) THEREAFTER, WITH ALL THREE PRISMS TESTED AT 28 DAYS. THE ENGINEER MAY REQUIRE ANY AREA OF WALL TESTING BELOW 2,000 PSI TO BE REPLACED AT NO COST TO THE OWNER. EVERY TIME A SET OF GROUT PRISMS IS MADE, THE LABORATORY SHALL VERIFY:
 - PROPORTIONS OF MORTAR AND GROUT MIXING
 - REBAR AND JOINT REINFORCEMENT SIZES AND LOCATIONS
 - PROPER GROUT PLACEMENT AT REBAR
 - HEADJOINTS ARE FULLY MORTARED
 - CONTROL JOINTS ARE REINFORCED AND FULLY MORTARED
 - PROPER COLD AND HOT WEATHER PROCEDURES USED
- COLD WEATHER AND HOT WEATHER PROCEDURES SHALL BE USED IN ACCORDANCE WITH ACI 530.1/ASCE 6/TMS 602 ARTICLE 1.8C AND 1.8D.
- REINFORCING STEEL SHALL BE NEW DOMESTIC DEFORMED BILLET STEEL CONFORMING TO ASTM A-615 GRADE 60.
- ALL LOAD BEARING CMU WALLS (IDENTIFIED ON THE ROOF PLAN) SHALL BE REINFORCED VERTICALLY WITH #5 BARS, AT 4 FEET ON CENTER, AND HORIZONTALLY WITH STANDARD LADDER TYPE DUR-O-WALL, AT 16 INCHES ON CENTER. HORIZONTAL BOND BEAMS SHALL BE REINFORCED WITH 2 #5 BARS. VERTICAL REINFORCEMENT SHALL EXTEND TO THE TOP OF ALL PARAPETS. PROVIDE REINFORCEMENT BARS ALL AROUND ALL OPENINGS, EXTENDING 2 FEET PAST EACH CORNER. REFER TO THE LINTEL SCHEDULE FOR ADDITIONAL REINFORCEMENT. ALL TOP COURSES SHALL HAVE A HORIZONTAL KNOCK-OUT BLOCK BOND BEAM. ALL REINFORCEMENT BARS IN CMU WALLS SHALL BE PROVIDED WITH 1" CONCRETE GROUT COVER.
- ALL NON-LOAD BEARING CMU WALLS SHALL BE REINFORCED HORIZONTALLY WITH STANDARD LADDER TYPE DUR-O-WALL, AT 16 INCHES ON CENTER. HORIZONTAL BOND BEAMS SHALL BE LOCATED AT THE TOP COURSE OF THE WALL AND ABOVE AND BELOW OPENINGS. HORIZONTAL BEAMS SHALL BE REINFORCED WITH 2 #5 BARS, IN 8 INCH AND 12 INCH WALLS, OR 1 #4 BAR, IN 6 INCH WALLS. PROVIDE 1 #4 BAR VERTICAL REINFORCEMENT ON EACH SIDE OF AN OPENING. EXTEND REINFORCEMENT 2 FEET PAST EACH CORNER OF AN OPENING. REFER TO THE LINTEL SCHEDULE FOR ADDITIONAL REINFORCEMENT. ALL REINFORCEMENT BARS IN CMU WALL SHALL BE PROVIDED WITH 1" CONCRETE GROUT COVER.
- THE MINIMUM SPLICE LENGTH FOR ALL VERTICAL AND HORIZONTAL REINFORCEMENT IN ALL MASONRY SHALL BE AS FOLLOWS:
 - #4 BARS - 1'-0" (MIN)
 - #5 BARS - 1'-4" (MIN)
 - #6 BARS - 2'-5" (MIN)
 - #7 BARS - 3'-4" (MIN)
- PROVIDE VERTICAL CONTROL JOINTS AT LOCATIONS APPROVED BY THE ARCHITECT, WITH A MAXIMUM SPACING OF 20 FEET. HORIZONTAL BOND BEAM REINFORCEMENT SHALL CONTINUE THROUGH ALL CONTROL JOINTS IN ALL WALLS (BOTH LOAD-BEARING AND NON-LOAD BEARING WALLS). CONTROL JOINTS SHALL CONSIST OF A VERTICAL MASONRY JOINT, RAKED BACK AND CAULKED.

WOOD NOTES:

- CLIPS AND HOLDDOWNS SHALL BE EQUAL TO SIMPSON CONNECTORS AND SHALL BE INSTALLED ACCORDING TO THE SPECIFICATIONS OF SIMPSON STRONG-TIE COMPANY, INC. (800-999-5099). ALL OPTIONAL HOLES (TRIANGLE, OBROUND, AND DIAMOND) SHALL BE FILLED WITH NAILS.
- OSB SHEATHING MAY BE USED IN LIEU OF PLYWOOD SHOWN ON THE PLANS UNLESS NOTED OTHERWISE OR EXPOSED TO HIGH MOISTURE.
- COMPLY WITH THE LATEST EDITIONS OF THE "PLYWOOD DESIGN SPECIFICATION" AND "PANEL DESIGN SPECIFICATION" BY THE ENGINEERED WOOD ASSOCIATION.
- "RECOMMENDED NAILING SCHEDULE" OF REFERENCED FRAMING STANDARD AND WITH "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION" BY AMERICAN WOOD COUNCIL.
- PRESERVATIVE WOOD TREATMENT:
 - GENERAL: WHERE LUMBER OR PLYWOOD IS INDICATED AS PRESSURE-TREATED WOOD OR IS SPECIFIED HEREIN TO BE TREATED, COMPLY WITH APPLICABLE REQUIREMENTS OF AWPA C2 (LUMBER) AND AWPA C9 (PLYWOOD). MARK EACH TREATED ITEM WITH THE QUALITY MARK REQUIREMENTS OF AN INSPECTION AGENCY APPROVED BY ALSC'S BOARD OF REVIEW.
 - PRESSURE-TREATED WOOD MEMBERS WITH WATER-BORNE PRESERVATIVE TO A MINIMUM RETENTION OF 0.40 PCF, AFTER TREATMENT, KILN-DRY LUMBER TO A MAXIMUM MOISTURE CONTENT OF 15 PERCENT.

ALUMINUM GRATING NOTES:

- ALUMINUM GRATING SHALL COMPLY WITH APPLICABLE PROVISIONS AND RECOMMENDATIONS OF THE FOLLOWING:
 - NAAM METAL BAR GRATING MANUAL DESIGNATED ANSINAAM MBG 531 (ALUMINUM AND LIGHT DUTY STEEL AND STAINLESS STEEL GRATING) AND MBG 532 (HEAVY DUTY STEEL GRATING).
- ALUMINUM MATERIAL SHALL BE ASTM B221, ALUMINUM ALLOY, EXTRUDED BARS, RODS, WIRE, SHAPES AND TUBING.
- ALUMINUM GRATING SHALL BE:
 - IKG BORDEN, INC. - TYPE FS.
 - OHIO GRATINGS, INC. - TYPE 15-SG-4.
 - OR EQUAL
- PERMETER FRAMES SHALL BE EXTRUDED DESIGN, ALLOY 6063-T6 AND SHALL BE PROVIDED BY MANUFACTURER OF APPROVED GRATING SYSTEM. FRAME ASSEMBLIES SHALL BE SHOP FABRICATED WITH MITER CUTS AND WELDED CORNERS AND SHALL BE SIZED TO MATCH GRATING DEPTH. ALL EXPOSED WELDS SHALL BE GROUND SMOOTH.
- VERTICAL AND HORIZONTAL LEGS OF FRAME SHAPE SHALL HAVE 1/4" WALL THICKNESS. FRAME SHALL BE DESIGNED TO PROVIDE A CONTINUOUS SLOT TO ACCOMMODATE FASTENERS, AND SHALL HAVE A CONTINUOUS EXTRUDED ANCHOR.
- TRAFFIC SURFACE FOR ALUMINUM BAR GRATINGS SHALL BE GROOVED.
- INSTALL GRATING IN ACCORDANCE WITH SHOP DRAWINGS AND STANDARD INSTALLATION CLEARANCES AS RECOMMENDED BY THE NAAMM METAL BAR GRATING MANUAL.
- PERFORM ALL CUTTING AND FITTING REQUIRED FOR INSTALLATION. GRATING SHALL BE PLACED SUCH THAT CROSS BARS ALIGN.
- WHEREVER GRATING IS PIERCED BY PIPES, DUCTS AND STRUCTURAL MEMBERS, CUT OPENINGS NEATLY AND ACCURATELY TO SIZE AND WELD A RECTANGULAR BAND BAR OF THE SAME HEIGHT AND MATERIAL AS BEARING BARS.
- CUTOUTS FOR CIRCULAR OBSTRUCTIONS ARE TO BE AT LEAST 2" LARGER IN DIAMETER THAN THE OBSTRUCTION. CUTOUTS FOR ALL PIPING 4" OR LESS SHALL BE MADE IN THE FIELD.
- ALL RECTANGULAR CUTOUTS ARE TO BE MADE TO THE NEXT BEARING BAR BEYOND THE PENETRATION WITH A CLEARANCE NOT TO EXCEED BEARING BAR SPACING.
- UTILIZE STANDARD PANEL WIDTHS WHEREVER POSSIBLE.
- EDGE BAND ALL GRATING PANELS WITH ALUMINUM RECTANGULAR BAR OF SAME SIZE AS GRATING BARS. WELD EDGE BANDING AT EVERY GRATING BAR WITHIN CENTER 75 PERCENT OF BAR DEPTH. GRIND SMOOTH ALL WELDS THAT EXTEND PAST THE TOP OR BOTTOM EDGE.
- SIZE OF GRATING PANELS SHALL NOT EXCEED 60 POUNDS PER SECTION.
- GRATING SECTIONS SHALL BE FASTENED DOWN WITH TYPE 316 STAINLESS STEEL SADDLE CLIPS. PROVIDE A MINIMUM OF FOUR FASTENERS (ONE AT EACH CORNER) PER PANEL.
- ALL ALUMINUM FRAMES AND SUPPORTS IN DIRECT CONTACT WITH CONCRETE OR MASONRY SHALL BE BACKPAINTED WITH BITUMINOUS PAINT.
- THE CONTRACTOR SHALL SUBMIT FOR APPROVAL SHOP DRAWINGS FOR THE FABRICATION AND ERECTION OF ALL WORK. INCLUDE PLANS, ELEVATIONS, AND DETAILS OF SECTIONS AND CONNECTIONS. SHOW TYPE AND LOCATION OF ALL FASTNERS.
- THE CONTRACTOR SHALL SUBMIT THE MANUFACTURER'S SPECIFICATIONS, LOAD TABLES, ANCHOR DETAILS AND STANDARD INSTALLATION DETAILS.

COLD FORMED METAL FRAMED TRUSS NOTES:

- COLD FORMED STEEL TRUSSES SHALL BE DESIGNED IN ACCORDANCE WITH THE AMERICAN IRON AND STEEL INSTITUTE "NORTH AMERICAN STANDARD FOR COLD-FORMED STEEL FRAMING - TRUSS DESIGN (AISI S214-12)", 2012 EDITION, THE "NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS (AISI S100-12)", 2012 EDITION, AND THE "NORTH AMERICAN STANDARD FOR COLD-FORMED STEEL FRAMING - GENERAL PROVISIONS (AISI S1200-12)", 2012 EDITION.
- COLD FORMED STEEL TRUSSES SHALL BE DESIGNED FOR THE LOADS INDICATED IN THE TRUSS LOADING DIAGRAMS.
- ROOF PURLINS BRACE THE TOP CHORD OF THE TRUSSES. TEMPORARY AND UPLIFT BRACING SHALL BE PROVIDED AS REQUIRED PER THE TRUSS MANUFACTURER'S RECOMMENDATIONS TO PROVIDE LATERAL STABILITY UNTIL CONNECTIONS ARE COMPLETE (INCLUDING HORIZONTAL BRACING).
- ROOF TRUSS CONNECTIONS:
 - ALL FIELD CONNECTIONS ARE TO BE SCREWED UNLESS OTHERWISE NOTED ON THE DRAWINGS.
 - DESIGN OF CONNECTION SHALL INCLUDE LOADS FROM ALL MEMBERS INCLUDING BRACING MEMBERS.
 - THE SREW REQUIREMENTS FOR EACH MEMBER IN A CONNECTION SHALL BE CONSIDERED INDEPENDENTLY TO DETERMINE THE NUMBER OF SCREWS REQUIRED.
 - ROOF TRUSS CONNECTIONS SHALL BE DESIGNED FOR THE LOADS SHOWN ON THE CONTRACT DRAWINGS.
 - UNLESS SPLICE, SIZE OR SLOPE CHANGE IS NOTED; BOTTOM AND TOP CHORD MEMBERS OF TRUSSES SHALL BE CONTINUOUS.
 - WHERE SPLICE IS REQUIRED, LOCATE SPLICE ON THE SIDE OF THE PANEL POINT WHICH HAS THE SMALLER FORCE. SPLICE LOCATION SHALL BE COORDINATED WITH THE ENGINEER OF RECORD.
- ROOF TRUSSES SHALL BE ASTM A 1003, STRUCTURAL GRADE, TYPE H, METALLIC COATED, GALVANIZED (G60).

DESIGN LOADS:

THE FOLLOWING DESIGN LOADS WERE USED FOR THIS BUILDING BASED ON THE 2012 VIRGINIA UNIFORM STATEWIDE BUILDING CODE:

BUILDING OCCUPANCY CATEGORY - III

DESIGN OF THE CONCRETE SLABS-ON-GRADE ARE BASED ON THE ABOVE EQUIPMENT LOADS. CONTRACTOR SHALL VERIFY ALL FINAL PURCHASED EQUIPMENT LOADS. SHOULD THE LOADS OF THE PURCHASED EQUIPMENT EXCEED THOSE VALUES SHOWN ABOVE, CONTRACTOR SHALL NOTIFY OWNER AND ENGINEER PRIOR TO ORDERING MATERIAL OR PLACING ANY CONCRETE SLABS.

| | | |
|--------------------------------------|----|-----|
| ROOF DEAD LOADS TOP CHORD: | | |
| STANDING SEAM ROOFING: | 3 | PSF |
| 3/4 INCH PLYWOOD ROOF SHEATHING: | 3 | PSF |
| ROOF DEAD LOADS BOTTOM CHORD: | | |
| 12 INCH PLYWOOD CEILING: | 2 | PSF |
| MECHANICAL AND ELECTRICAL ALLOWANCE: | 2 | PSF |
| INSULATION | | |
| TOTAL | 14 | PSF |

| | | |
|---------------------|-----|-----|
| GRATING LIVE LOADS: | 100 | PSF |
| ROOF LIVE LOAD: | 20 | PSF |

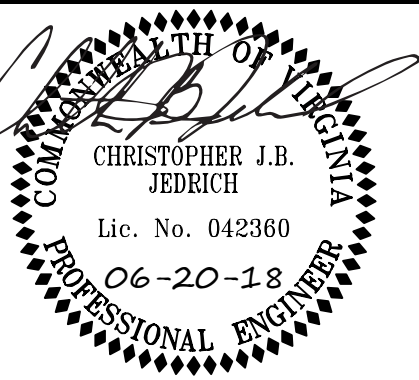
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|------------------------------|------|-----|
| ROOF SNOW LOAD: | 25 | PSF |
| GROUND SNOW LOAD: | 21.2 | PSF |
| FLAT-ROOF SNOW LOAD: | 1.0 | |
| SNOW EXPOSURE FACTOR: | 1.1 | |
| SNOW LOAD IMPORTANCE FACTOR: | 1.1 | |
| THERMAL FACTOR: | 1.1 | |

| | | |
|--|----------|-----|
| WIND DESIGN DATA: | | |
| ULTIMATE DESIGN WIND SPEED (3 SECOND GUST): | 120 | MPH |
| NOMINAL DESIGN WIND SPEED: | 93 | MPH |
| WIND IMPORTANCE FACTOR: | 1.0 | |
| WIND EXPOSURE CATEGORY: | C | |
| INTERNAL PRESSURE COEFFICIENTS: | +/- 0.18 | |
| ALL NEW COMPONENTS AND CLADDING NOT DESIGNED BY THE ENGINEER SHALL BE DESIGNED FOR 25 PSF UNLESS OTHERWISE APPROVED BY THE ENGINEER. | | |

| | | |
|---|---|--|
| EARTHQUAKE DESIGN DATA: | | |
| SEISMIC IMPORTANCE FACTOR: | 1.25 | |
| MAPPED SPECTRAL RESPONSE ACCELERATIONS: | SS = 0.169 | |
| | S1 = 0.071 | |
| | D | |
| | B | |
| | INTERMEDIATE REINF. MASONRY SHEAR WALLS | |
| | 21.5 kips | |
| | Cs = 0.0646 | |
| | R = 3.5 | |
| | EQUIVALENT LATERAL FORCE METHOD | |

| | |
|---------------------------------------|--|
| SITE CLASS: | |
| SEISMIC DESIGN CATEGORY: | |
| BASIC SEISMIC-FORCE-RESISTING SYSTEM: | |
| DESIGN BASE SHEAR: | |
| SEISMIC RESPONSE COEFFICIENT: | |
| RESPONSE MODIFICATION FACTOR: | |
| ANALYSIS PROCEDURE USED: | |

FLOOD HAZARD INFORMATION:
THIS BUILDING IS NOT DESIGNED FOR FLOOD LOADS.



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

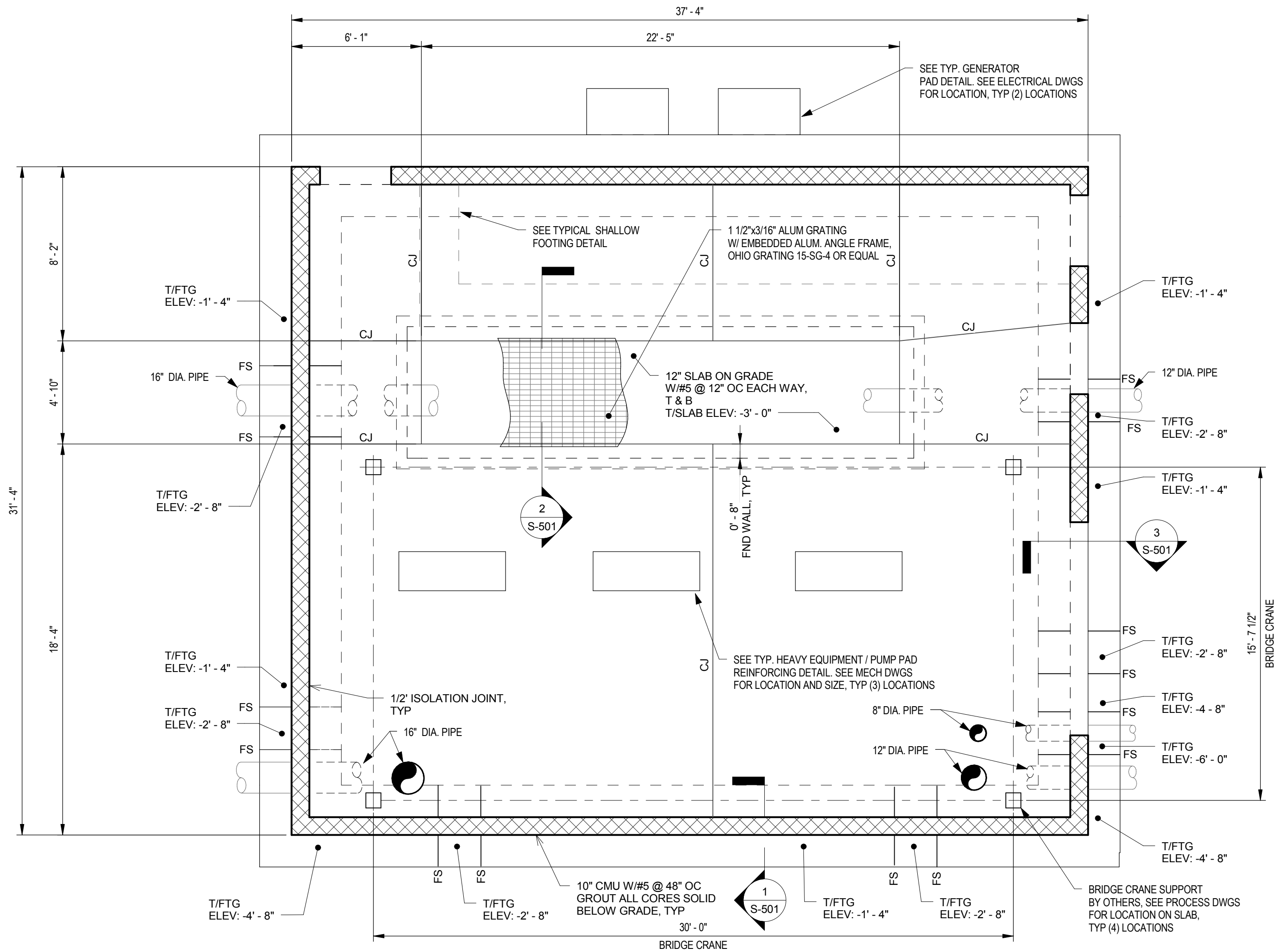
| No. | Submittal / Revision | App'd. | By | Date |
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| BID ISSUE | ETA | CTB | 6/20/2018 |
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GENERAL NOTES AND
DESIGN DATA

| | | |
|-------------------------|---------------------------|--------------------|
| Designed By: APM | Drawn By: CEC | Checked By: CJJ |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

Central File - Update this text with Central file location
Saved: 6/20/2018 7:43:36 AM Current Local File: C:\Users\5799\Documents\Revit 2016\27872-3002-STRUCT16-CENT_mmno.rvt



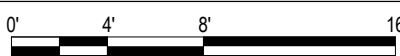
- NOTES:
1. PROVIDE A 6" SLAB ON GRADE WITH #4 @ 12" OC EACH WAY, CENTERED, UNLESS NOTED OTHERWISE.
 2. FINISHED FLOOR ELEVATION TO BE AT ELEVATION: 950.5' (REFERENCE ELEVATION: 0' - 0" UNLESS NOTED +/- THEREFROM ON PLAN.)
 3. FS :DENOTES FOOTING STEP
 4. CJ :DENOTES CONTROL JOINT



2

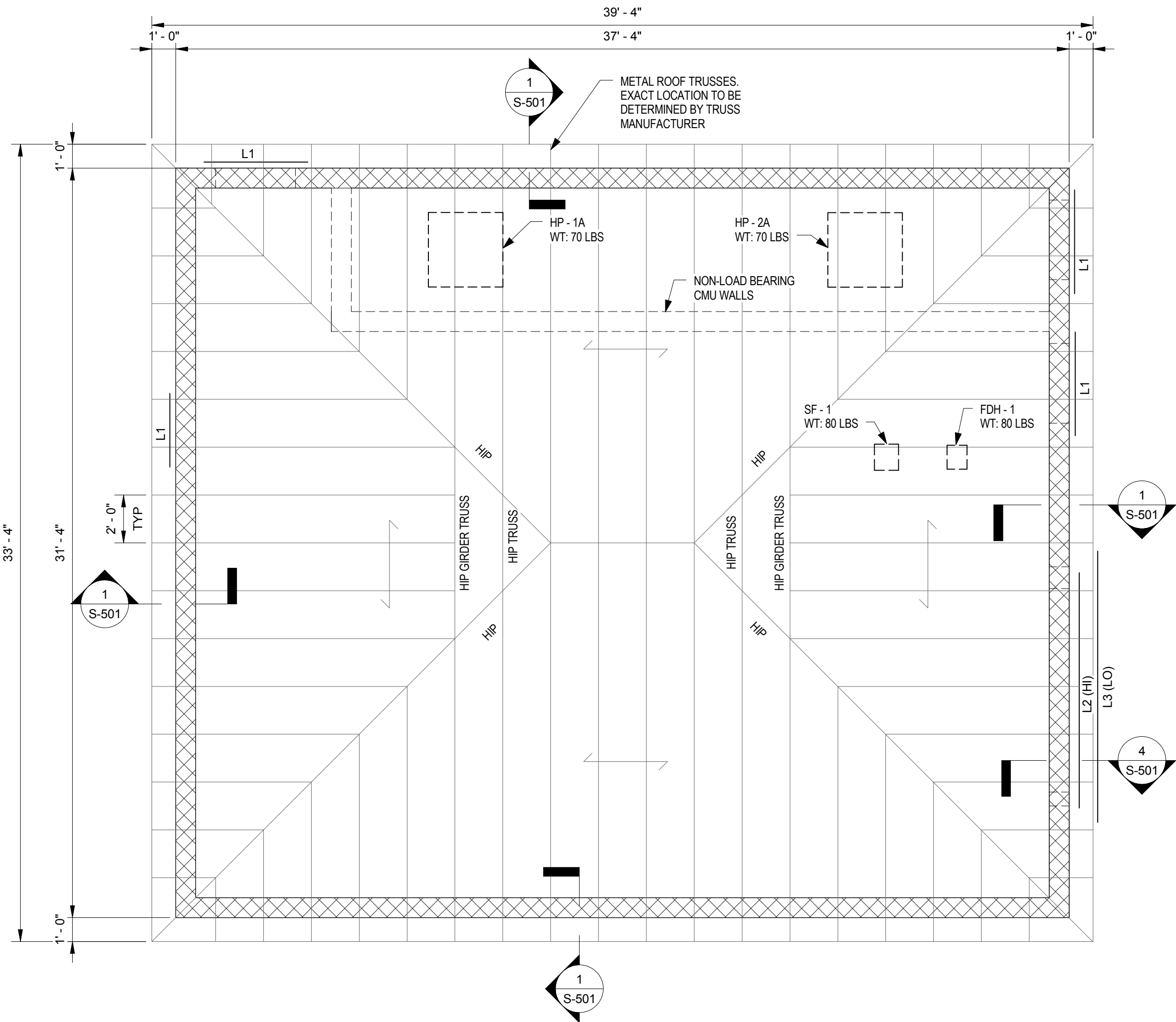
FOUNDATION/FLOOR PLAN

1/4" = 1'-0"



NOTE:

FLOOR SLAB DESIGN AT BRIDGE CRANE AT (4) COLUMNS IS PRELIMINARY AND FOR BID PURPOSES ONLY. GENERAL CONTRACTOR SHALL VERIFY FINAL DESIGN REACTIONS AT COLUMNS WITH SELECTED CRANE MANUFACTURER. CONTRACTOR SHALL COORDINATE WITH THE CRANE MANUFACTURER AND PROVIDE FINAL DESIGN REQUIREMENTS FOR SLAB THICKNESS, SLAB REINFORCING, ANCHOR BOLT DIAMETERS, MATERIAL PROPERTIES AND EMBEDMENT LENGTHS, SEALED AND SIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF VIRGINIA. COST OF SLAB MODIFICATIONS, IF NECESSARY, SHALL BE INCLUDED IN THE CONTRACTOR'S BASE BID.



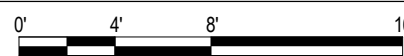
- NOTES:
1. TOP OF CMU WALL AND TRUSS BEARING ELEV: +16' - 8" UNLESS NOTED +/- THEREFROM ON PLAN.
 2. TRUSS LAYOUT SHOWN FOR INTENT ONLY. CONTRACTOR TO SUBMIT LIGHT GAUGE TRUSS ROOF SYSTEM CALCULATION AND PLANS SIGNED AND SEALED BY VIRGINIA STATE LICENSED ENGINEER PRIOR TO FABRICATION.
 3. CONTRACTOR SHALL VERIFY OPERATION WEIGHT OF ALL MECHANICAL EQUIPMENT. SHOULD LOADS SHOWN ON PLAN BE EXCEEDED, CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO INSTALLATION.
 4. SEE ARCHITECT AND MECHANICAL DRAWINGS FOR ROOF OPENINGS, EQUIPMENT HUNG FROM THE ROOF STRUCTURE, AND ROOFTOP EQUIPMENT.



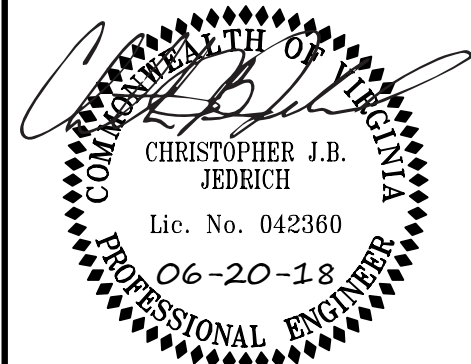
1

ROOF FRAMING PLAN

1/4" = 1'-0"



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ROUTE 460 PUMPSTATION
BEDFORD, VA

| No. | Submittal / Revision | App'd. | By | Date |
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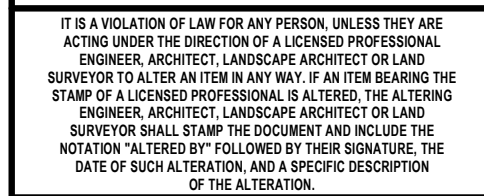
BID ISSUE | ETA | CTB | 6/20/2018

FOUNDATION/FLOOR AND ROOF FRAMING PLAN

| | | |
|-------------------------|---------------------------|--------------------|
| Designed By: APM | Drawn By: CEC | Checked By: CJJ |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

Drawing No:

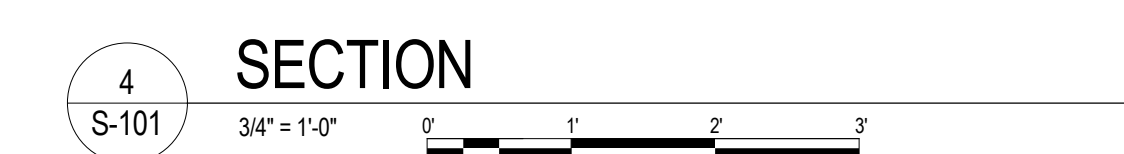
S-101



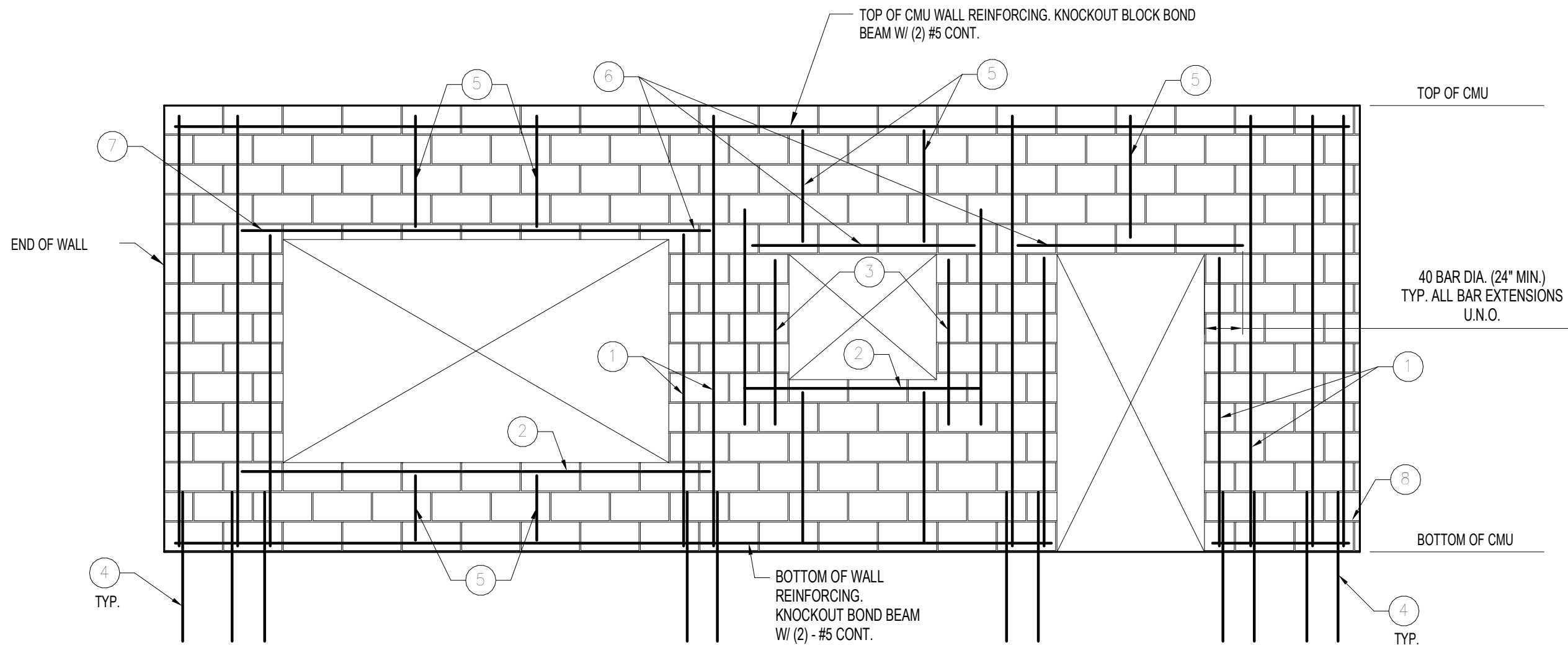
| No. | Submittal / Revision | App'd. | By | Date |
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SECTIONS AND DETAILS

S-501



Central File: Update this text with Central file location
Saved: 6/20/2018 7:43:36 AM Current Local File: C:\Users\5799\Documents\Revit 2016\27872-3002-STRUCT-16-CENT_mmwr.rvt



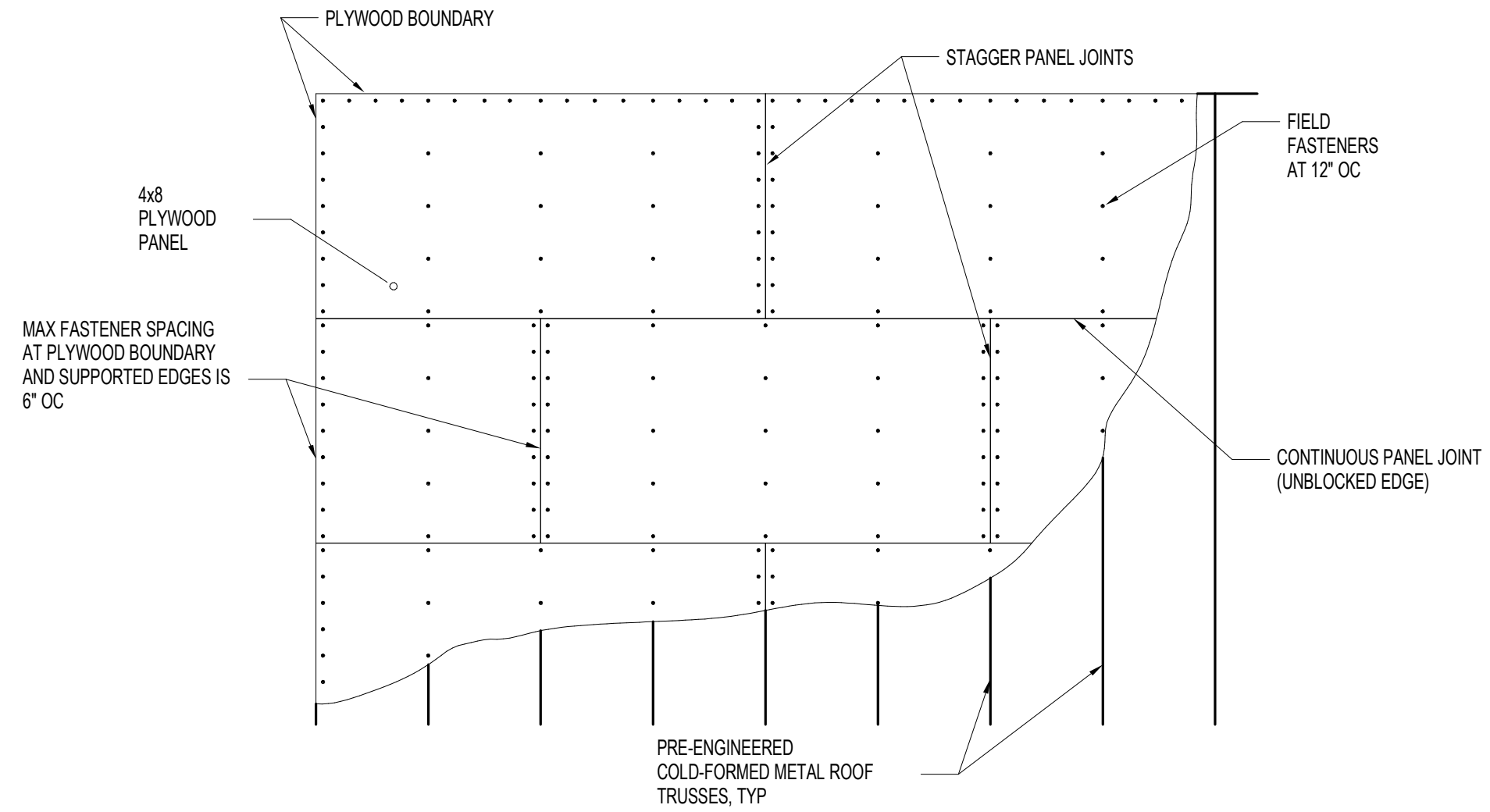
OPENING GREATER THAN
16\"/>

OPENING TO 16\"/>

DOOR

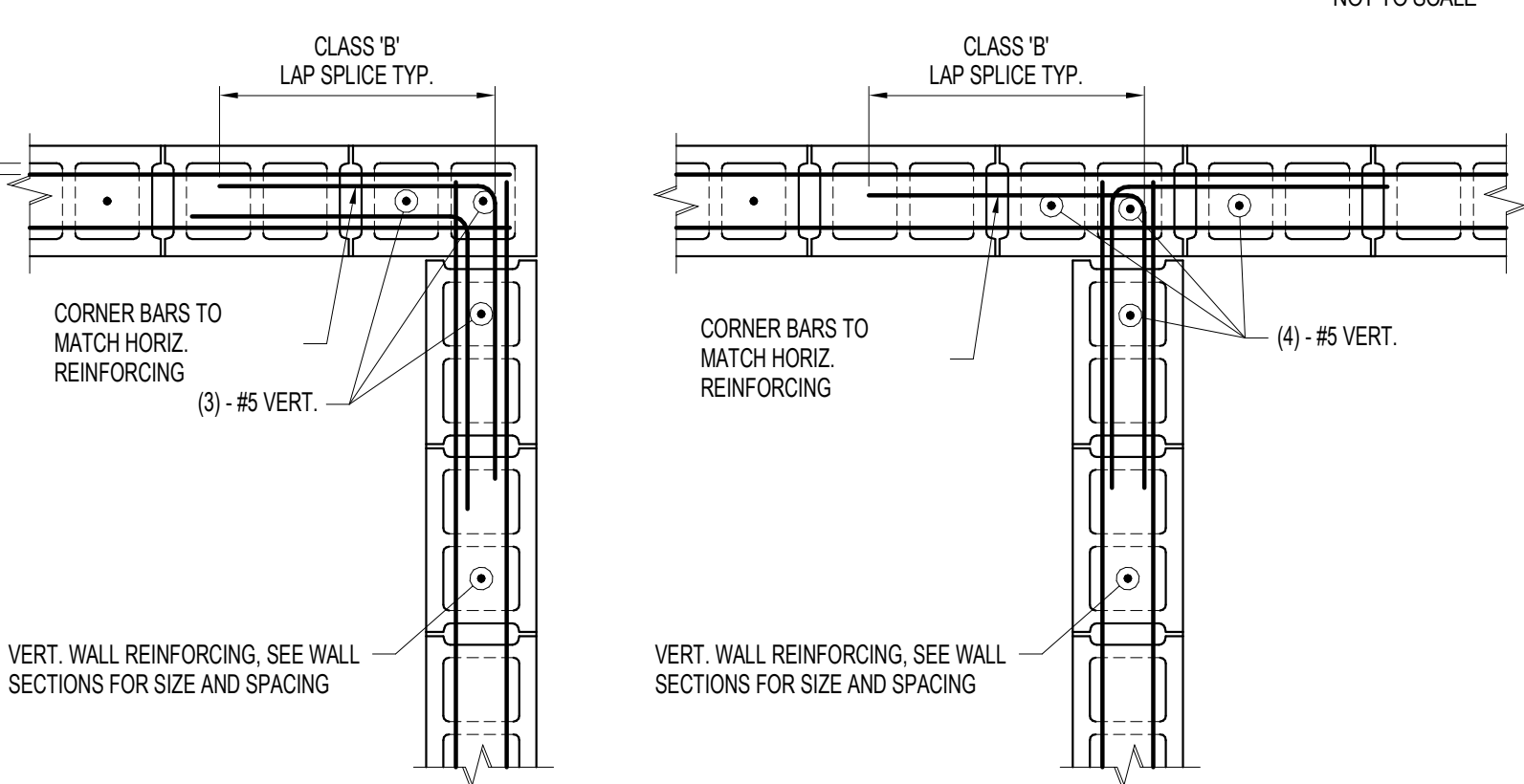
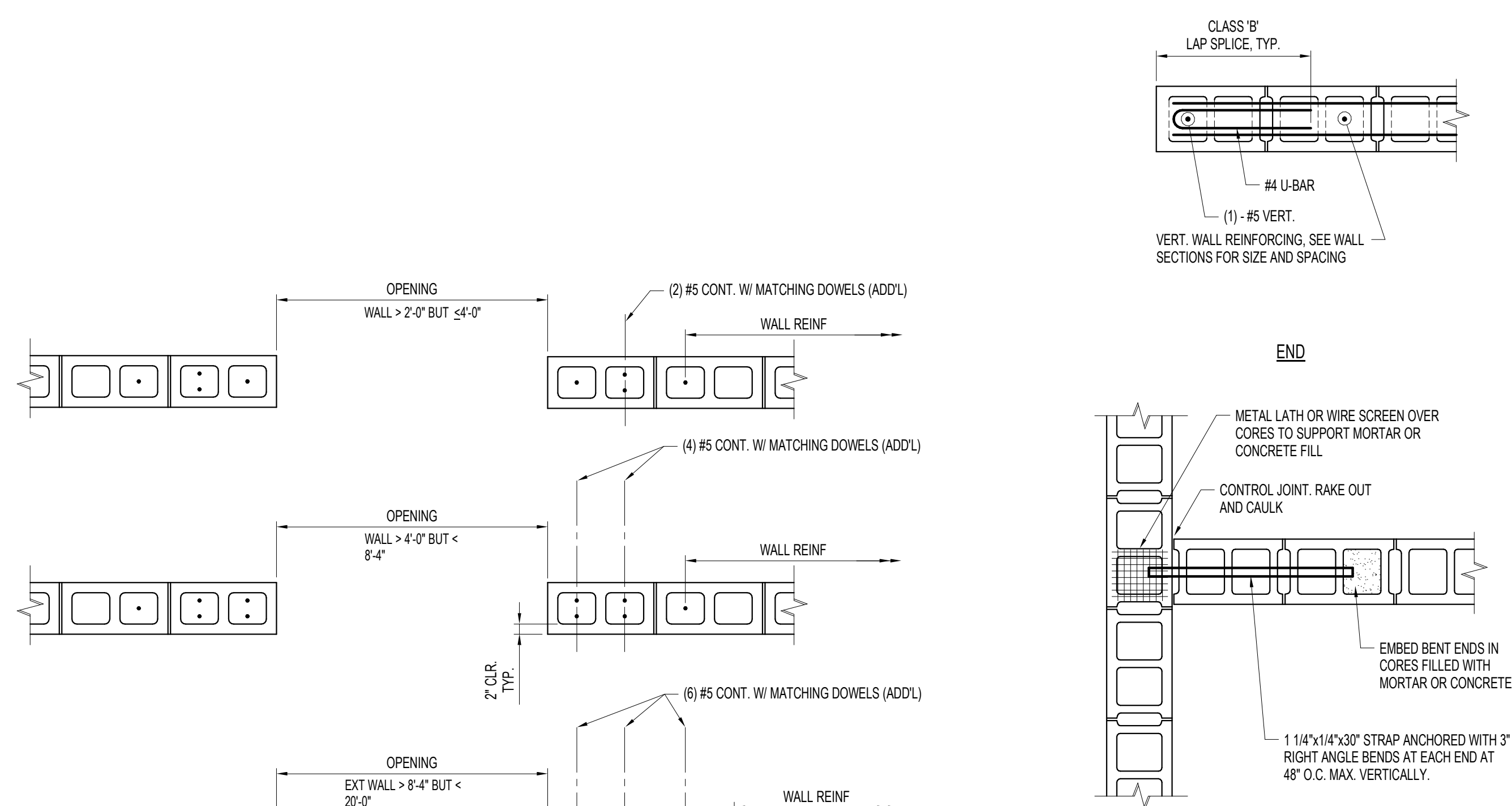
TYP. MASONRY WALL REINFORCEMENT LAYOUT DETAIL
SCALE: N.T.S.

- SEE TYPICAL CMU WALL OPENING DETAIL, THIS SHEET. BARS IN CORES DIRECTLY ADJACENT TO OPENING EXTEND TO UNDERSIDE OF LINTEL BEARING. BARS IN CORES 12\"/>
- SILL BARS. KNOCK OUT BLOCK BOND BEAM W/(2) #5 CONT. BELOW ALL OPENINGS
- (1) #5 EACH SIDE
- SEE TYPICAL CMU WALL REINFORCING DETAIL
- BETWEEN BARS SHOWN, PROVIDE TYPICAL WALL REINF PER TYP. WALL REINFORCING DETAIL
- U-BLOCK OR STEEL LINTELS. SEE LINTEL SCHEDULE. PROVIDE KNOCKOUT BOND BEAM W/(2)#5 CONTINUOUS ABOVE ALL STEEL LINTELS
- IF FULL LENGTH IS NOT AVAILABLE, EXTEND AS FAR AS POSSIBLE, HOOK 90°, THEN EXTEND, BEYOND BEND, REMAINDER OF LENGTH REQD (NOT LESS THAN 12\")
- PROVIDE HORIZONTAL LADDER TYPE JOINT REINFORCEMENT AT 16\"/>



- NOTES:
- PLYWOOD SHALL BE FASTENED TO PRE-ENGINEERED COLD-FORMED METAL ROOF TRUSSES WITH FLAT HEAD STABBER, #8x1-1/2\", CLEAR ZINC SCREWS BY GRABBER CONSTRUCTION PRODUCTS OR EQUAL. DRYWALL SCREWS SHALL NOT BE USED.

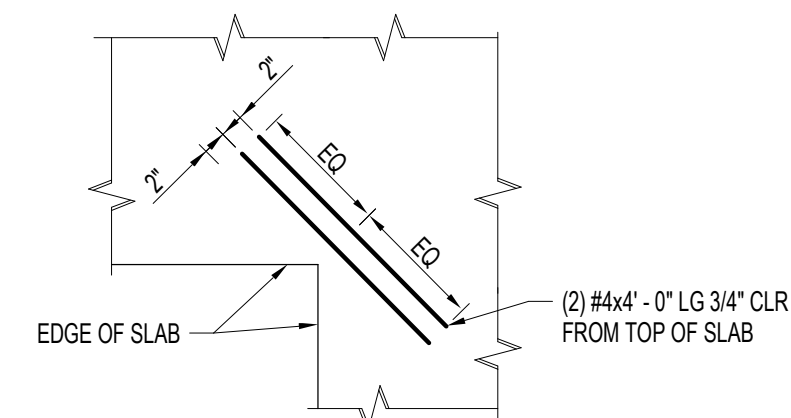
TYPICAL PLYWOOD FASTENING DETAIL
NOT TO SCALE



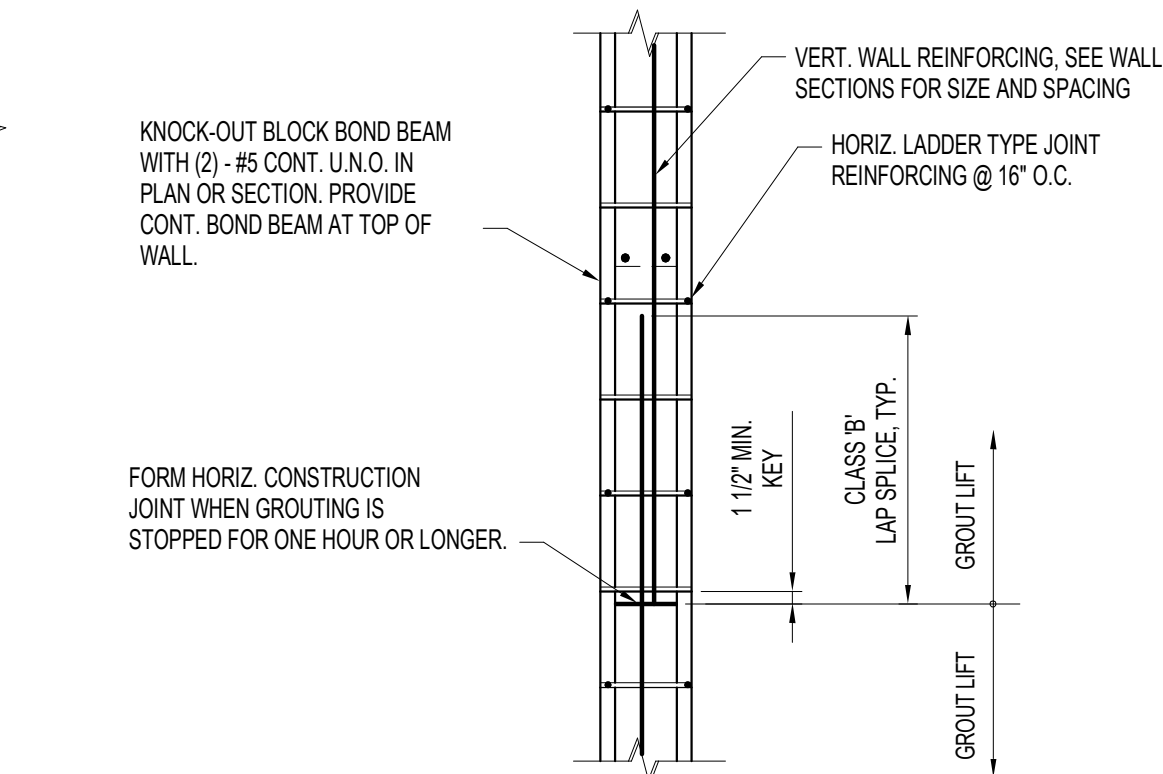
CORNER

TYP. BOND BEAM DETAILS
NOT TO SCALE

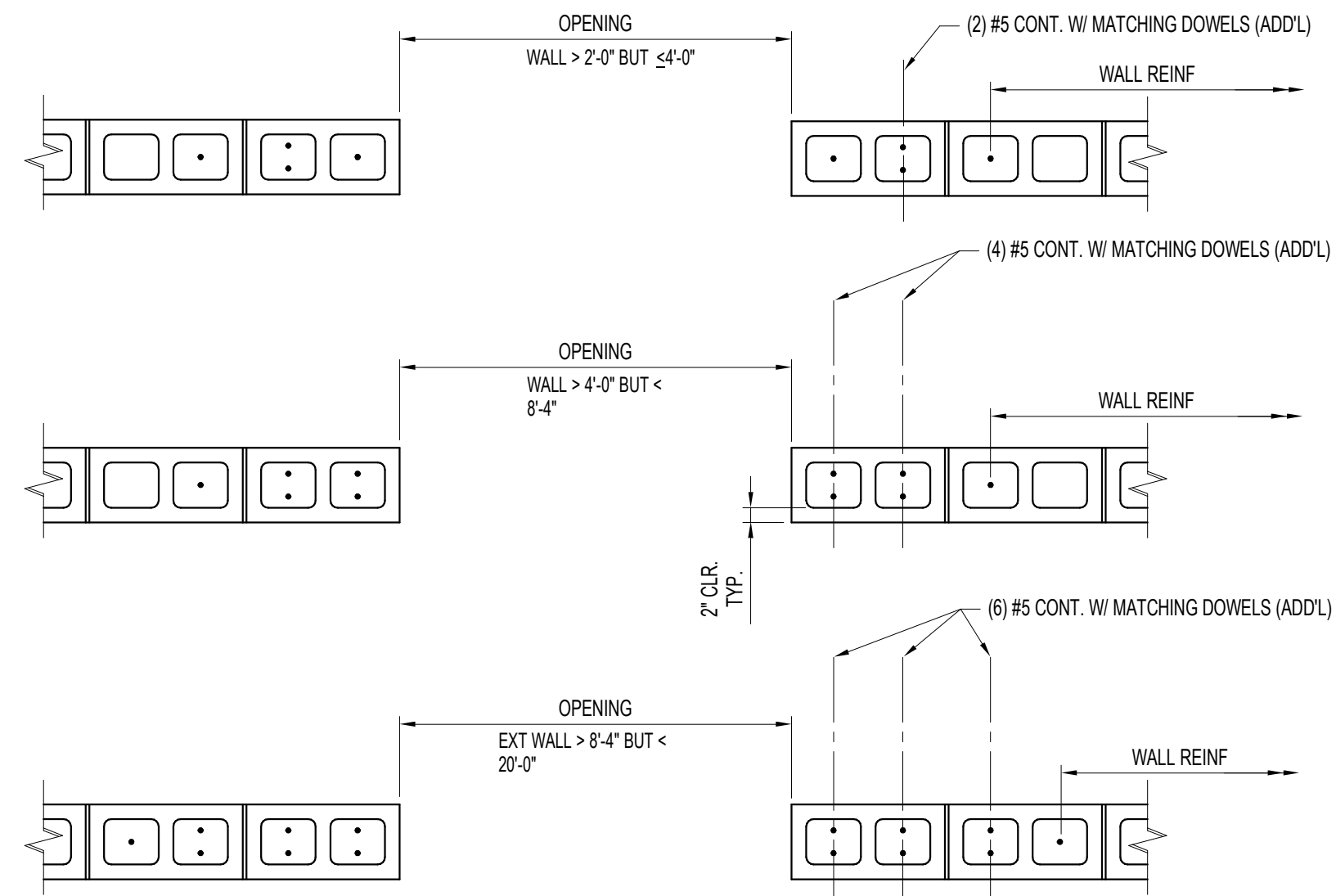
INTERSECTION



TYP. MASONRY DETAIL AT INTERSECTION
NOT TO SCALE



TYP. MASONRY WALL VERTICAL LAP SPLICE DETAIL
NOT TO SCALE



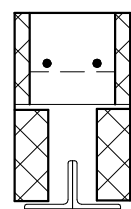
TYP. ADDITIONAL REINFORCING AT CMU OPENING DETAIL
NOT TO SCALE

| INTERIOR LINTEL SCHEDULE | | |
|--|------------------|------------------|
| (NON-LOADBEARING MASONRY PARTITION WALLS ONLY) | | |
| MAXIMUM MASONRY OPENING | 8 INCH WALLS | 12 INCH WALLS |
| 4'-0" | (2) L4x3 1/2x1/4 | (3) L4x3 1/2x1/4 |
| 6'-0" | (2) L5x3 1/2x1/4 | (3) L4x3 1/2x1/4 |
| 8'-0" | (2) L6x3 1/2x1/4 | (3) L4x3 1/2x1/4 |

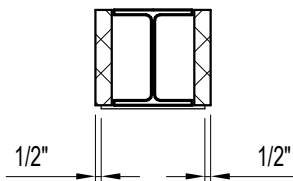
- NOTES:
- INTERIOR LINTELS ARE NOT SHOWN ON STRUCTURAL PLANS.
 - ALL HORIZONTAL LINTEL ELEMENTS SUPPORTING EXTERIOR WYTHES OF MASONRY SHALL BE HOT DIP GALVANIZED.
 - SEE ARCHITECTURAL AND MECHANICAL DRAWINGS FOR SIZE AND LOCATION OF OPENINGS.
 - FOR OPENINGS OVER 8'-0\"/>
 - ALL ANGLES SCHEDULED ABOVE SHALL BE ORIENTED WITH LONG LEGS VERTICAL, U.N.O.
 - TACK WELD BACK-TO-BACK VERTICAL LEGS OF MULTIPLE ANGLE LINTELS.
 - LOOSE LINTELS UP TO 4'-0\"/>
 - STEEL LINTELS SHALL NOT BE USED IN MASONRY FIREWALLS. ONLY CMU LINTELS ARE ACCEPTABLE.

| EXTERIOR LINTEL SCHEDULE | | | | |
|--------------------------|---------------------|--------|---------|---|
| MARK | SIZE | M.O. | SECTION | REMARKS |
| L-1 | (2)-L4X4 3/8x1/4" | 3'-4" | A | REINFORCE BOND BEAM W/ (2) #5 CONT. EXTEND 2'-0\"/> |
| L-2 | W8x24 + 5/16" PLATE | 8'-6" | B | PROVIDE 6" MINIMUM BEARING |
| L-3 | W8x24 + 5/16" PLATE | 10'-0" | C | PROVIDE 8" MINIMUM BEARING. REINFORCE BOND BEAM W/ (2) #5 CONT. EXTEND 2'-0\"/> |

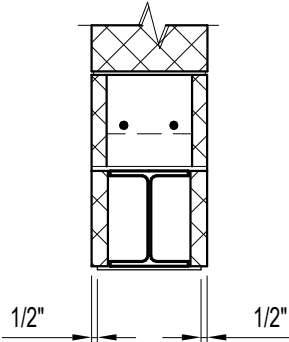
- NOTES:
- SEE ARCHITECTURAL DRAWINGS FOR SIZE AND LOCATION OF OPENINGS.
 - ALL ANGLES SCHEDULED ABOVE SHALL BE ORIENTED WITH LONG LEGS VERTICAL, U.N.O.
 - LOOSE LINTELS UP TO 4'-0\"/>



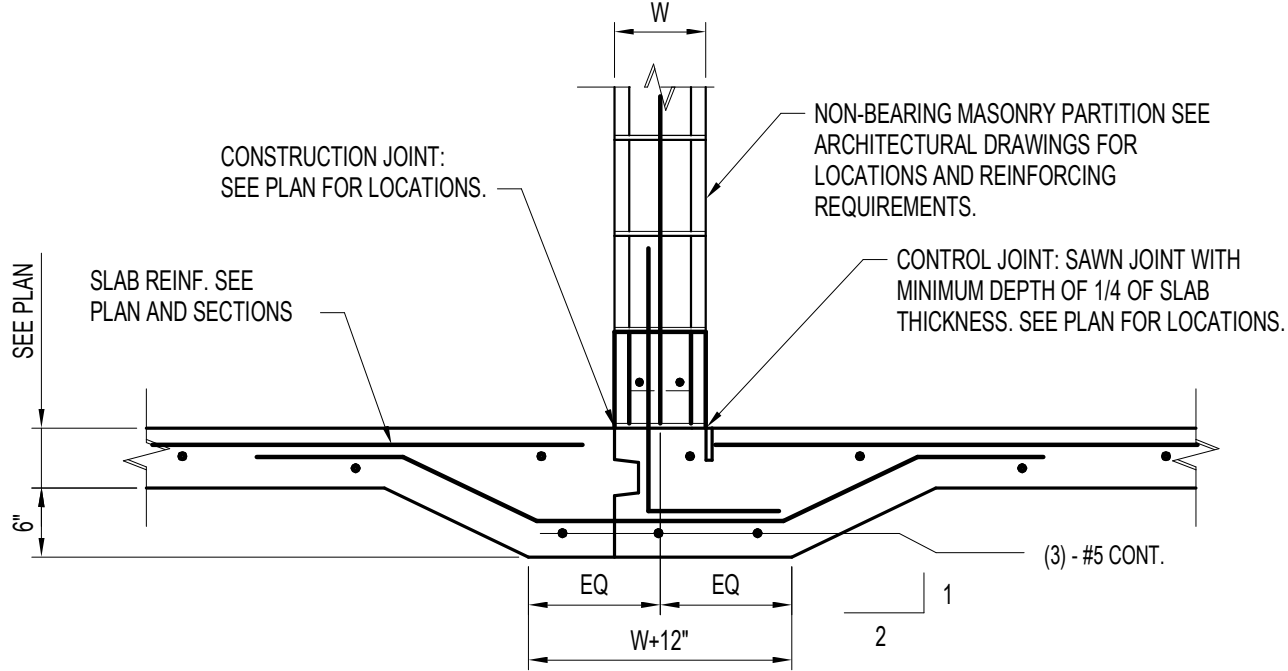
SECTION A



SECTION B

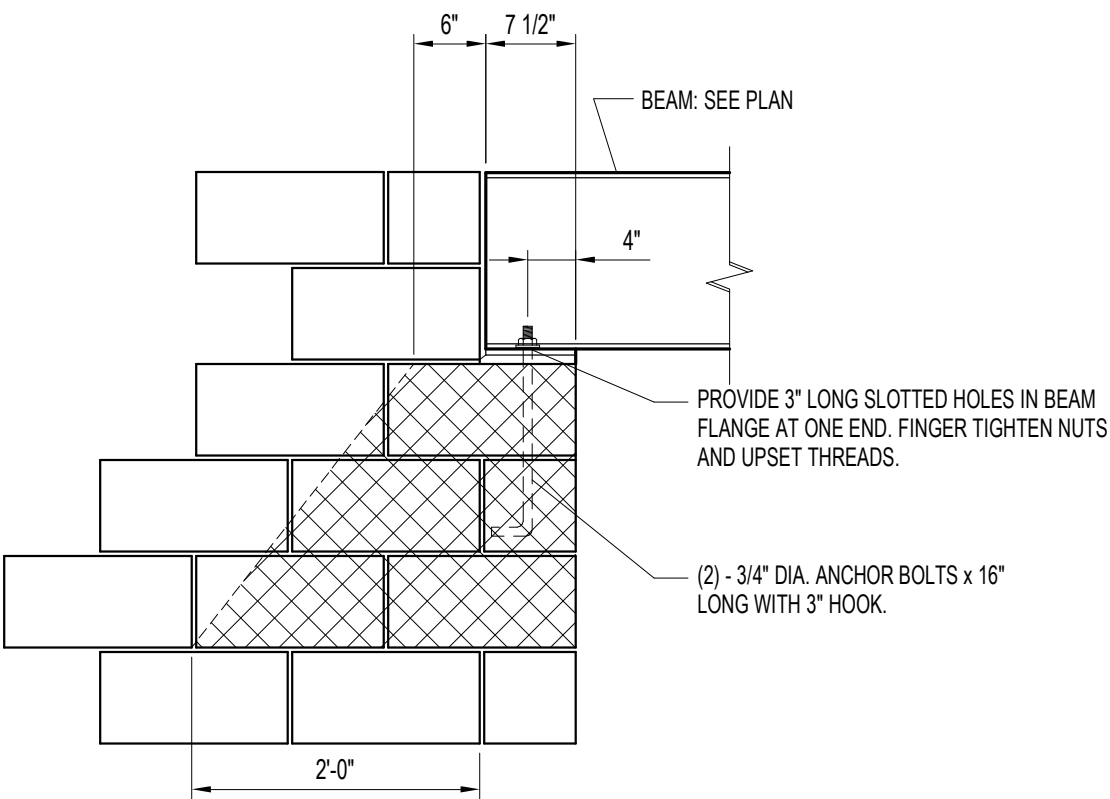


SECTION C



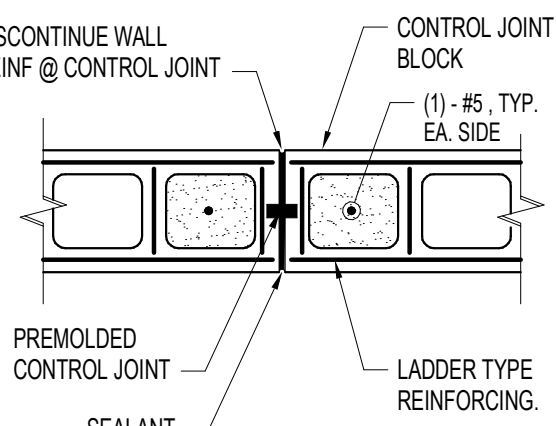
- NOTE:
- PROVIDE EITHER CONSTRUCTION OR CONTROL JOINT, NOT BOTH. BOTH TYPES OF JOINTS ARE SHOWN FOR INFORMATIONAL PURPOSES.
 - COORDINATE JOINT LOCATIONS WITH PLANS AND REINFORCING SUPPLIER.
 - SEE SPECIFICATIONS FOR UNDER SLAB MATERIAL REQUIREMENTS.
 - NOT INTENDED FOR USE AT LIQUID CONTAINMENT STRUCTURES.

TYP. SHALLOW FOOTING DETAIL
NOT TO SCALE



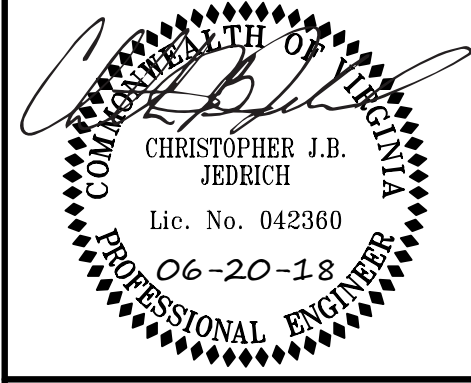
- NOTES:
- ALL MASONRY UNITS ENTIRELY OR PARTIALLY IN SHADED AREA SHALL BE GROUT FILLED HOLLOW CORE BLOCK.

TYP. BEAM BEARING ON MASONRY WALL DETAIL
NOT TO SCALE



TYP. MASONRY CONTROL JOINT DETAIL
NOT TO SCALE

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ROUTE 460 PUMPSTATION
BEDFORD, VA

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| No. | Submittal / Revision | App'd | By | Date |
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| BID ISSUE | ETA | CTB | 6/20/2018 |
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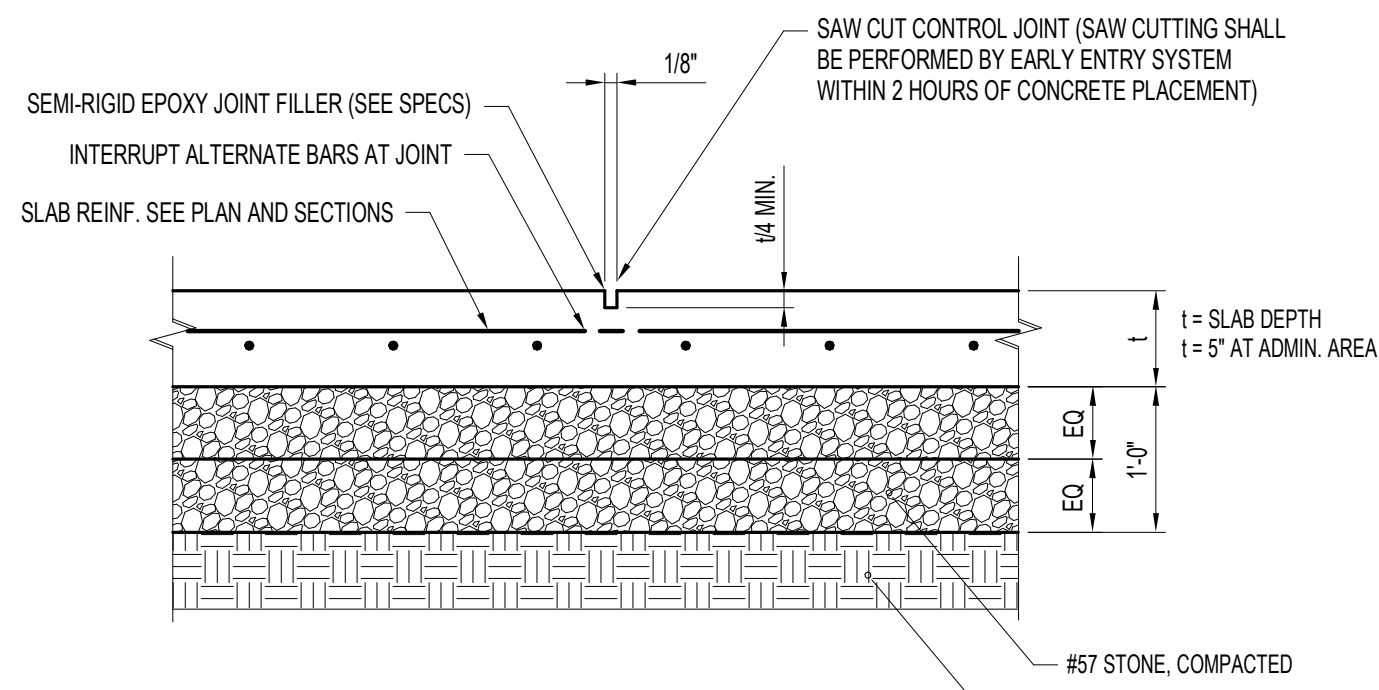
TYPICAL SECTIONS,
DETAILS AND SCHEDULES

| | | |
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| Designed By: APM | Drawn By: CEC | Checked By: CJJ |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

Drawing No:

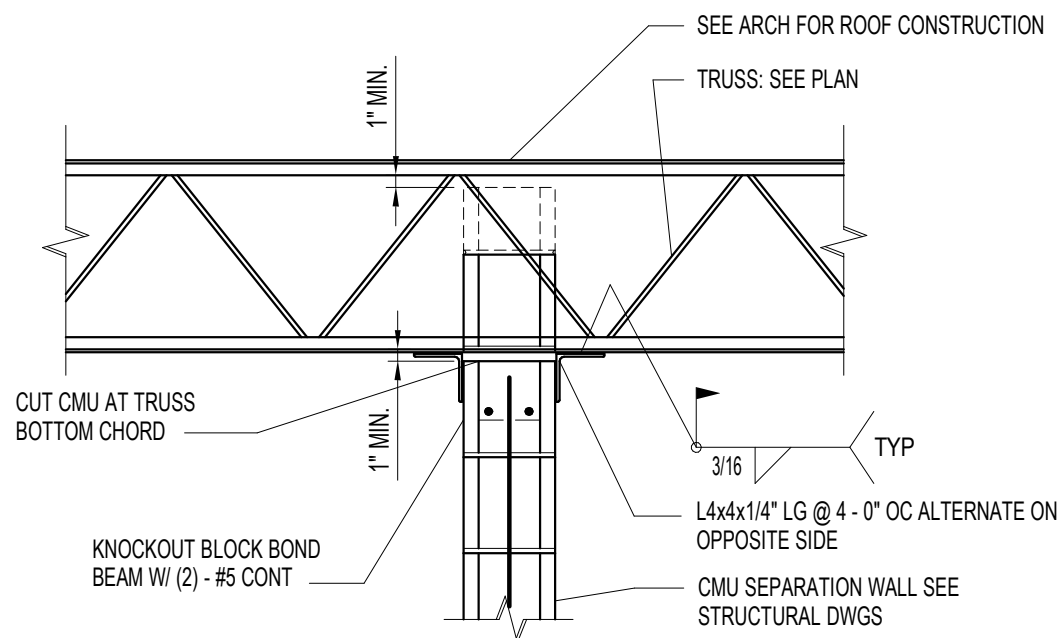
S-701

Central File: Update this text with Central file location
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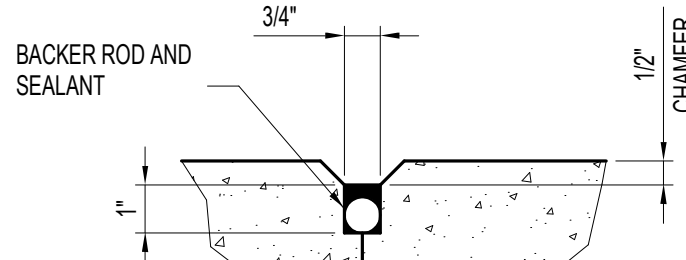
NOTES:
1. PROVIDE CONTROL JOINTS AS SHOWN IN PLAN.
2. NOTED ON PLAN AS CJ

TYP. SLAB ON GRADE CONTROL JOINT DETAIL
NOT TO SCALE

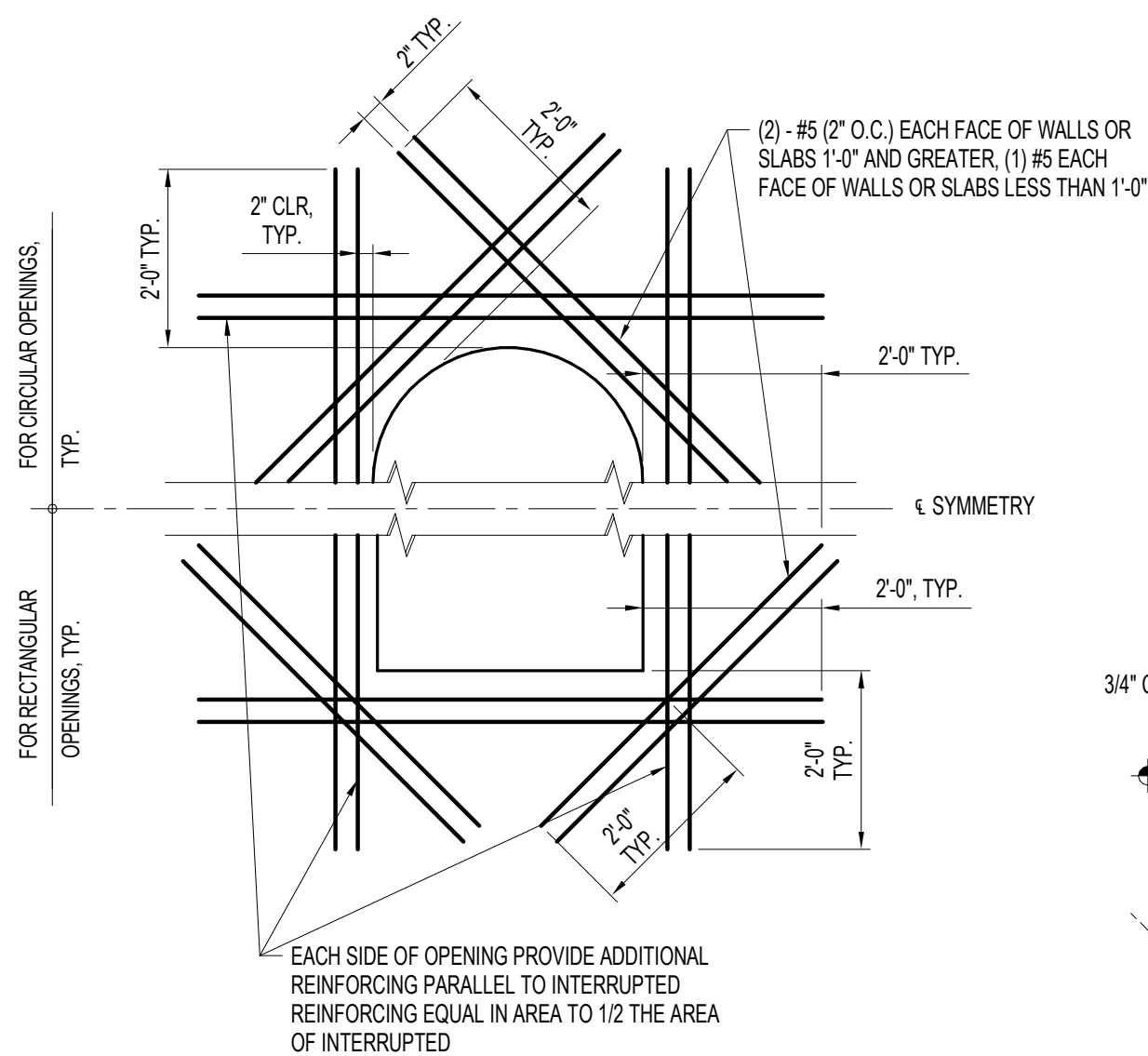


- NOTES:
1. PROVIDE 1" MINIMUM GAP BETWEEN TRUSS AND MASONRY ALL AROUND. FILL GAP WITH FIRE-SAFING AS SPECIFIED. SPACE ANGLES AT 15" - 0" OC MAX FOR 6" WALLS OR 20" - 0" OC MAX FOR 8" WALLS.
2. ANGLES NOT REQUIRED WHERE CROSS WALLS PROVIDE LATERAL SUPPORT AT ABOVE MAX SPACING.

CMU PARTITION WALL BRACING - TRUSS
NOT TO SCALE

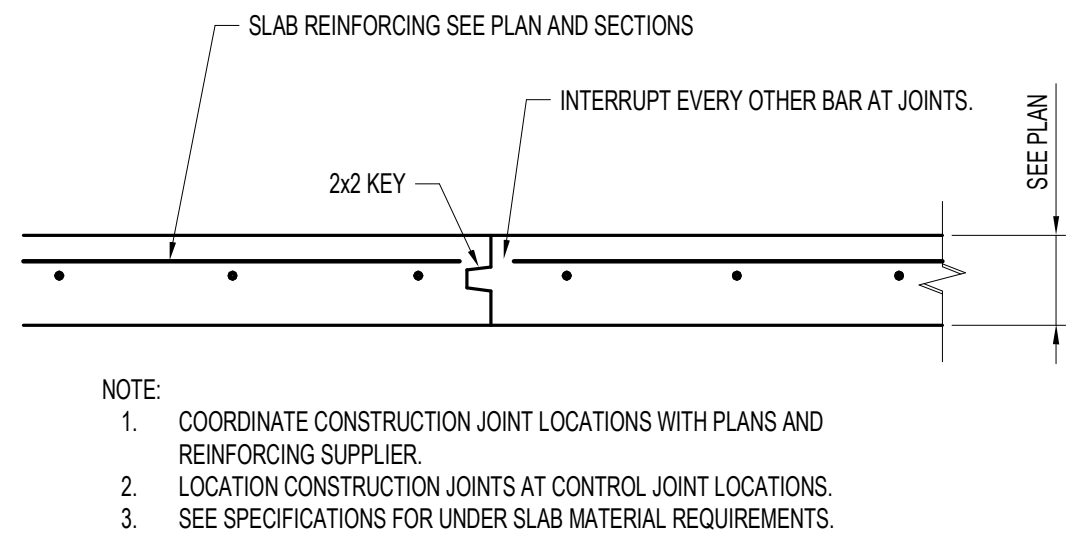


TYP JOINT SEALANT DETAIL
NOT TO SCALE



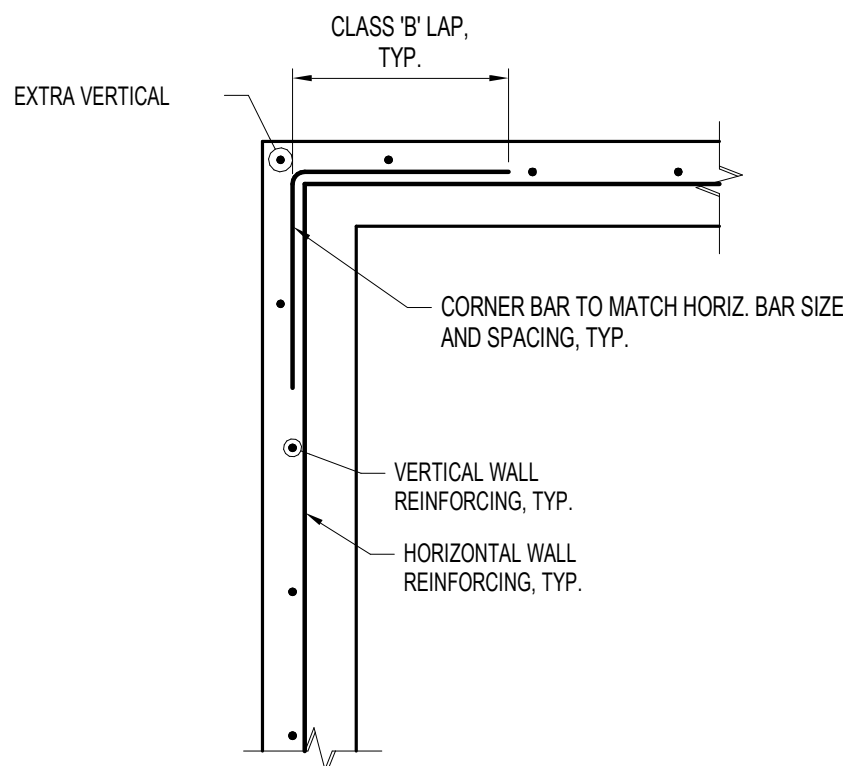
- NOTES:
USE ABOVE REINFORCING AROUND OPENING 1'-0" AND LARGER UNLESS NOTED OTHERWISE ON DRAWINGS. FOR OPENINGS LESS THAN 1'-0", NO ADDITIONAL REINFORCING IS REQUIRED, UNLESS NOTED OTHERWISE ON DRAWINGS.

TYP. REINFORCING AT RECTANGULAR AND CIRCULAR OPENINGS IN SLABS AND WALLS
NOT TO SCALE



- NOTE:
1. COORDINATE CONSTRUCTION JOINT LOCATIONS WITH PLANS AND REINFORCING SUPPLIER.
2. LOCATION CONSTRUCTION JOINTS AT CONTROL JOINT LOCATIONS.
3. SEE SPECIFICATIONS FOR UNDER SLAB MATERIAL REQUIREMENTS.

TYP. SLAB ON GRADE CONSTRUCTION JOINT DETAIL
NOT TO SCALE



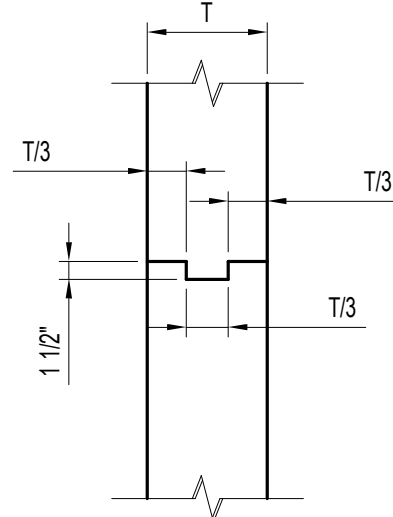
- NOTE:
1. POSITION OF HORIZONTAL BARS SHOWN IS SCHEMATIC. BARS ARE IN ONE PLANE, UNLESS NOTED OTHERWISE IN PLAN OR SECTION.
2. REINFORCING STEEL SHALL BE LAPPED PER REINFORCING LAP LENGTH SCHEDULE U.N.O.

TYP. HORIZONTAL WALL REINFORCING
NOT TO SCALE

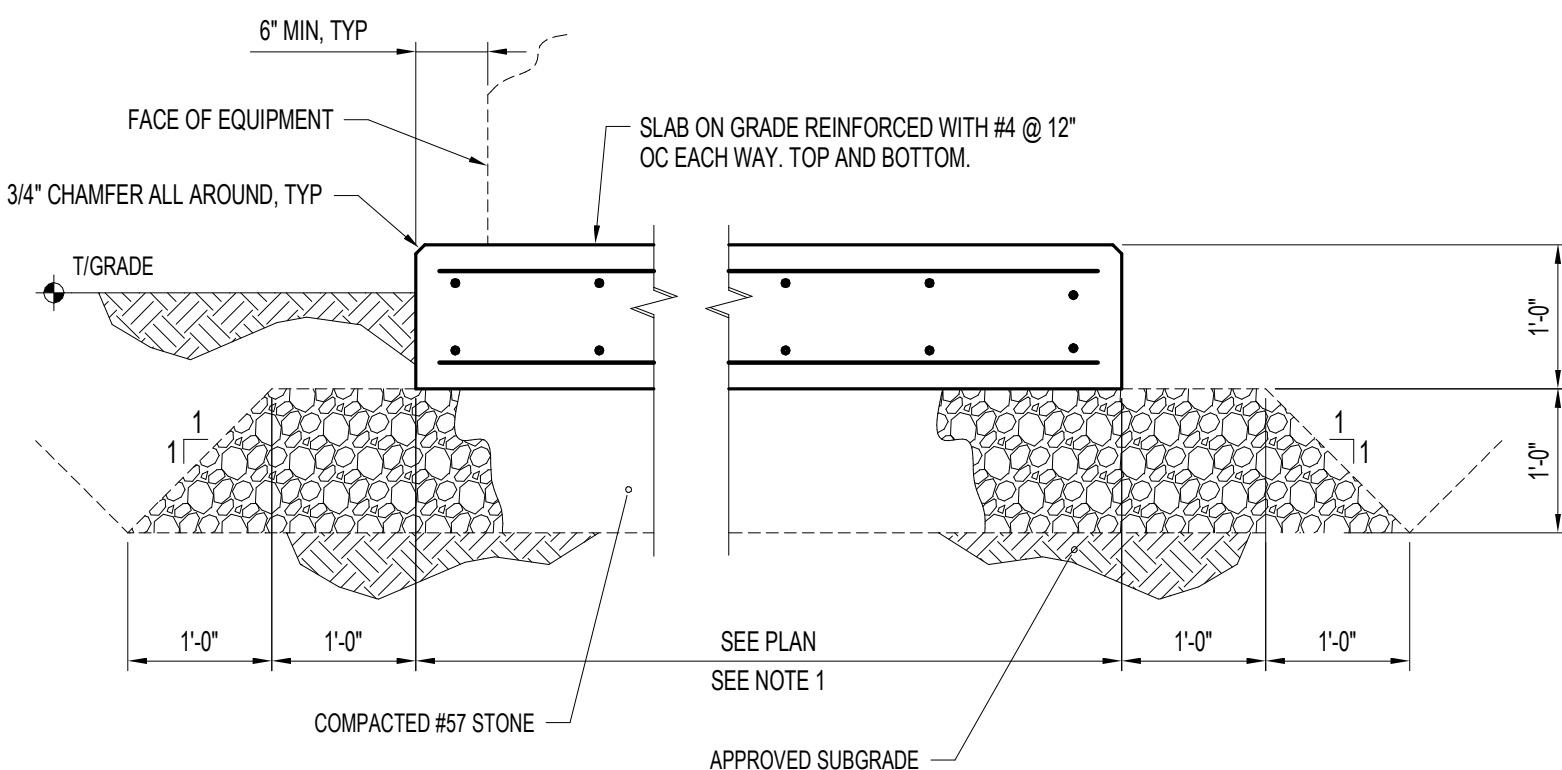
| REINFORCING LAP LENGTH | | | |
|------------------------|-----------|-------|--------|
| BAR SIZE | LAP CLASS | VERT. | HORIZ. |
| #3 | B | 18 | 24 |
| #4 | B | 25 | 32 |
| #5 | B | 31 | 40 |
| #6 | B | 37 | 48 |
| #7 | B | 54 | 70 |
| #8 | B | 62 | 80 |
| #9 | B | 69 | 90 |
| #10 | B | 77 | 100 |

- NOTES:
1. TABLE TO BE INCLUDED ON ALL REINFORCING SHOP DRAWINGS.

TYP. REINFORCING LAP LENGTH SCHEDULE

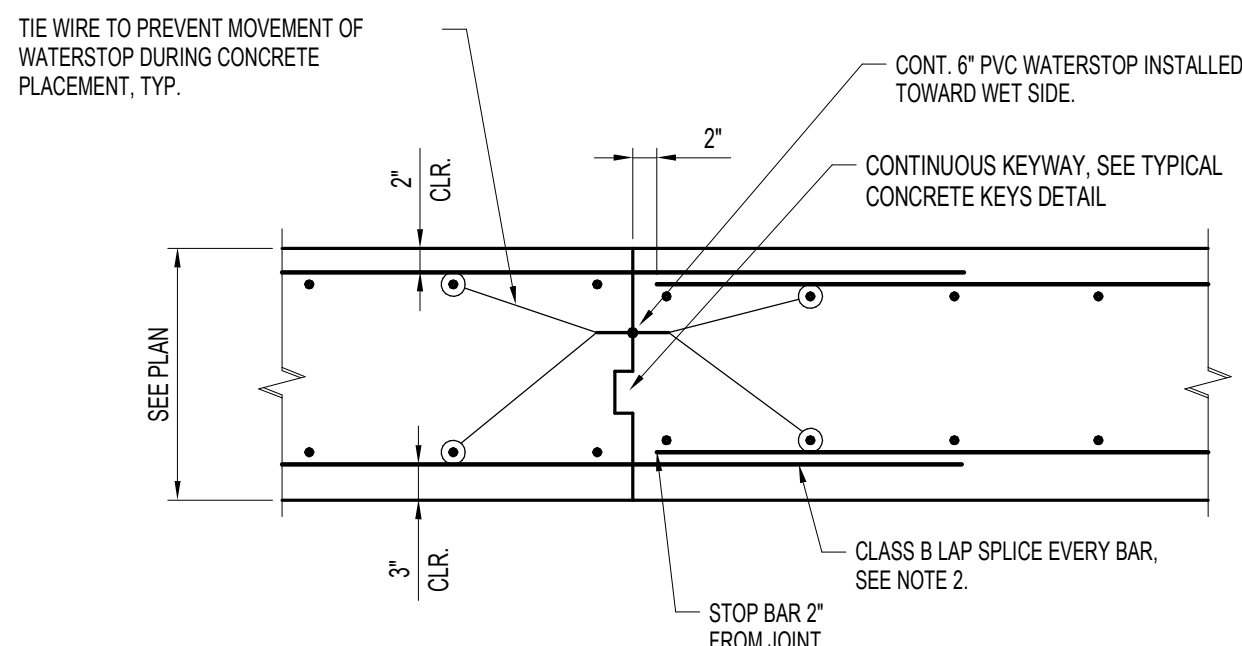


TYP. CONCRETE KEYS
NOT TO SCALE



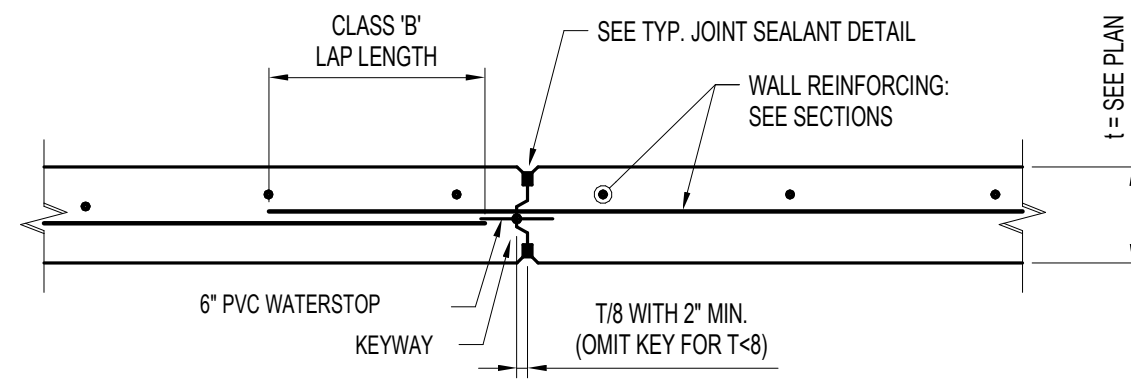
- NOTE:
1. CONCRETE PAD TO EXTEND 6" MINIMUM BEYOND EQUIPMENT ON ALL SIDES. COORDINATE DIMENSIONS WITH EQUIPMENT.

TYP. GENERATOR PAD DETAIL
NOT TO SCALE



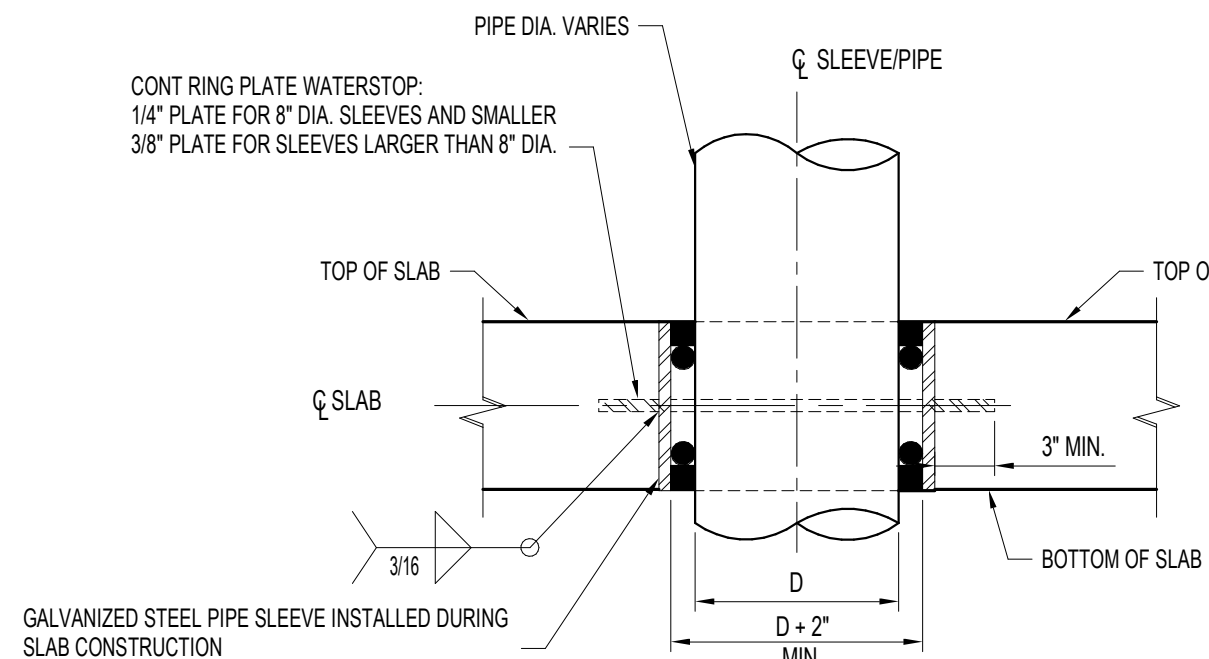
- NOTE:
1. SEE PLAN FOR REQUIRED CONSTRUCTION JOINT LOCATIONS.
2. REINFORCING STEEL SHALL BE LAPPED PER REINFORCING LAP LENGTH SCHEDULE U.N.O.
3. SEE SECTIONS FOR SLAB SIZE AND REINFORCING.
4. PROVIDE 48 HOURS BETWEEN ADJACENT POURS AT CONSTRUCTION JOINTS, TYP

TYP. BASE SLAB CONSTRUCTION JOINT DETAIL AT PIPE TRENCHES AND CONTAINMENT AREAS
NOT TO SCALE



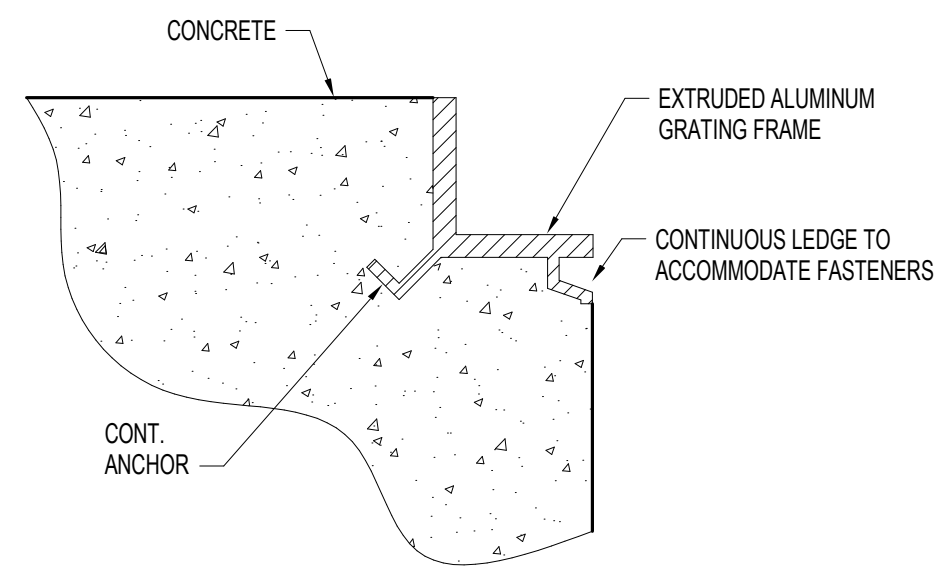
- NOTE:
1. LOCATE AT WALL CONTROL JOINTS 60'-0" OC MAXIMUM, UNLESS NOTED OTHERWISE ON PLANS.
2. COORDINATE JOINT LOCATIONS WITH MASONRY CONTROL/EXPANSION JOINTS.

TYP. CONCRETE FOUNDATION WALL CONSTRUCTION JOINT DETAIL (PLAN)
NOT TO SCALE



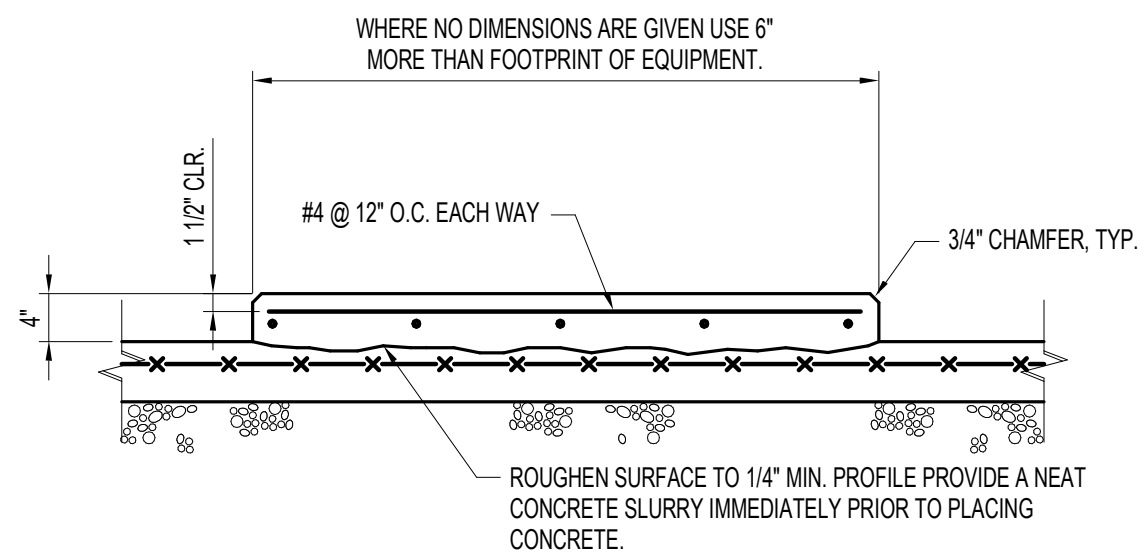
- NOTE:
1. D = NOMINAL PIPE SIZE DIAMETER
2. REFERENCE CIVIL AND MECHANICAL DRAWINGS FOR QUANTITIES AND LOCATIONS.

TYP. PIPE SLEEVE THRU NEW SLAB ON GRADE
SCALE: NTS

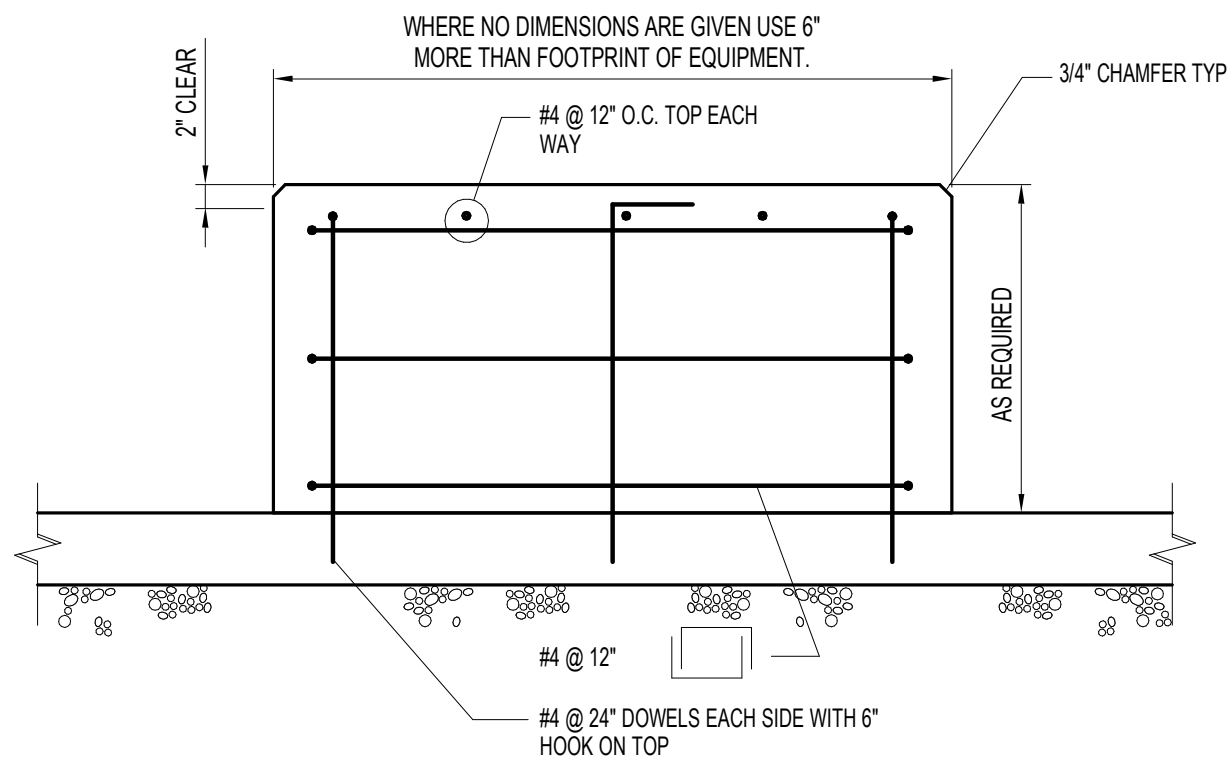


- NOTES:
1. BACKPAINT ALL ALUMINUM IN CONTACT WITH CONCRETE WITH BITUMINOUS PAINT

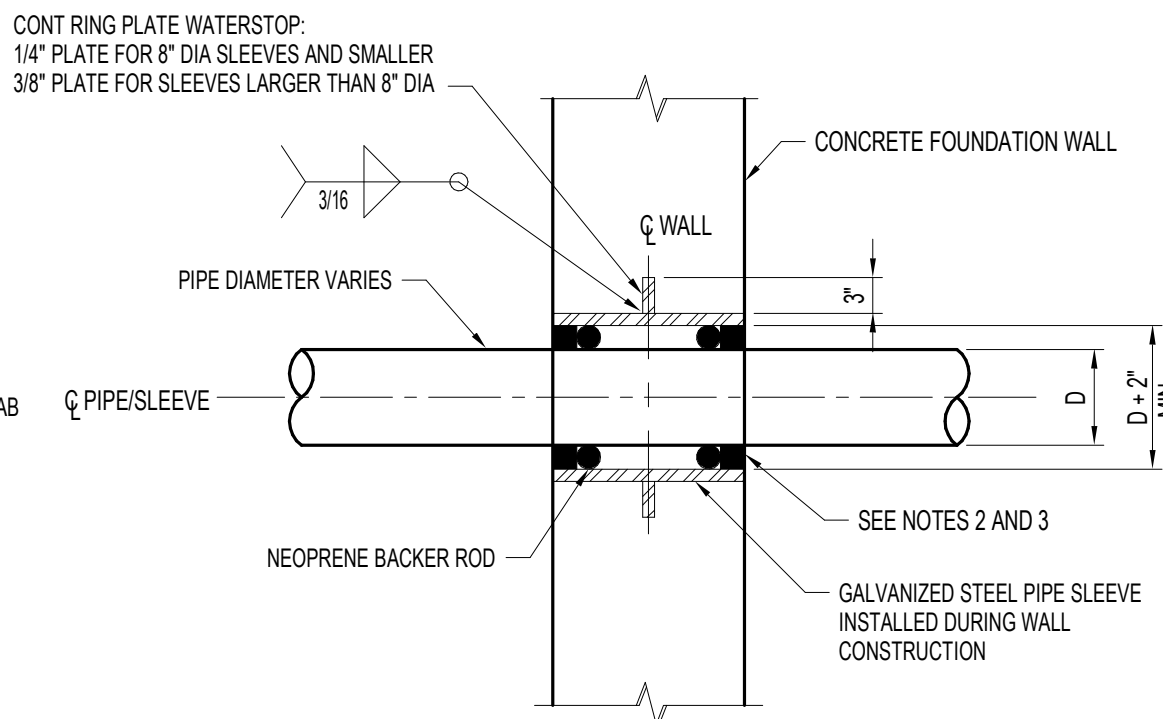
TYP. ALUMINUM GRATING FRAME DETAIL
NOT TO SCALE



TYP. GENERAL HOUSEKEEPING PAD REINFORCING DETAILS
NOT TO SCALE

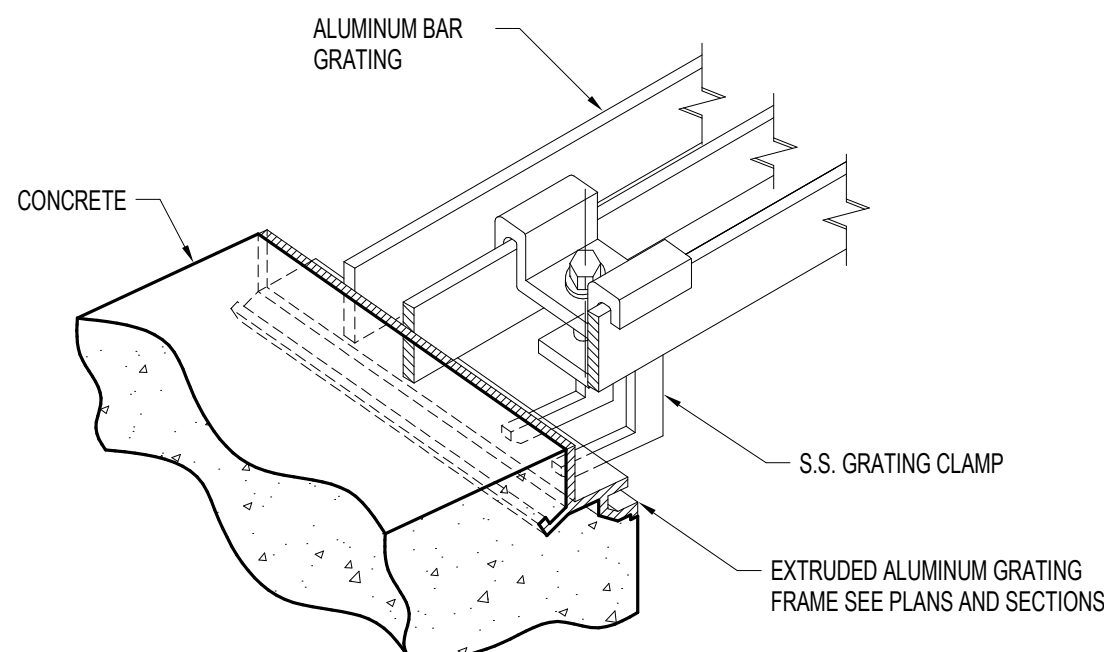


TYP. HEAVY EQUIPMENT/ PUMP PAD REINFORCING DETAILS
NOT TO SCALE



- NOTE:
1. D = NOMINAL PIPE SIZE DIAMETER
2. SEAL GAP BETWEEN PIPE AND PIPE SLEEVE WATER TIGHT WITH MASTIC OR BITUMINOUS COATING.
3. SEAL GAP BETWEEN PIPE AND CONCRETE WALL WATER TIGHT WITH "LINK-SEAL" OR EQUAL.
4. REFERENCE CIVIL AND MECHANICAL DRAWINGS FOR QUANTITIES AND LOCATIONS.

TYP. PIPE SLEEVE THROUGH NEW FOUNDATION WALL
NOT TO SCALE



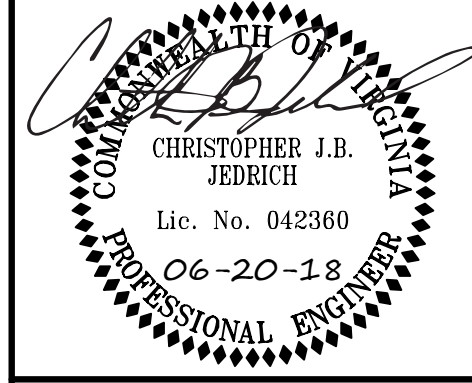
- NOTES:
1. PROVIDE MANUFACTURER'S STANDARD EMBEDDED ANGLE TO ACCOMMODATE MANUFACTURER'S STANDARD GRATING CLAMPS OR SUBMIT PROPOSED GRATING CLAMP AND ANCHOR DETAIL FOR REVIEW AND APPROVAL

TYP. ALUMINUM GRATING CLAMP CONNECTION DETAIL
NOT TO SCALE

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CHA
1341 Research Center Drive, Suite 2100
Blacksburg, VA 24060
Main: (540) 552-5548 : www.chacompanies.com

**BEDFORD
REGIONAL WATER
AUTHORITY**



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

**ROUTE 460 PUMPSTATION
BEDFORD, VA**

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| No. | Submital / Revision | App'd | By | Date |
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BID ISSUE | ETA | CTB | 6/20/2018

**TYPICAL SECTIONS,
DETAILS AND SCHEDULES**

| | | |
|-------------------------|---------------------------|--------------------|
| Designed By: APM | Drawn By: CEC | Checked By: CJJ |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

Drawing No:

S-702

CODE INFORMATION
APPLICABLE CODES AND STANDARDS
2012 VIRGINIA UNIFORM STATEWIDE BUILDING CODE (VUSBC)
2012 VIRGINIA ENERGY CONSERVATION CODE (VECC) COMPLIANCE PATH:
ASHRAE A 90.1 SECTIONS 5 THROUGH 10
2010 ADA STANDARDS FOR ACCESSIBLE DESIGN, SEPTEMBER 15, 2010

USE GROUP AND OCCUPANCY CLASSIFICATION (SECTION 302)
U - UTILITY

CONSTRUCTION CLASSIFICATION (SECTION 602): TYPE IIB
SECTION 903: AN AUTOMATIC SPRINKLER SYSTEM IS NOT REQUIRED PER SECTION 903.
SECTION 906: PORTABLE FIRE EXTINGUISHERS ARE REQUIRED AS INDICATED.
SECTION 907 - FIRE ALARM AND DETECTION SYSTEM:
NO AUTOMATIC FIRE ALARM SYSTEM IS REQUIRED PER SECTION 907.

GENERAL ARCHITECTURAL NOTES:
1. UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE CLEAR DIMENSIONS.
2. THE INTENT OF THE CONTRACT DOCUMENTS IS TO INCLUDE ALL WORK AND ITEMS REQUIRED FOR THE COMPLETION OF THAT WORK. ALL WORK LISTED, SHOWN, OR IMPLIED ON THE CONSTRUCTION DOCUMENTS SHALL BE PROVIDED BY THE CONTRACTOR; AS IT IS REASONABLE TO INFER THE WORK AS NECESSARY TO PROVIDE THE INTENDED RESULT. THE USE OF THE WORD "PROVIDED" IN CONNECTION WITH ANY ITEM SHOWN SHALL MEAN "FURNISHED, INSTALLED, AND CONNECTED;" UNLESS NOTED OTHERWISE.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF CONSTRUCTION DOCUMENTS AND SHOP DRAWINGS. CONTRACTOR SHALL NOTIFY ARCHITECT IN WRITING, IMMEDIATELY, OF ANY DISCREPANCIES IN PLANS, SHOP DRAWINGS, AND/OR SPECIFICATION. SHOULD A DISCREPANCY BE FOUND, DO NOT PROCEED UNTIL CLARIFICATIONS HAVE BEEN MADE BY THE ARCHITECT/ENGINEER.
4. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND FIELD CONDITIONS; DO NOT SCALE DRAWINGS. IF INSUFFICIENT INFORMATION EXISTS, NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY FOR CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK.
5. ITEMS MARKED "NIC" ARE "NOT IN CONTRACT". SUCH ITEMS ARE INCLUDED IN THE DOCUMENTS AND REQUIRE CONTRACTOR COORDINATION FOR CONSTRUCTION.
6. DETAILS MARKED "TYPICAL" OR "TYP" SHALL APPLY IN ALL CASES UNLESS OTHERWISE NOTED.
7. ALL ITEMS SHOWN ON DRAWINGS SHALL BE ASSUMED TO BE NEW WORK UNLESS NOTED AS EXISTING.
8. MATERIAL HATCHES ARE FOR MATERIAL IDENTIFICATION PURPOSES ONLY. HATCHES ARE NOT TO BE USED FOR MATERIAL QUANTIFICATION.

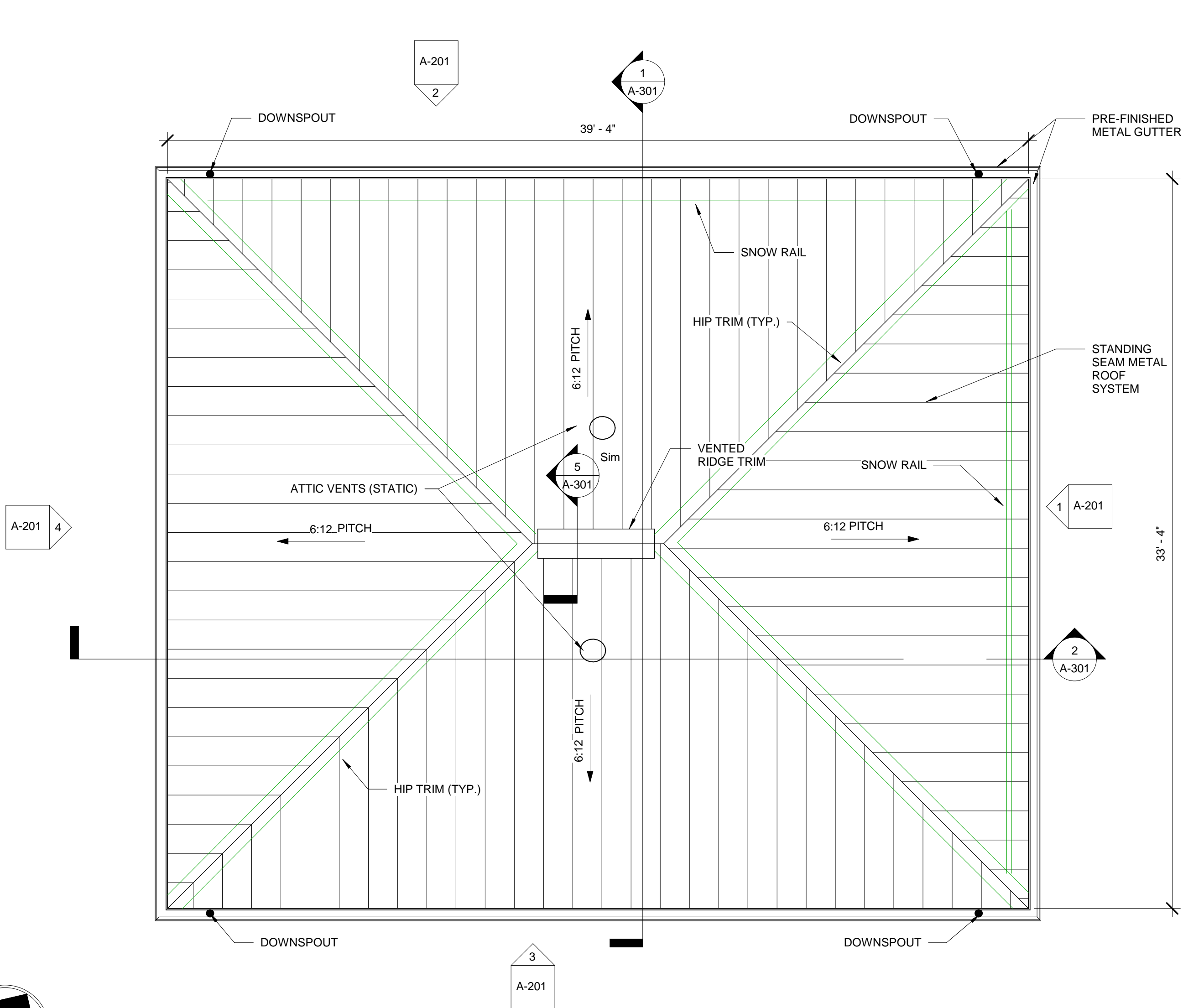
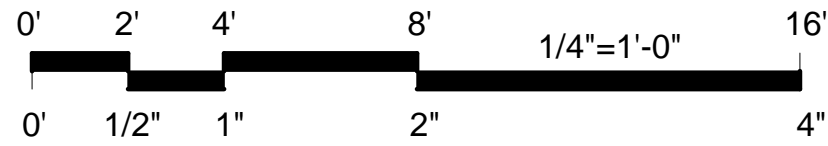
ABBREVIATIONS (SEE OTHER SHEETS FOR DETAIL-SPECIFIC ABBREVIATIONS)

AFF ABOVE FINISHED FLOOR
AHU AIR HANDLING UNIT
ALUM ALUMINUM
CMU CONCRETE MASONRY UNIT
CONC CONCRETE
CONT CONTINUOUS
DIA DIAMETER
DIM DIMENSION
DS DOWNSPOUT
DWG DRAWING
EA EACH
ELEC ELECTRICAL
EPS EXTRUDED POLYSTYRENE
EQ EQUAL
EXIST EXISTING
FD FLOOR DRAIN
FEC FIRE EXTINGUISHER CABINET
FE FIRE EXTINGUISHER
FIN FINISH, FINISHED
FRP FIBERGLASS REINFORCED PLASTIC
FV FIELD VERIFY
GEN GENERAL
GWB GYPSUM WALL BOARD
HDPE HIGH DENSITY POLYETHYLENE
HDW HARDWARE
HM HOLLOW METAL
IHM INSULATED HOLLOW METAL
INSUL INSULATION
MAS MASONRY
MAX MAXIMUM
MECH MECHANICAL
MIN MINIMUM
MO MASONRY OPENING
MR MOISTURE RESISTANT
MTL METAL, MATERIAL
NIC NOT IN CONTRACT
OC ON CENTER
OPP OPPOSITE
PTD PAINT, PAINTED
PT PRESSURE TREATED
RC ROOF CAP
RS ROLLED STEEL
SIM SIMILAR
STRUCT STRUCTURAL
TOM TOP OF MASONRY
T/SLAB TOP OF SLAB
TYP TYPICAL
UNO UNLESS NOTED OTHERWISE
VTR VENT THROUGH ROOF
WD WOOD

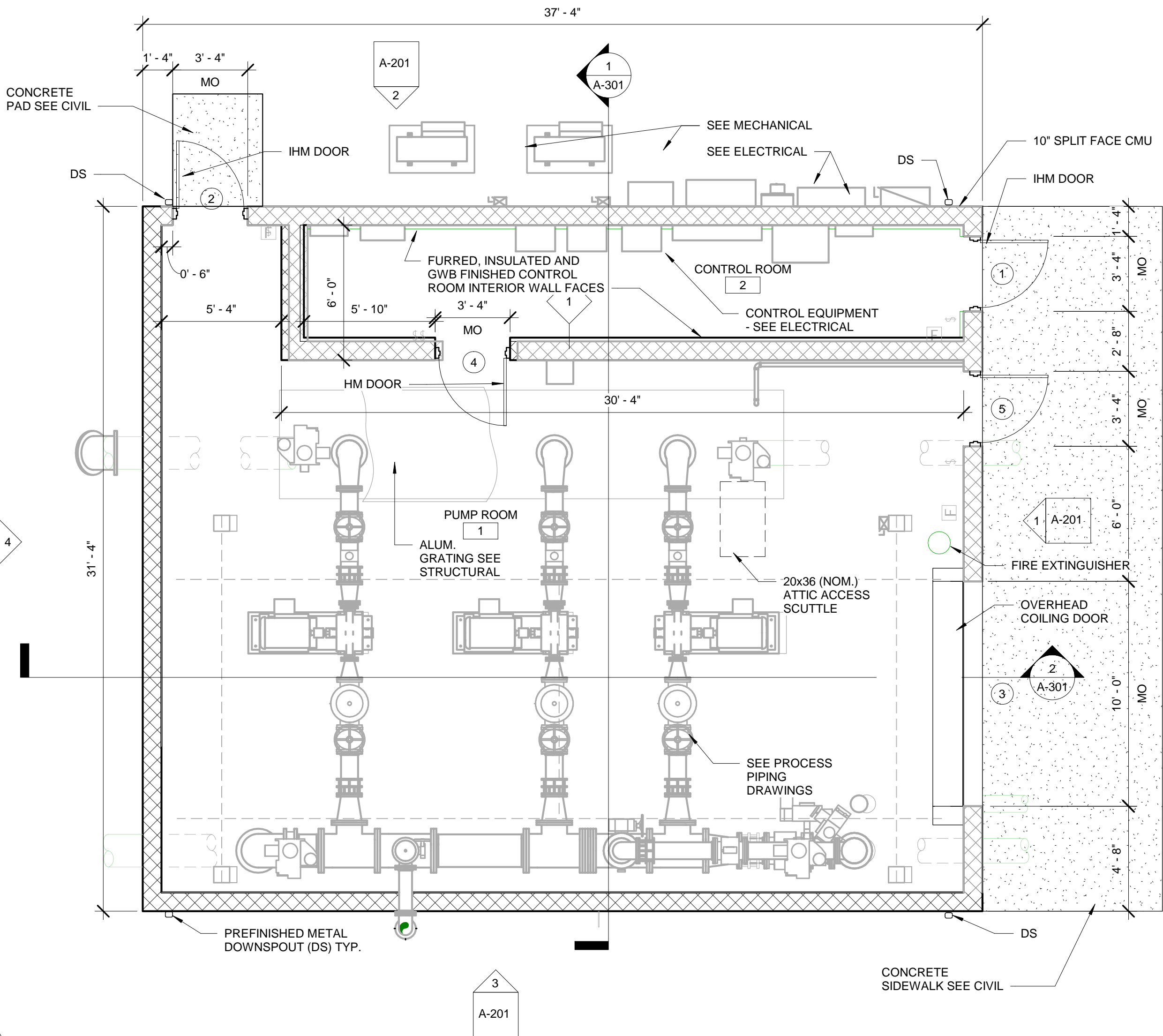
FIRE RESISTANCE RATING FOR BUILDING ELEMENTS

| BUILDING ELEMENT | | WALLS & STRUCTURE | OPENINGS |
|--------------------------|----------|-------------------|----------|
| PRIMARY STRUCTURAL FRAME | | 0 HR (TABLE 601) | NR |
| BEARING WALLS | EXTERIOR | 0 HR (TABLE 601) | NR |
| | INTERIOR | 0 HR (TABLE 601) | NR |
| NONBEARING WALLS | EXTERIOR | 0 HR (TABLE 602) | NR |
| | INTERIOR | 0 HR (TABLE 601) | NR |
| FLOOR CONSTRUCTION | | 0 HR (TABLE 601) | NR |
| ROOF CONSTRUCTION | | 0 HR (TABLE 601) | NR |

NOTE: NR = NO REQUIREMENT



2 ROOF PLAN
1/4" = 1'-0"



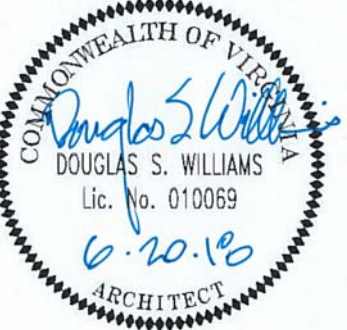
1 FLOOR PLAN
1/4" = 1'-0"



PLAN NORTH



PLAN NORTH



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No. Submittal / Revision App'd. By Date

Bid Issue HR DSW 6-20-2018

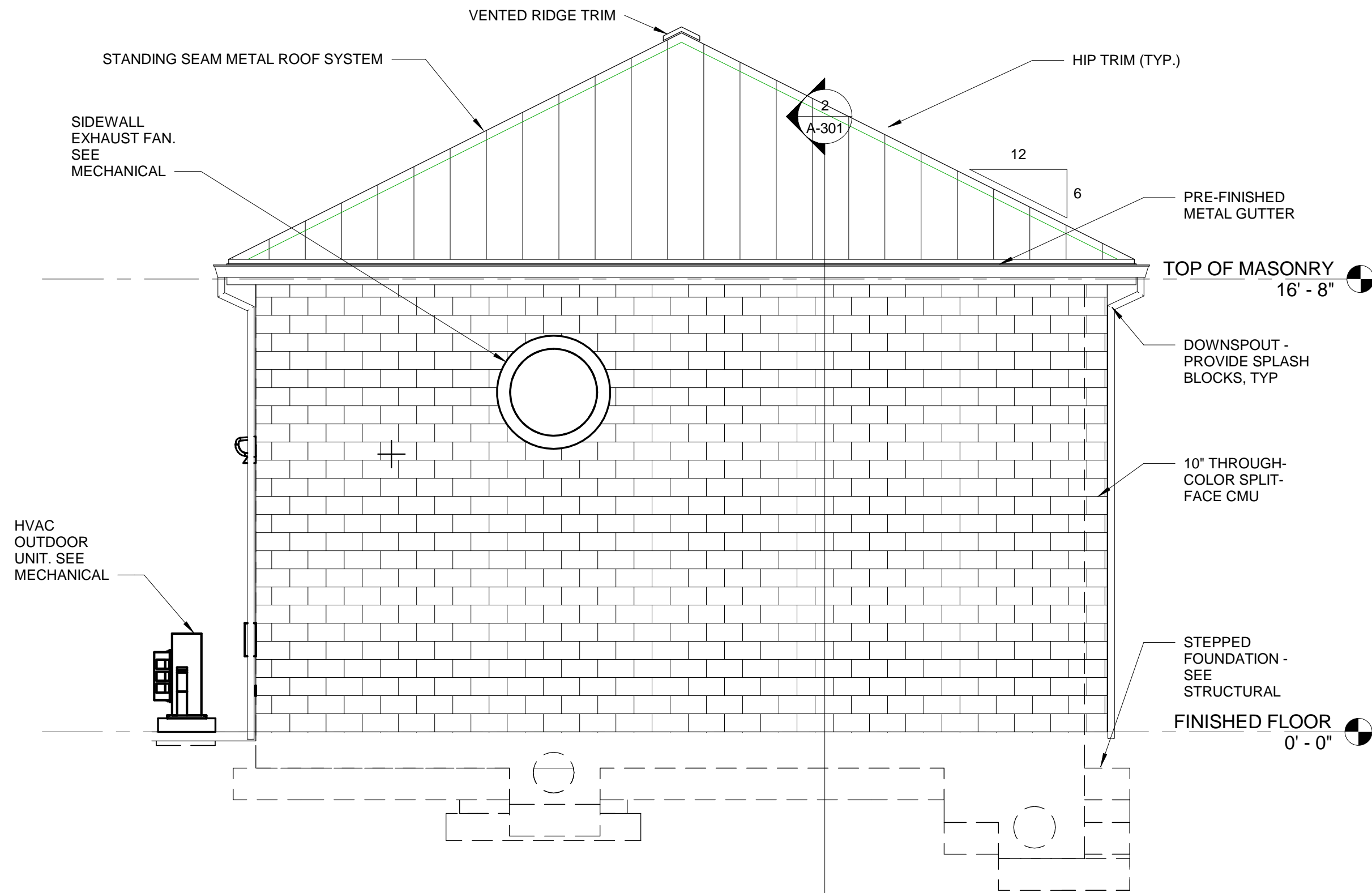
FLOOR PLAN, ROOF PLAN,
CODE INFORMATION, AND
NOTES

Designed By: AHW
Drawn By: AHW
Checked By: DCC
Issue Date: 08/01/2017
Project No: 27872-3002
Scale: AS SHOWN

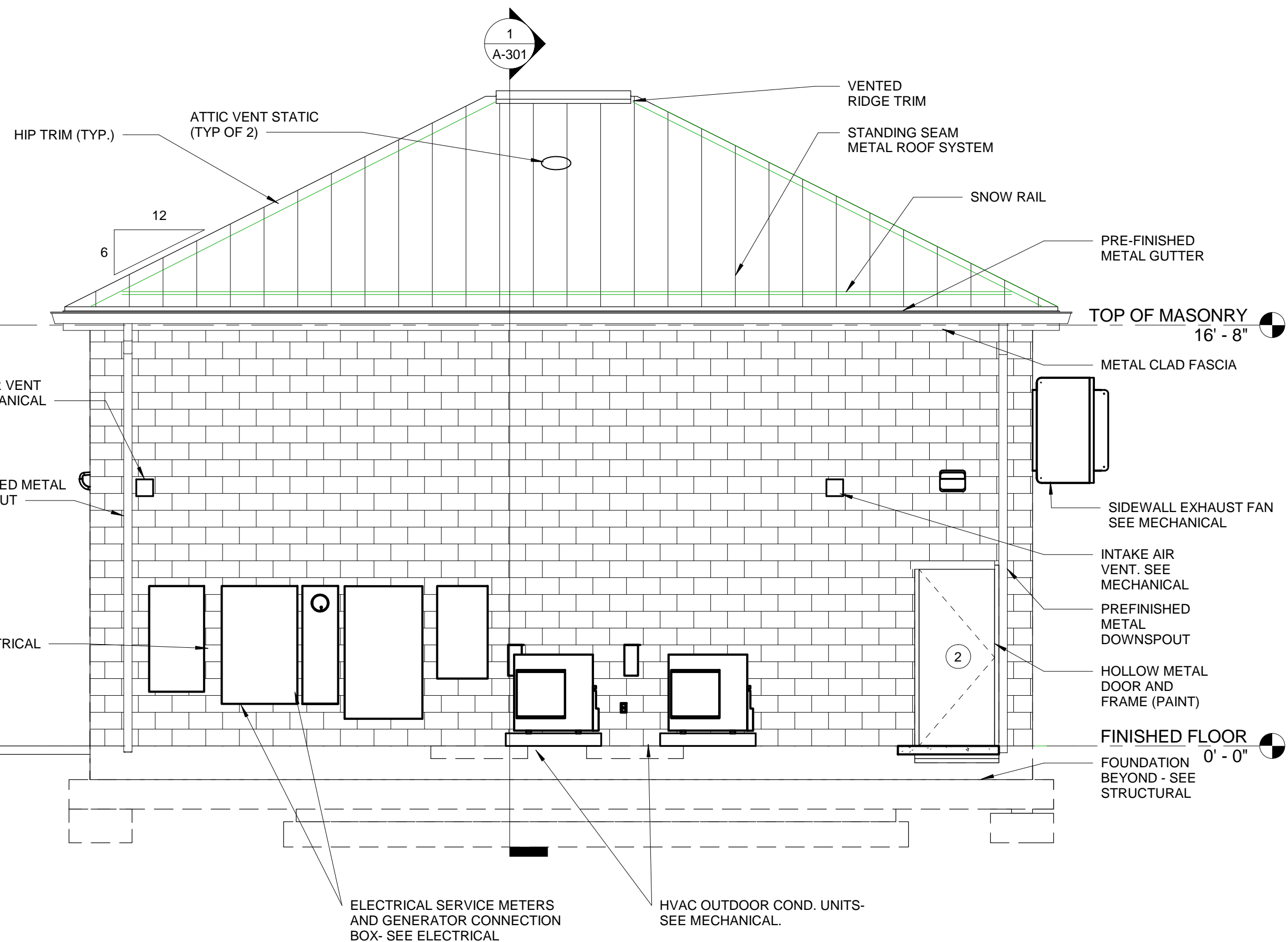
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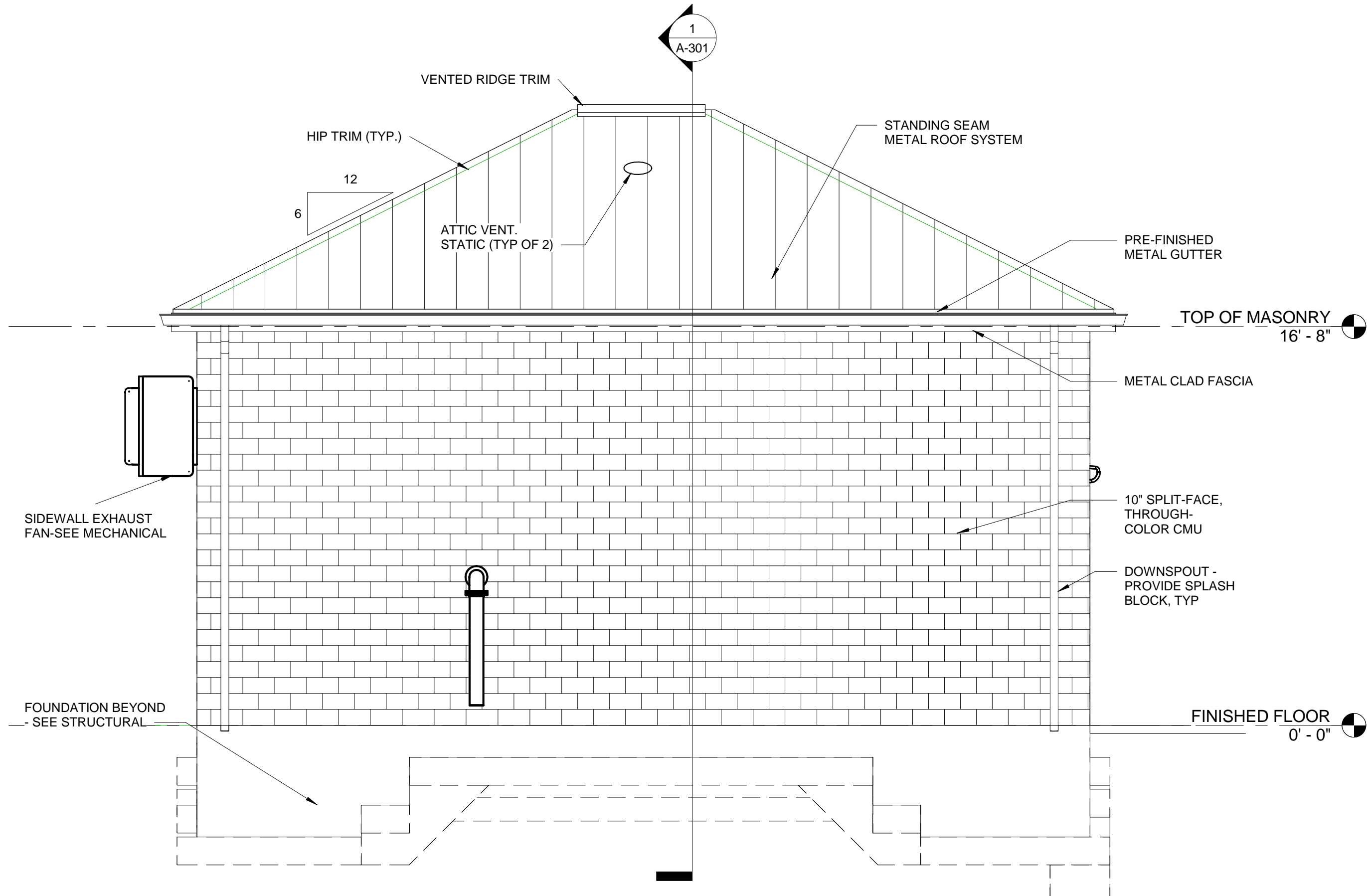
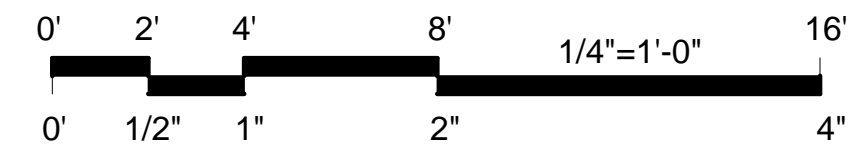
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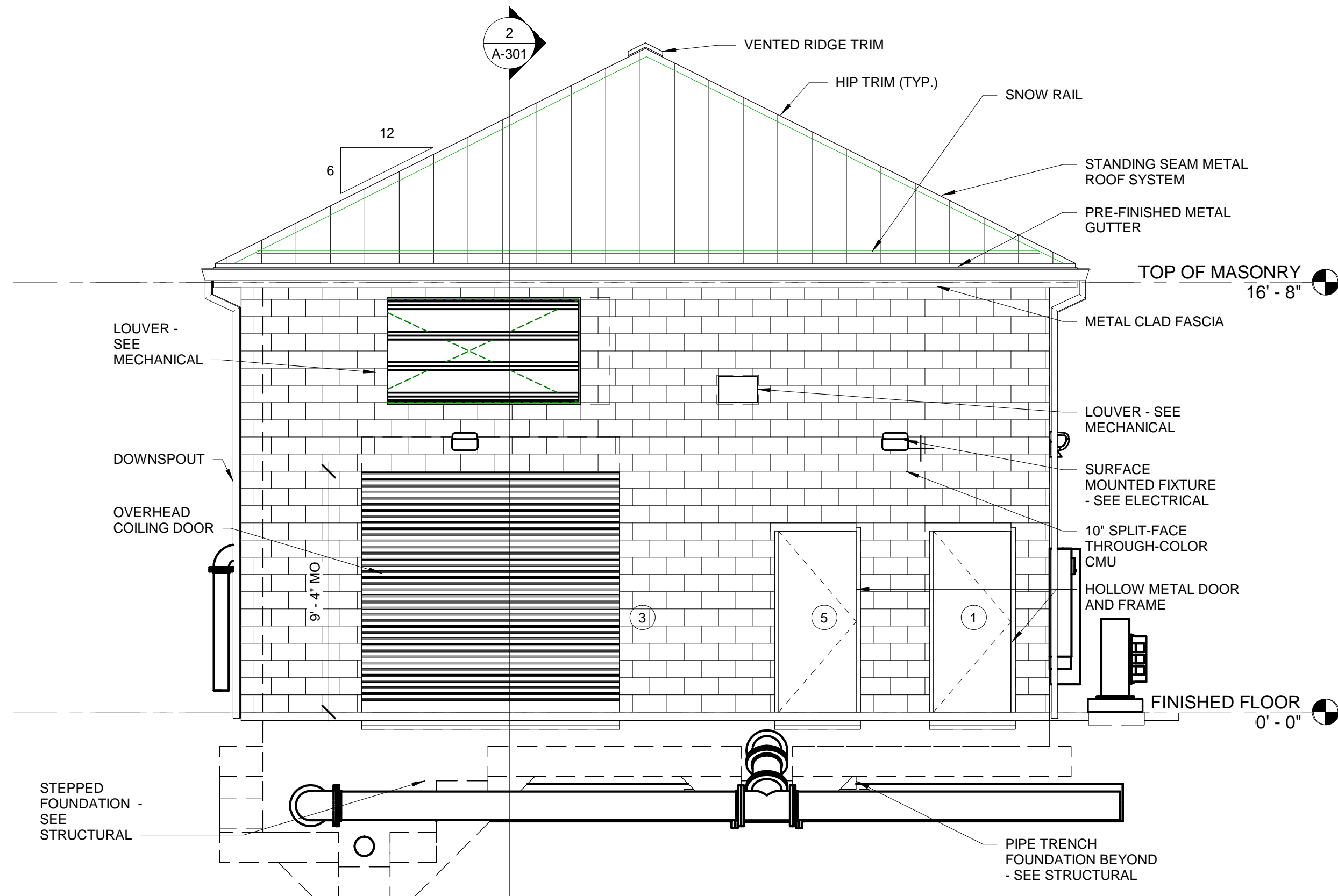
④ SOUTHWEST ELEVATION
1/4" = 1'-0"



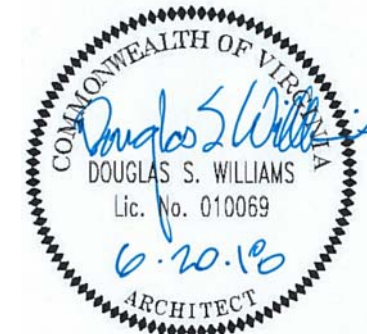
② NORTHWEST ELEVATION
1/4" = 1'-0"



③ SOUTHEAST ELEVATION
1/4" = 1'-0"



① NORTHEAST ELEVATION
1/4" = 1'-0"



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| No. | Submittal / Revision | App'd. | By | Date |
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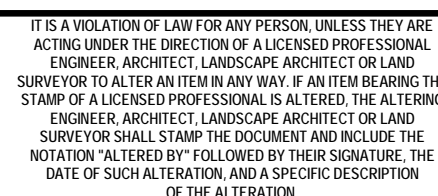
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| Bid Issue | HR | DSW | 6-20-2018 |
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BUILDING
ELEVATIONS

| | | |
|---------------------------|---------------------------|--------------------|
| Designed By: AHW | Drawn By: AHW | Checked By: DCC |
| Issue Date: 08/01/2017 | Project No: 27872-3002 | Scale: AS SHOWN |

Drawing No:

A-201



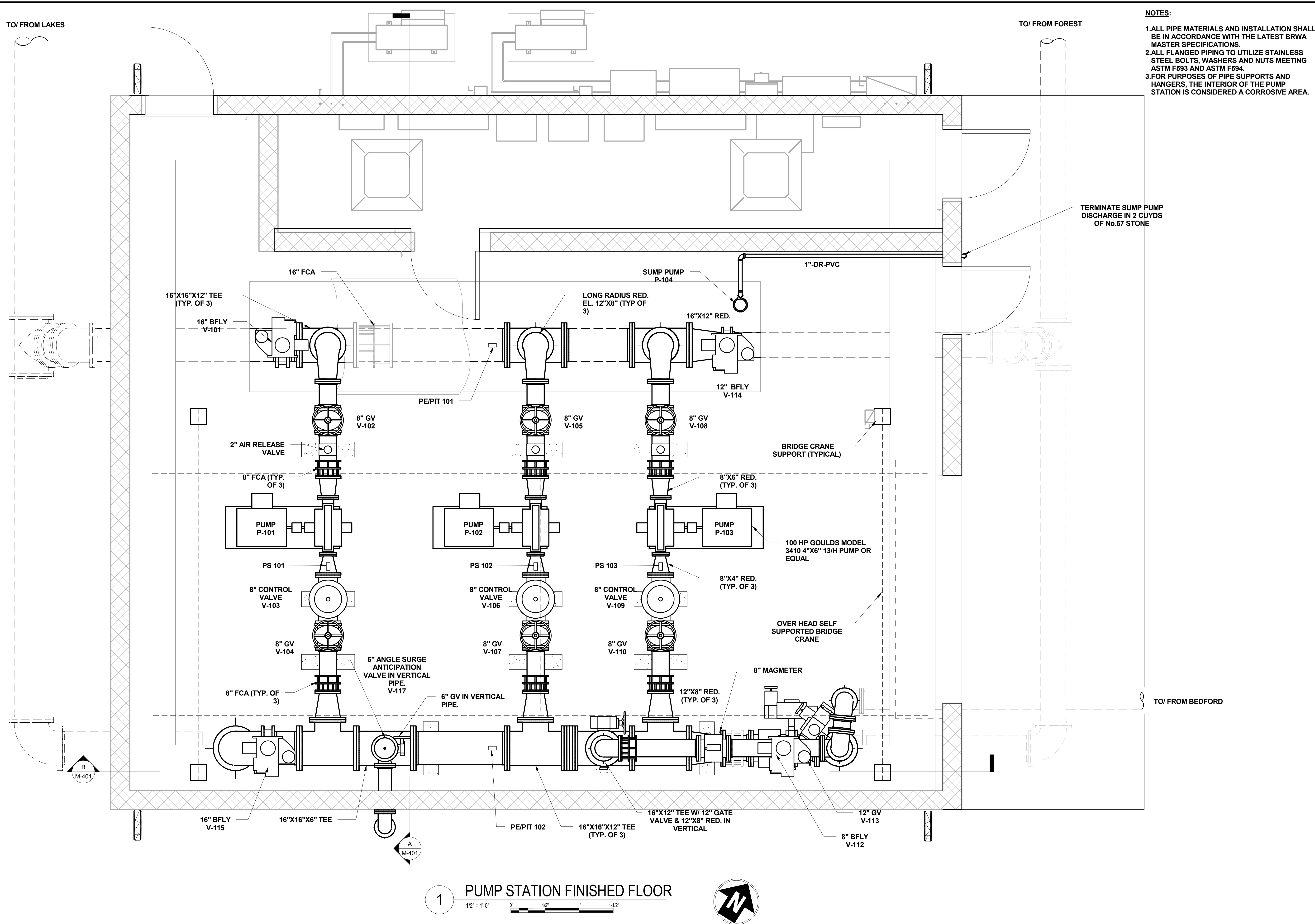
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| Designed By: AHW | Drawn By: AHW | Checked By: DCC |
| Issue Date: 08/01/2017 | Project No: 27872-3002 | Scale: AS SHOWN |

A-301



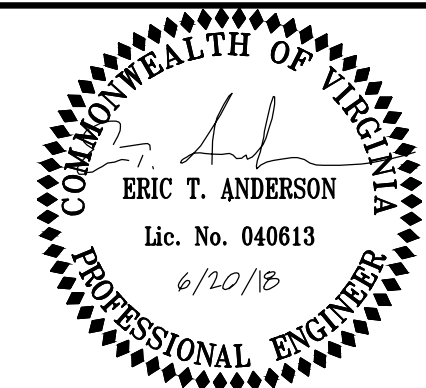
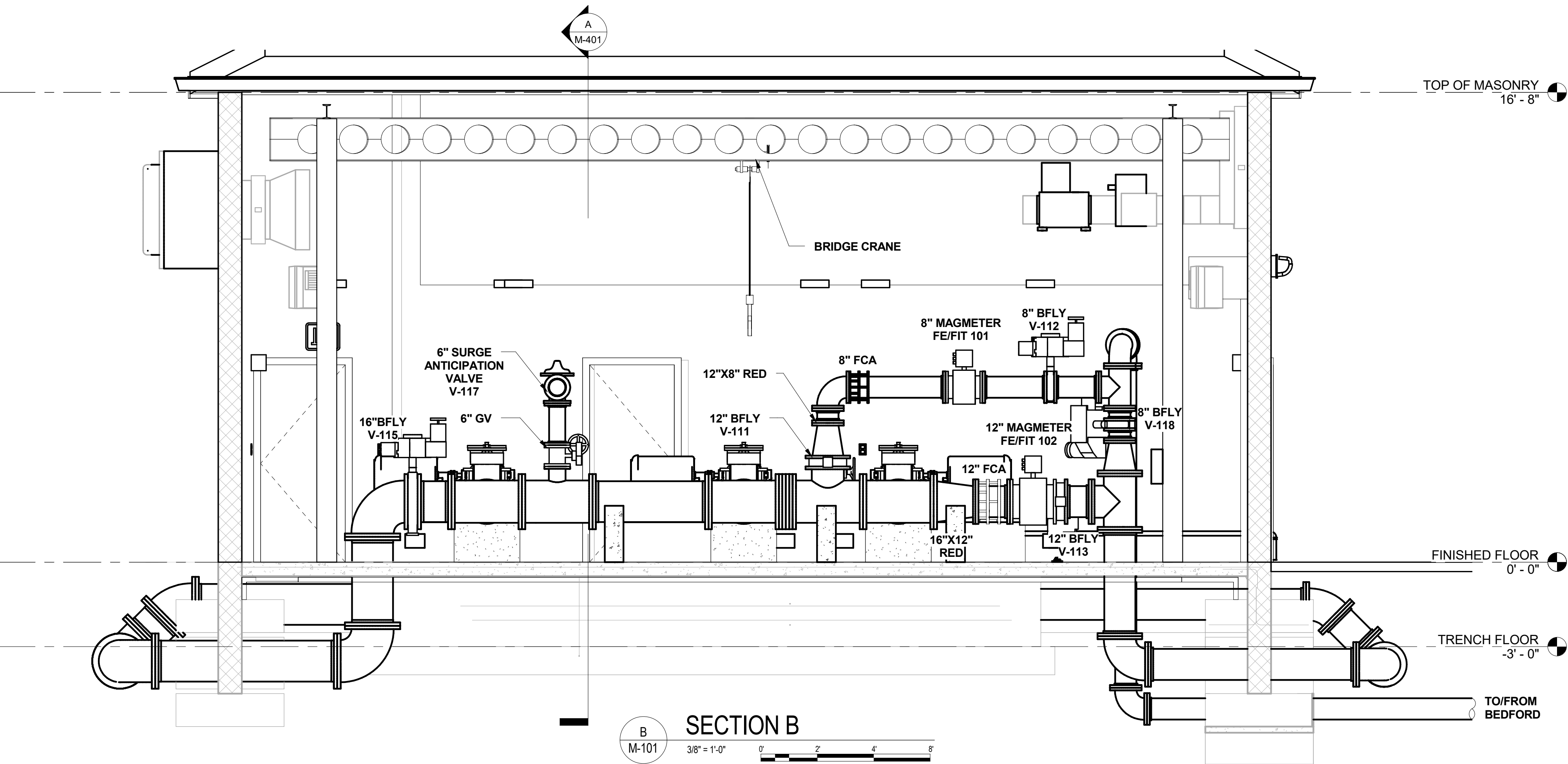
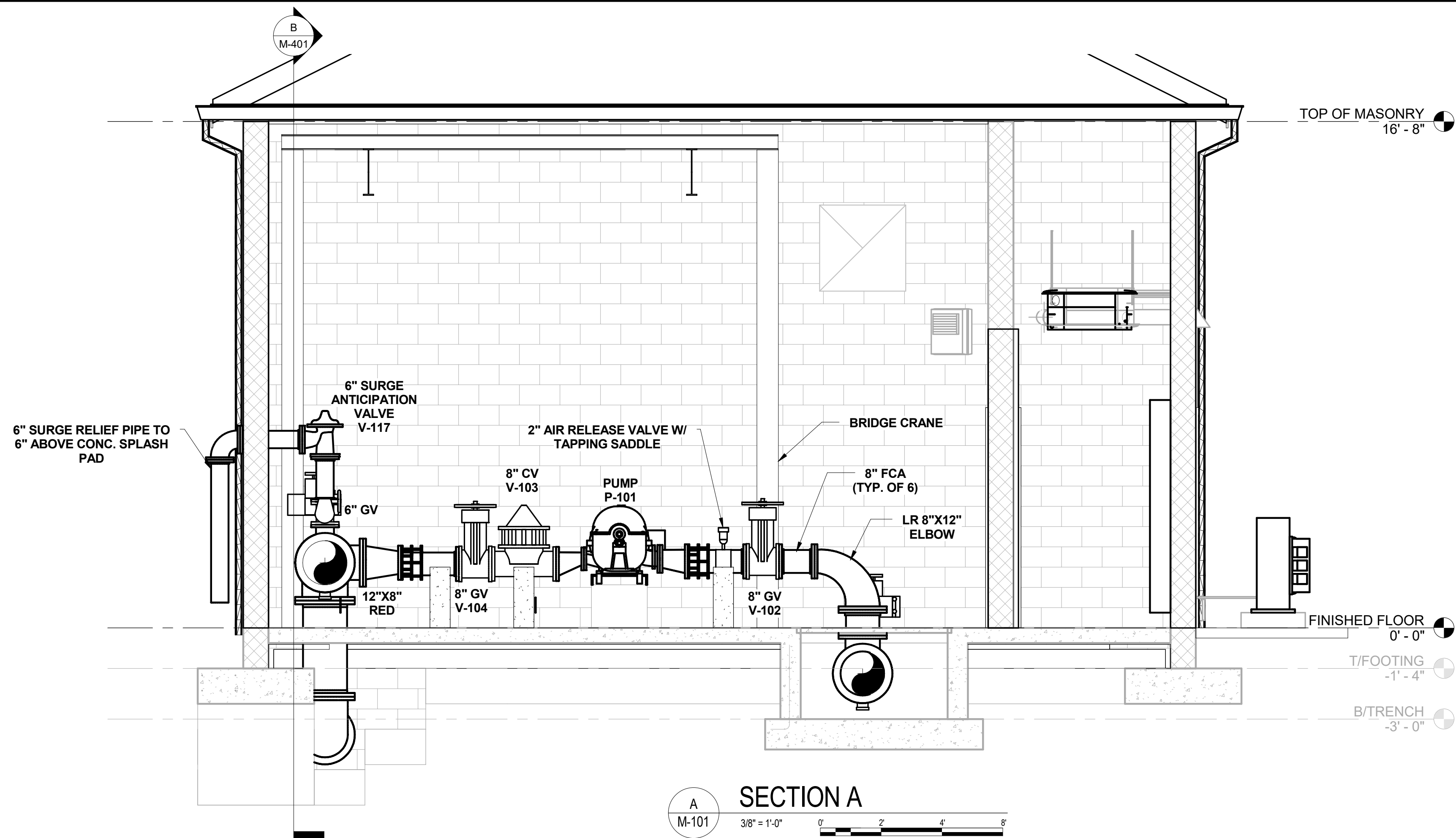
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NOTES:

- 1.ALL PIPE MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST BRWA MASTER SPECIFICATIONS.
- 2.ALL FLANGED PIPING TO UTILIZE STAINLESS STEEL BOLTS, WASHERS AND NUTS MEETING ASTM F593 AND ASTM F594.
- 3.FOR PURPOSES OF PIPE SUPPORTS AND HANGERS, THE INTERIOR OF THE PUMP STATION IS CONSIDERED A CORROSIVE AREA.

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| No. | Submittal / Revision | App'd. | By | Date |
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| BID ISSUE | ETA | CTB | 06/20/18 |
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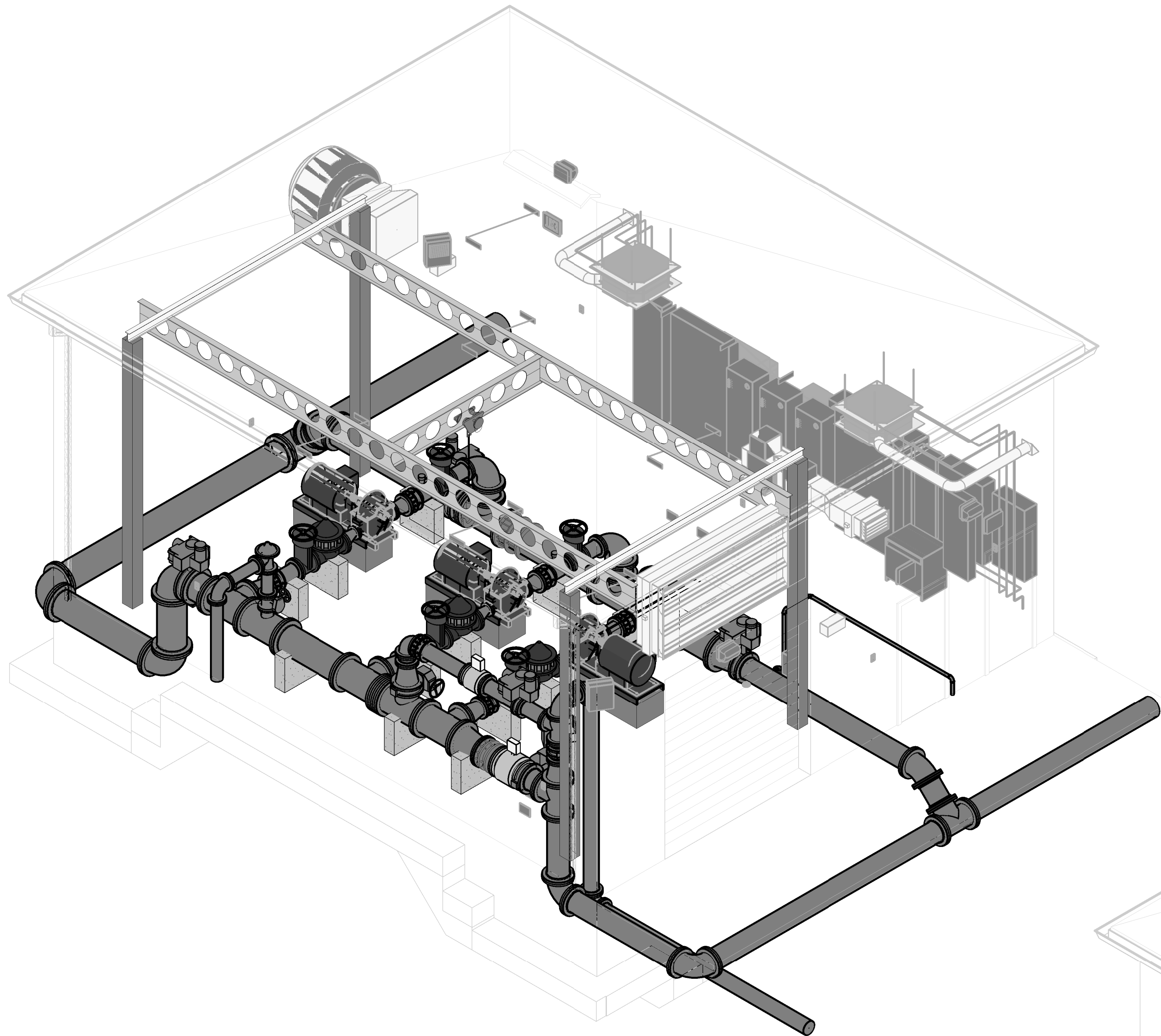
PUMP STATION SECTIONS

| | | |
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| Designed By: ETA | Drawn By: CTB | Checked By: SMS |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

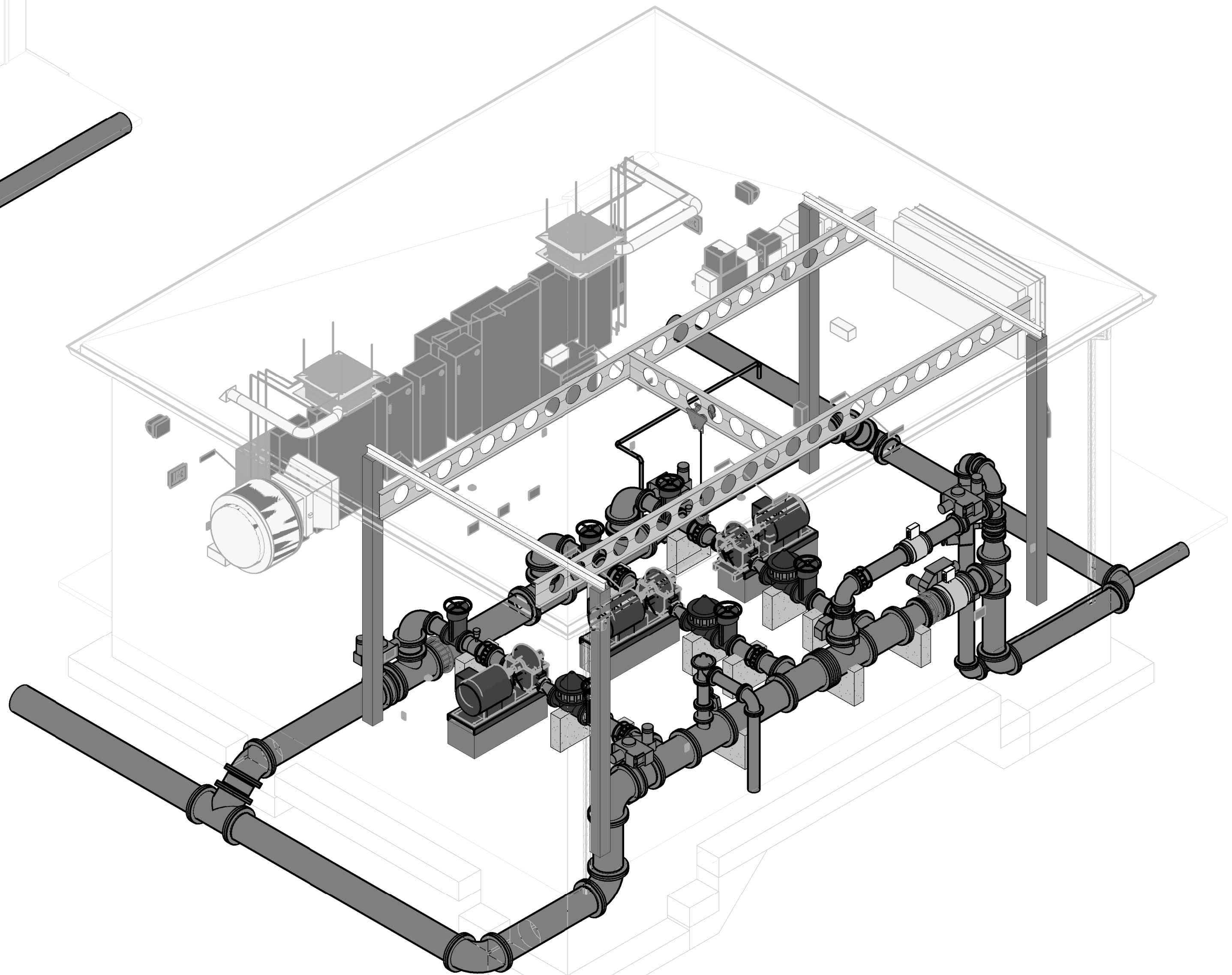
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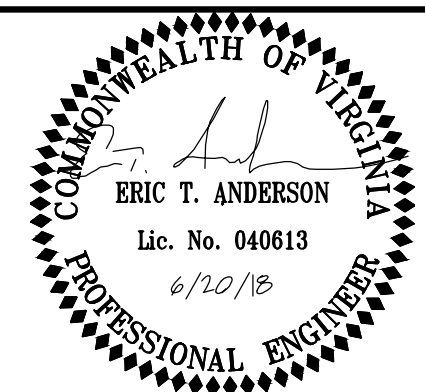


1 ISOMETRIC 1
NOT TO SCALE



2 ISOMETRIC 2
NOT TO SCALE

BEDFORD
REGIONAL WATER
AUTHORITY



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

ROUTE 460 PUMPSTATION
BEDFORD, VA

| No. | Submittal / Revision | App'd. | By | Date |
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| BID ISSUE | ETA | CTB | 06/20/18 |
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


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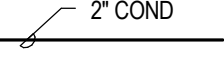
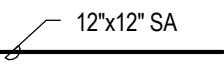
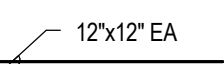
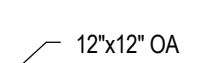
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| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |



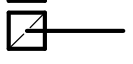



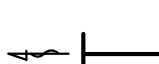

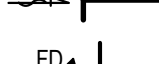
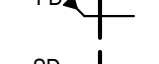
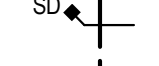
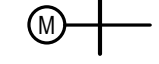
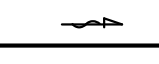
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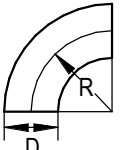

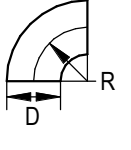


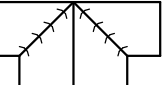
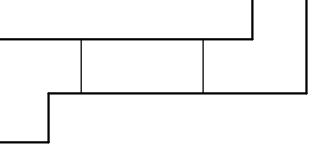
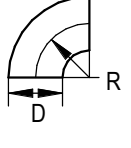
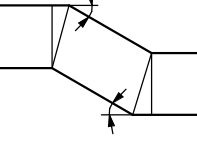
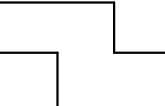
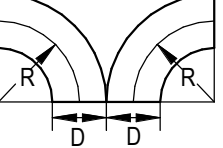
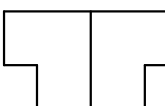
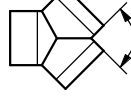
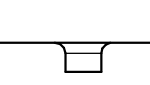
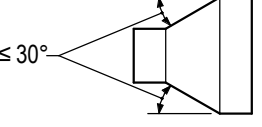

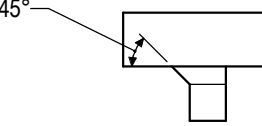

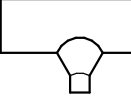
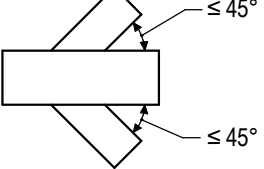
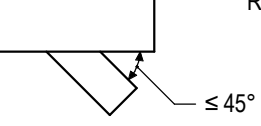
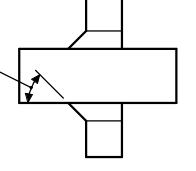
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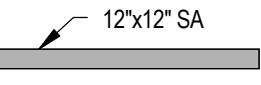
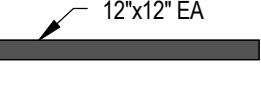
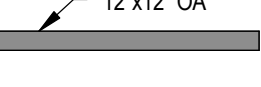

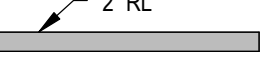
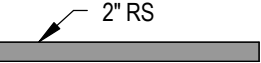
| MECHANICAL ABBREVIATIONS | |
|--------------------------|-----------------------------------|
| AD | ACCESS DOOR |
| AFD | ABOVE FINISH FLOOR |
| AFD | AIR PRESSURE DROP |
| BHP | BRAKE HORSEPOWER |
| CD | CONDENSATE DRAIN |
| CFM | CUBIC FEET PER MINUTE |
| COND | CONDENSATE |
| dB | DECIBEL |
| DB | DRY BULB |
| DN | DOWN |
| DX | DIRECT EXPANSION |
| EA | EXHAUST AIR |
| EAT | ENTERING AIR TEMPERATURE |
| EC | ELECTRICAL CONTRACTOR |
| EDH | ELECTRIC DUCT HEATER |
| EF | EXHAUST FAN |
| ELEV | ELEVATION |
| ESP | EXTERNAL STATIC PRESSURE |
| EUH | ELECTRIC UNIT HEATER |
| FD | FIRE DAMPER |
| FF | FINISH FLOOR |
| FLA | FULL LOAD AMPS |
| FPM | FEET PER MINUTE |
| FT | FOOT / FEET |
| GA | GAUGE OR GAGE |
| HC | HEATING CONTRACTOR |
| HP | HORSEPOWER |
| HPU | HEAT PUMP UNIT |
| HZ | HERTZ |
| IN | INCHES |
| IN WG | INCHES WATER GAUGE |
| KW | KILOWATTS |
| LAT | LEAVING AIR TEMPERATURE |
| LV | LOUVER |
| MAX | MAXIMUM |
| MBH | BTU PER HOUR (THOUSAND) |
| MCA | MINIMUM CIRCUIT AMPS |
| MIN | MINIMUM |
| MOCP | MAXIMUM OVERCURRENT PROTECTION |
| MTG HGT | MOUNTING HEIGHT |
| N/A | NOT APPLICABLE |
| NC | NOISE CRITERIA |
| N C | NORMALLY CLOSED |
| NIC | NOT IN CONTRACT |
| NTS | NOT TO SCALE |
| OA | OUTSIDE AIR |
| PH | PHASE |
| PSI | POUNDS PER SQUARE INCH |
| PSIG | POUND-FORCE PER SQUARE INCH GAUGE |
| RPM | REVOLUTIONS PER MINUTE |
| SA | SUPPLY AIR |
| SF | SQUARE FEET |
| STR | STARTER |
| TD OR ΔT | TEMPERATURE DIFFERENCE |
| TSP | TOTAL STATIC PRESSURE |
| TYP | TYPICAL |
| VOLT | VOLTAGE |
| W | WATT |
| WB | WET BULB |
| °F | DEGREES FAHRENHEIT |
| & | AND |
| # | NUMBER |

| MECHANICAL CONTROL SYMBOLS (ONE-LINE) | |
|---|---|
|  | MOTORIZED DAMPER |
|  | TEMPERATURE ELEMENT |
|  | MOTOR STARTER |
|  | THERMOSTAT - LOW VOLTAGE (24 VOLT - MOUNT AT 48" AFF) |
|  | THERMOSTAT - LINE VOLTAGE (120 VOLT - MOUNT AT 48" AFF) |
| AO | ANALOG OUTPUT |
| AI | ANALOG INPUT |
| DO | DIGITAL OUTPUT |
| DI | DIGITAL INPUT |

| MECHANICAL LINE-TYPES (ONE-LINE) | |
|---|--|
|  | CONDENSATE PIPING (SIZE AS INDICATED) |
|  | SUPPLY AIR DUCTWORK (SIZE AS INDICATED) |
|  | EXHAUST AIR DUCTWORK (SIZE AS INDICATED) |
|  | OUTSIDE AIR DUCTWORK (SIZE AS INDICATED) |

| MECHANICAL SYMBOLS (ONE-LINE) | |
|---|---|
|  | SUPPLY / OUTSIDE AIR DUCT UP |
|  | RETURN / EXHAUST AIR DUCT UP |
|  | SUPPLY / OUTSIDE AIR DUCT DOWN |
|  | RETURN / EXHASUT AIR DUCT DOWN |
|  | FLEXIBLE DUCT CONNECTION |
|  | VOLUME CONTROL DAMPER IN DUCT |
|  | FLEXIBLE DUCT, MAXIMUM LENGTH 4'-0" |
|  | SUPPLY / OUTSIDE AIR SIDEWALL REGISTER / GRILLE |
|  | RETURN / EXHAUST AIR SIDEWALL REGISTER / GRILLE |
|  | FIRE DAMPER IN DUCT |
|  | SMOKE DAMPER IN DUCT |
|  | MOTOR OPERATED DAMPER IN DUCT |
|  | AIRFLOW ARROW |

| DUCTWORK FITTING STANDARDS | |
|--|---|
| THE FOLLOWING INDICATE THE STANDARD FOR DUCTWORK FITTINGS REQUIRED FOR THIS PROJECT | |
| ACCEPTABLE | NOT ACCEPTABLE |
|  SMOOTH RADIUS ELBOWS W/ R/D ≥ 1.5 |  MITERELBOWS (SUPPLY) |
|  SMOOTH RADIUS ELBOWS W/ R/D ≥ 75 WITH FULL RADIUS SPLITTER VANE |  MITERED ELBOWS W/ VANES |
|  RECTANGULAR THROAT W/ RADIUS HEEL |  WYE W/ TURNING VANES W/ OR W/OUT DIVIDER |
|  MITERED ELBOWS (TRANSFER DUCT ONLY) |  SMOOTH RADIUS ELBOWS W/ R/D ≤ 1.5 |
|  OFFSET W/ ANGLE ≤ 30° |  ELBOWS Z-SHAPED (SUPPLY ONLY) |
|  SMOOTH RADIUS WYE W/ R/D ≥ 1.5 |  WYE W/ OR W/OUT DIVIDER |
|  WYE W/ ANGLE ≤ 90° |  BELLMOUTH FITTINGS |
|  TRANSITION WYE ANGLE ≤ 30° |  SPIN-IN-FITTINGS |
|  TEE W/ 45° ENTRY BRANCH TO MAIN |  STRAIGHT TEES |
|  CONICAL TEES |  DOUBLE TEE WITH BRANCH ANGLE ≤ 45° |
|  TEE WITH BRANCH ANGLE ≤ 45° | |
|  DOUBLE TEE W/ 45° ENTRY BRANCH TO MAIN | |

| MECHANICAL LINE-TYPES (TWO-LINE) | |
|---|--|
|  | SUPPLY AIR DUCTWORK (SIZE AS INDICATED) |
|  | EXHAUST AIR DUCTWORK (SIZE AS INDICATED) |
|  | OUTSIDE AIR DUCTWORK (SIZE AS INDICATED) |
|  | CONDENSATE PIPING (SIZE AS INDICATED) |
|  | REFRIGERANT LIQUID PIPING (SIZE AS INDICATED) |
|  | REFRIGERANT SUCTION PIPING (SIZE AS INDICATED) |

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BEDFORD
REGIONAL WATER
AUTHORITY

COMMONWEALTH OF VIRGINIA

DAVID L. BARLOW

Lic. No. 031636

6/20/2018

PROFESSIONAL ENGINEER

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ROUTE 460 PUMPSTATION
BEDFORD, VA.

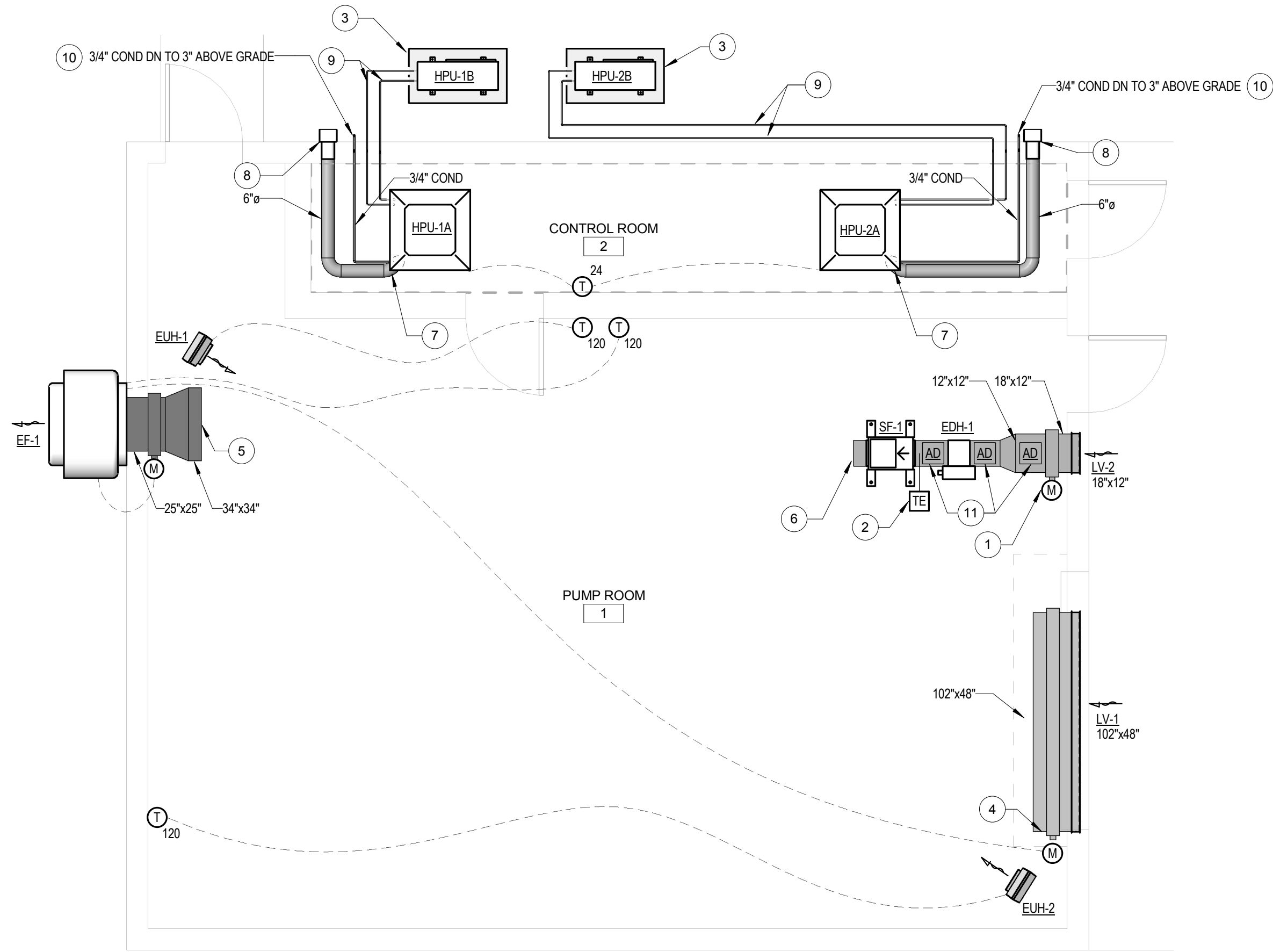
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LEGEND, ABBREVIATIONS
AND SYMBOLS

| | | |
|-------------------------|---------------------------|--------------------|
| Designed By: RS | Drawn By: EE | Checked By: NS |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

Drawing No:
H-001

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1 FIRST FLOOR PLAN
1/4" = 1'-0"



CODED NOTES

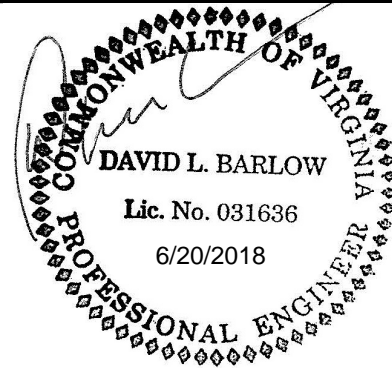
- 120 VAC MOTORIZED DAMPER TO BE INTERLOCKED WITH SF-1
- TEMPERATURE ELEMENT AT EDH-1 AIR DISCHARGE
- CONCRETE PAD FOR OUTDOOR UNIT BY STRUCTURAL
- 120 VAC MOTORIZED DAMPER FOR LV-1
- PROVIDE 1/2" SPACING STAINLESS STEEL WIRE MESH SCREEN AT OPEN DUCT (34"x34")
- PROVIDE 1/2" SPACING STAINLESS STEEL WIRE MESH SCREEN AT FAN DISCHARGE
- 6" Ø OA INTAKE DUCT TO BE CONNECTED WITH FRESH AIR INTAKE OF THE INDOOR UNIT
- 6" STAINLESS STEEL FRESH AIR INTAKE VENT WITH 1/4" WIRE MESH SCREEN, LUXURY METAL WALL VENT 6" ROUND MODEL OR APPROVED EQUAL
- ROUTE SPLIT SYSTEM REFRIGERANT LINES TO HEAT PUMPS OUTSIDE ON GRADE. REFRIGERANT LINES SHALL BE SIZED PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
- ROUTE AND SLOPE CONDENSATE DRAIN PIPE OUTSIDE AND DOWN TO GRADE; PROVIDE INSECT SCREEN AT OUTLET AND SPASH BLOCK ON GRADE.
- PROVIDE ACCESS DOORS ON BOTH SIDES OF DUCT MOUNTED ELECTRIC HEATING COIL AND AT OUTSIDE AIR INTAKE DAMPER.

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ROUTE 460 PUMPSTATION
BEDFORD, VA.

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FIRST FLOOR PLAN

| | | |
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| Designed By: | Drawn By: | Checked By: |
| RS | EE | NS |

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| Issue Date: | Project No: | Scale: |
| 08/01/17 | 27872-3002 | AS SHOWN |

Drawing No:

H-101

SEQUENCES OF OPERATION, GENERAL

THE SEQUENCES OF OPERATION ARE PROVIDED TO ASSIST IN THE FAMILIARIZATION WITH THE CONTROL LOGIC PRESENTED ON THE SYSTEM SCHEMATICS. THE SEQUENCES ARE NOT INTENDED TO BE ALL INCLUSIVE.

IT IS UNDERSTOOD THAT UPON A CONTROL LOOP SETPOINT BEING SATISFIED, EQUIPMENT SHUTDOWN OR EQUIPMENT FAILURE, THE REVERSE SEQUENCE FROM WHAT IS DESCRIBED SHALL OCCUR TO SHUTDOWN SYSTEMS OR STOP EQUIPMENT IN A CONTROLLED MANNER.

SOME OF THE SIMPLER, REPETITIVE LOGIC NECESSARY HAS NOT BEEN INCLUDED IN THE SEQUENCES.

THE CONTROL SYSTEM SEQUENCE OF OPERATION SHALL BE DEVELOPED WITH THE INPUT, AND FINAL APPROVAL, OF THE OWNER.

NOTES:

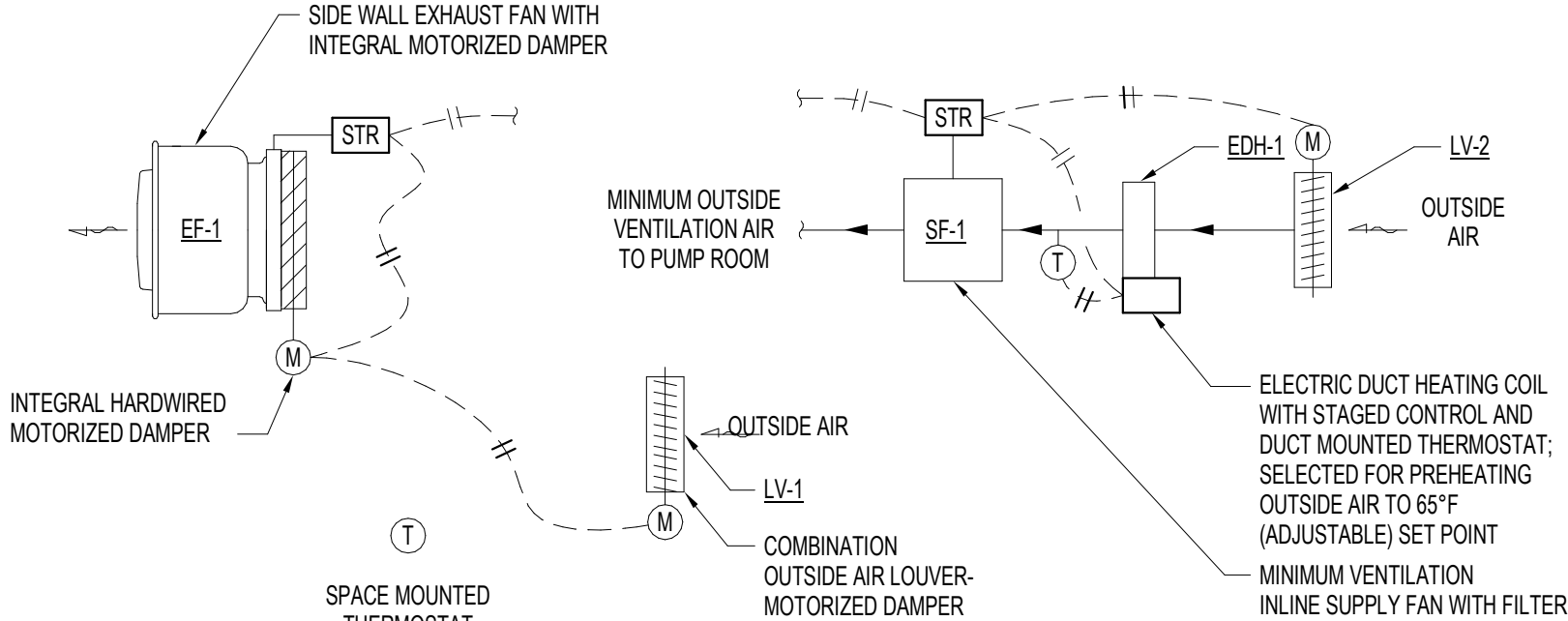
1. PROVIDE MANUFACTURER'S THERMOSTAT THERMAL BREAK MOUNTING ACCESSORY.

1 ELECTRIC UNIT HEATER FLOW DIAGRAM
NOT TO SCALE

SEQUENCE OF OPERATION

ELECTRIC PROPELLER UNIT HEATERS (EUH-1& 2)

1. ELECTRIC UNIT HEATERS (UH) SHALL PROVIDE AUXILIARY ELECTRIC FREEZE PROTECTION HEATING FOR THE PROCESS AREA, SELECTED AT A 65°F (MANUALLY ADJUSTABLE) SPACE TEMPERATURE SETPOINT.
2. ELECTRIC UNIT HEATER SHALL START, WHEN THE SPACE TEMPERATURE (SIGNALLED BY ITS WALL MOUNTED THERMOSTAT) IS BELOW 65°F (MANUALLY ADJUSTABLE). THE UNIT HEATER SHALL STOP WHEN THE TEMPERATURE OF THE SPACE IS ABOVE 67°F (MANUALLY ADJUSTABLE).
3. INTENT IS FOR EQUIPMENT TO OPERATE STAND ALONE.



2 EXHAUST FAN & MINIMUM VENTILATION FLOW DIAGRAM
NOT TO SCALE

SEQUENCE OF OPERATION

SIDE WALL EXHAUST FAN (EF-1/LV-1)

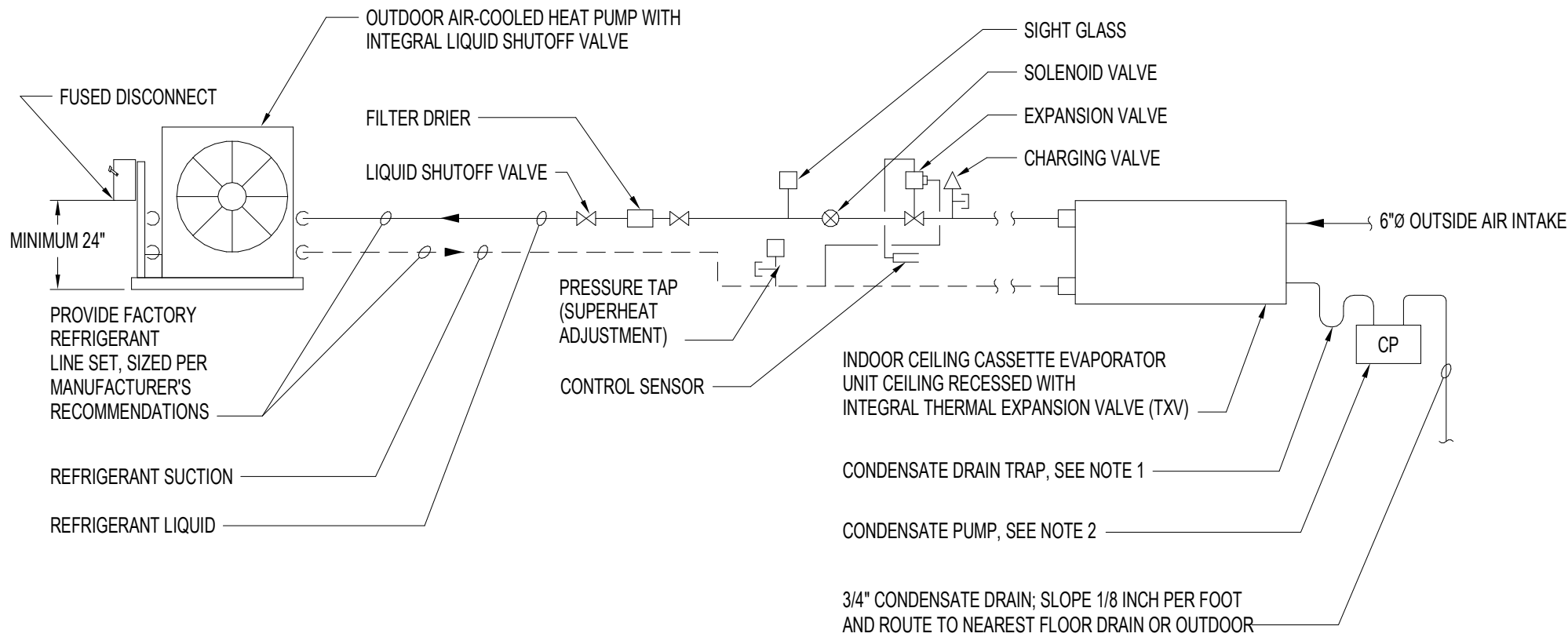
1. THE EXHAUST FAN SHALL START WHEN THE SPACE TEMPERATURE (SIGNALLED BY THE WALL-MOUNTED THERMOSTAT) IS ABOVE 80°F (MANUALLY ADJUSTABLE). THE FAN'S INTEGRAL MOTORIZED ISOLATION DAMPER SHALL BE HARDWIRE INTERLOCKED TO OPEN WHENEVER THE FAN IS STARTED, AND TO STOP WHENEVER THE FAN STOPS. THE EXHAUST FANS SHALL STOP WHEN THE SPACE TEMPERATURE IS BELOW 78°F (MANUALLY ADJUSTABLE).
2. THE MINIMUM VENTILATION SUPPLY FAN SHALL START AND OPERATE WHENEVER THE EXHAUST FAN IS STOPPED AND NOT OPERATING. THE FAN SHALL BE INTERLOCKED WITH ITS OWN INTEGRAL MOTORIZED ISOLATION DAMPER. THE DAMPER SHALL BE OPENED WHEN FAN IS STARTED AND SHALL BE CLOSED WHEN FAN IS STOPPED.
4. THE EXHAUST FAN'S DEDICATED OUTSIDE AIR LOUVER WITH MOTORIZED DAMPER SHALL BE HARDWIRE INTERLOCKED TO OPEN WHENEVER THAT FAN STARTS, AND CLOSE WHENEVER IT STOPS.
5. INTENT IS FOR EQUIPMENT TO OPERATE STAND ALONE.

MINIMUM VENTILATION OUTSIDE AIR SUPPLY FAN (SF-1/LV-2)

1. MINIMUM VENTILATION OUTSIDE AIR SUPPLY FAN SHALL PROVIDE MINIMUM REQUIRED MAKEUP VENTILATION OUTSIDE AIR FOR THE PUMP ROOM YEAR ROUND. THE SUPPLY FAN SHALL BE HARDWIRE INTERLOCKED TO START WHENEVER THE EXHAUST FANS ARE NOT OPERATING. THE SUPPLY FAN'S DEDICATED OUTSIDE AIR LOUVER WITH MOTORIZED ISOLATION DAMPER SHALL BE HARDWIRE INTERLOCKED TO OPEN WHENEVER THE FAN IS STARTED, AND TO CLOSE WHENEVER THE FAN STOPS.
2. THE INTENT IS FOR THE EQUIPMENT TO OPERATE STAND ALONE.

ELECTRIC DUCT MOUNTED HEATING COIL (EDH-1)

1. THE ELECTRIC DUCT HEATING COIL SHALL BE ENERGIZED WHEN ITS DISCHARGE AIR TEMPERATURE (SIGNALLED BY ITS DUCT MOUNTED THERMOSTAT) IS BELOW 65°F (MANUALLY ADJUSTABLE). THE DUCT HEATING COIL SHALL BE DE-ENERGIZED WHEN THE AIR TEMPERATURE IS ABOVE 67°F (MANUALLY ADJUSTABLE).
2. ELECTRIC DUCT HEATING COIL SHALL HAVE MULTIPLE STAGES OF HEATING, INTEGRAL WITH MANUFACTURER'S FACTORY MOUNTED SCR CONTROLS AND SAFETIES.
3. INTENT IS FOR EQUIPMENT TO OPERATE STAND ALONE.



NOTES:

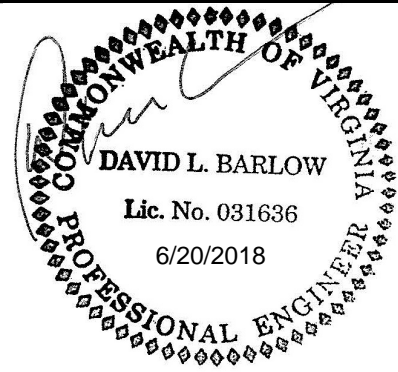
1. PROVIDE CHILLED WATER CONDENSATE DRAIN WITH TRAP HEIGHT PER MANUFACTURER'S INSTALLATION SPECIFICATIONS AND REQUIREMENTS.
2. PROVIDE MANUFACTURER'S RECOMMENDED CONDENSATE PUMP, OR LITTLE GIANT CONDENSATE PUMP MODEL VCMA-20UL, CAPABLE OF 48 GPH AT 10 FT WC; PROVIDE POWER CONNECTION FOR 1/30 HP AT 120V/1PH/60HZ.

3 DUCTLESS SPLIT SYSTEM PIPING FLOW DIAGRAM
NOT TO SCALE

SEQUENCE OF OPERATION

SPLIT SYSTEM HEAT PUMP UNITS (HP-1A & 2A)

1. CEILING CASSETTE INDOOR AIR HANDLING UNIT SHALL MAINTAIN THE CONDITIONED SPACE TEMPERATURE AT 75°F (ADJUSTABLE) IN THE COOLING MODE AND 72°F (ADJUSTABLE) IN THE HEATING MODE. THE DIGITAL WALL MOUNTED PROGRAMMABLE THERMOSTAT FURNISHED WITH THE INDOOR UNIT SHALL CONTROL THE SPACE TEMPERATURE WHERE THE UNIT IS SERVING. REFER TO DRAWINGS FOR THERMOSTAT LOCATIONS.
2. OUTDOOR AIR COOLED HEAT PUMP UNIT SHALL BE STARTED WHENEVER THERE IS A CALL FOR COOLING OR HEATING BY THE WALL MOUNTED PROGRAMMABLE THERMOSTAT.
3. AT A MINIMUM, PROGRAMMABLE THERMOSTAT SHALL BE CAPABLE OF SEVEN DAY SCHEDULE, OCCUPIED/UNOCCUPIED SET POINTS CONTROL AND AUTO CHANGEOVER BETWEEN COOLING AND HEATING.
4. MINIMUM REQUIRED MAKEUP VENTILATION OUTSIDE AIR FOR THE AREAS SERVED BY THE CEILING CASSETTE HEAT PUMP UNITS SHALL BE DUCTED FROM AN OUTSIDE AIR INTAKE BRICK VENT.
5. INTENT IS FOR EQUIPMENT TO OPERATE STAND ALONE.



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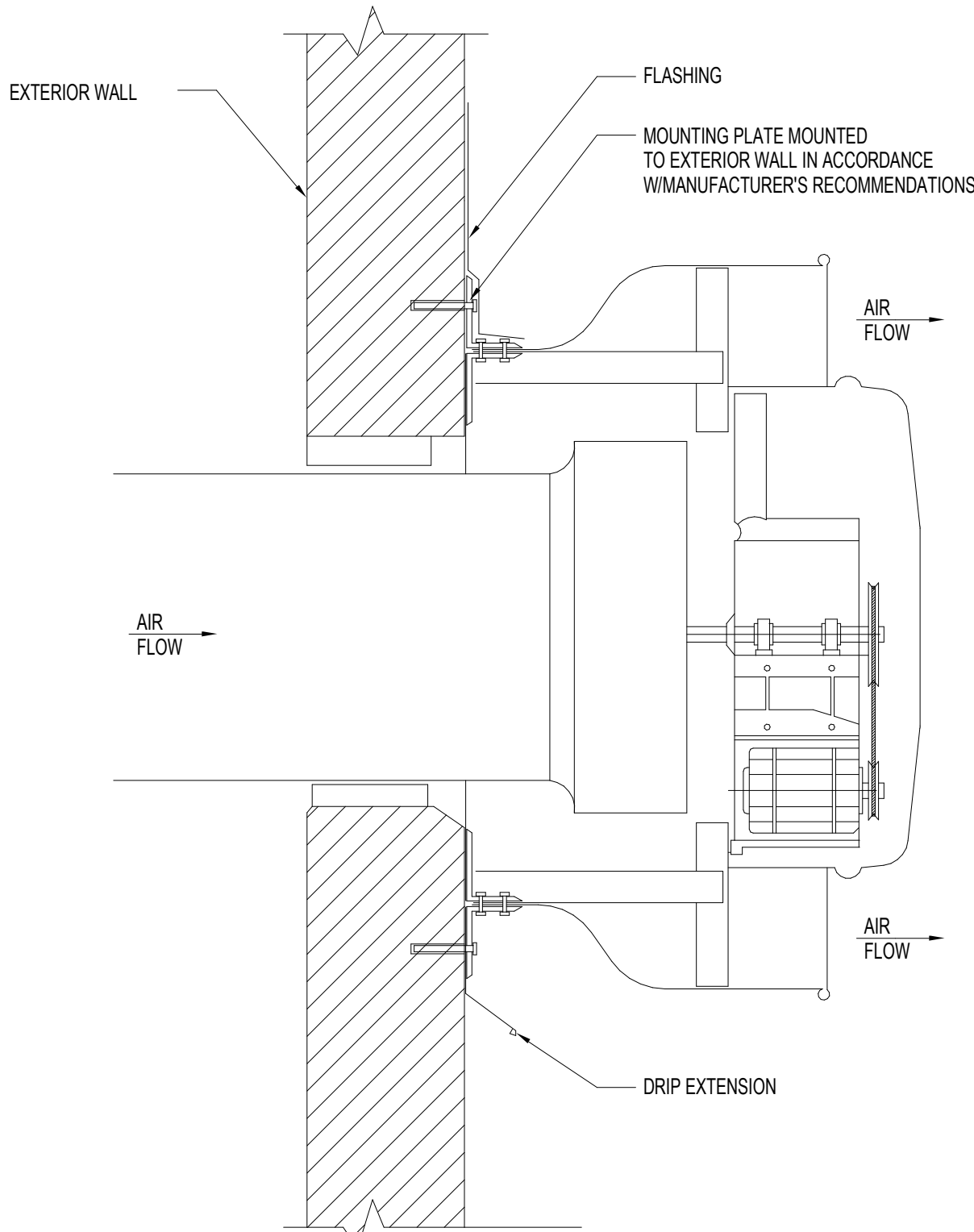
FLOW DIAGRAMS

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| Designed By: RS | Drawn By: EE | Checked By: NS |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

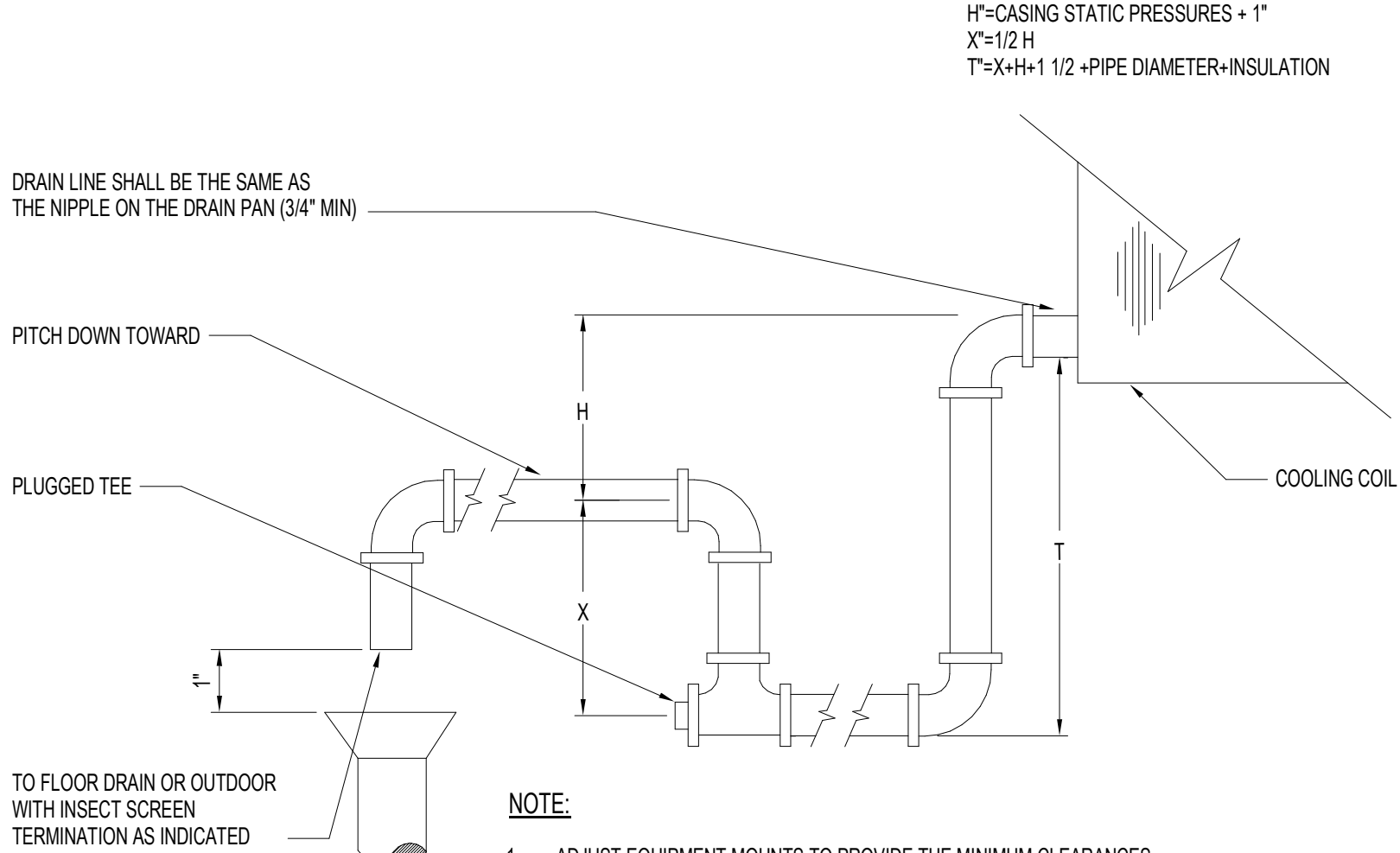
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1 CENTRIFUGAL SIDEWALL EXHAUSTER DETAIL
NOT TO SCALE



NOTE:
1. ADJUST EQUIPMENT MOUNTS TO PROVIDE THE MINIMUM CLEARANCES.
2. COOLING COIL CONDENSATE TRAP DETAIL
NOT TO SCALE

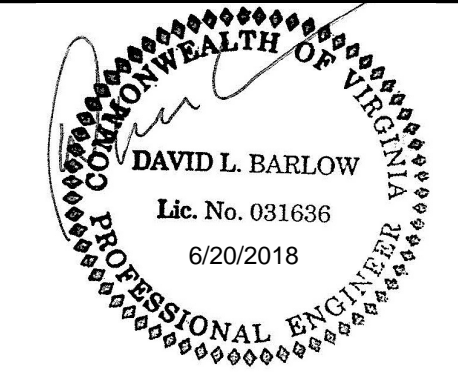
| FAN SCHEDULE | | | | | | | | | | | | |
|--------------|----------|---------|------------|--------|----------------|-------------|----------------|-----|------|----|--------------------------|---|
| TAG | LOCATION | SERVICE | TYPE | CFM | TSP (IN WG) | BHP (HP) | FAN MOTOR DATA | | | | MANUFACTURER & MODEL# | REMARKS |
| | | | | | | | RPM | HP | VOLT | PH | FLA | |
| EF-1 | PUMP RM | EXHAUST | BELT-DRIVE | 11,300 | 0.35 | 2.74 | 1725 | 3 | 460 | 3 | 4.8 | PROVIDE FACTORY-MOUNTED AND WIRED NEMA-3R DISCONNECT SWITCH, SPRING HANGING ISOLATORS AND BRACKETS. |
| SF-1 | PUMP RM | SUPPLY | BELT-DRIVE | 260 | 0.5 | 0.09 | 1725 | 1/4 | 120 | 1 | 5.8 | PROVIDE FACTORY-MOUNTED AND WIRED NEMA-3R DISCONNECT SWITCH, SPRING HANGING ISOLATORS AND BRACKETS. |

| ELECTRIC UNIT HEATER SCHEDULE | | | | | | | | | | | | | | | | | | | |
|-------------------------------|----------|------------------------------|-------------------------|------|-----|---------------|-------------|-------------|------------|------|----|-----|------------|-------|------|----|-------------------------|--------------------------|--|
| TAG | LOCATION | SERVICE | TYPE | MBH | CFM | THROW (FT) | EAT (°F) | LAT (°F) | ELECTRICAL | | | | MOTOR DATA | | | | MOUNTING HEIGHT (FT) | MANUFACTURER & MODEL# | REMARKS |
| | | | | | | | | | KW | VOLT | PH | MCA | RPM | HP | VOLT | PH | | | |
| EUH-1 | PUMP RM | FREEZE PROTECTION HEATING | HORIZONTAL DISCHARGE | 17.1 | 400 | 12 | 65 | 105 | 5 | 460 | 3 | 6.1 | 1550 | 1/125 | 460 | 3 | 9 | TRANE #UHEC-053DACA | PROVIDE MANUFACTURER'S MOUNTING BRACKETS AND HARDWARE FOR CEILING SUSPENDED OR WALL MOUNTED INSTALLATION. PROVIDE UNIT HEATER WITH 120 LINE VOLTAGE THERMOSTAT, INSTALLED AND WIRED BY EC. |
| EUH-2 | PUMP RM | FREEZE PROTECTION HEATING | HORIZONTAL DISCHARGE | 17.1 | 400 | 12 | 65 | 105 | 5 | 460 | 3 | 6.1 | 1550 | 1/125 | 460 | 3 | 9 | TRANE #UHEC-053DACA | |

| DUCTLESS HEAT PUMP SPLIT SYSTEM SCHEDULE | | | | | | | | | | | | | | | | |
|--|-----------------|-------------------|-----------------------------|------|-----------|-------------|---------------------------|-----------------------------------|----|----|-----|-------|---------------------------|-------------------|---------------------|--|
| TAG (INDOOR/ OUTDOOR) | SERVICE | COOLING (BTUH) | HEATING @ 17°F (BTUH) | SEER | OA CFM | REFRIGERANT | OUTDOOR UNIT | ELECTRICAL DATA (OUTDOOR UNIT) | | | | | INDOOR UNIT | | | REMARKS |
| | | | | | | | MANUFACTURER & MODEL# | VOLT | PH | HZ | MCA | MOCBP | MANUFACTURER & MODEL# | CFM (HIGH/LOW) | MOUNTING STYLE | |
| HPU-1A/1B | CONTROL ROOM | 24,000 | 16,000 | 13.6 | 30 | R410A | MITSUBISHI PUZ-A24NH44 | 208 | 1 | 60 | 18 | 30 | MITSUBISHI PLA-A24NH44 | 640/420 | CEILING RECESSED | PROVIDE FRESH AIR INTAKE KIT, CONDENSATE PUMP AND MOUNTING BRACKET FOR INDOOR UNITS. PROVIDE INVERTER TYPE COMPRESSOR, LOW AMBIENT CONTROL (FOR 0° AMBIENT COOLING), WIND BAFFLE AND MOUNTING BASE FOR OUTDOOR UNIT. INDOOR UNIT POWERED FROM OUTDOOR UNIT. |
| HPU-2A/2B | CONTROL ROOM | 24,000 | 16,000 | 13.6 | 30 | R410A | MITSUBISHI PUZ-A24NH44 | 208 | 1 | 60 | 18 | 30 | MITSUBISHI PLA-A24NH44 | 640/420 | CEILING RECESSED | |

| ELECTRIC DUCT HEATER SCHEDULE | | | | | | | | | | | | | | |
|-------------------------------|----------|------------|--------------------------------------|--------------------|------------|----------|----------|----------------------|------------|------|----|-------------------------|---|--|
| TAG | LOCATION | SERVICE | TYPE | DUCT SIZE (WXH) | DESIGN CFM | EAT (°F) | LAT (°F) | NO. OF CONTROL STEPS | ELECTRICAL | | | MANUFACTURER & MODEL# | REMARKS | |
| | | | | | | | | | KW | VOLT | PH | | | |
| EDH-1 | PUMP RM | OA HEATING | FLANGED ELECTRIC DUCT MOUNTED HEATER | 12"x12" | 260 | 0 | 65 | 2 | 6.0 | 460 | 3 | GREENHECK #IDHC FLANGED | PROVIDE UL LISTED DUCT HEATER AND PANEL, STEP CONTROLLER, AND CONTROL OPTION INCLUDING THERMAL CUTOUPS, AIRFLOW SWITCH, CONTACTOR, DISCONNECT SWITCH, CONTROL TRANSFORMER, AND DOOR INTERLOCKING DISCONNECTING SWITCH. PROVIDE WITH MANUFACTURER'S THERMOSTAT FOR DUCT MOUNTING AT ELECTRIC DUCT HEATING COIL DISCHARGE. PROVIDE ANY NECESSARY HARDWARE, ACCESSORIES AND APPURTENANCES FOR ELECTRIC DUCT HEATING COIL INSTALLATION. | |

| LOUVER SCHEDULE | | | | | | | | | | | | | | |
|-----------------|---------------|---------|-----------------------------|---|------------|-------------|----------------|----------------------|--------------------|----------|-----------------------|----------|--|--|
| TAG | LOCATION | AREA | SERVICE | TYPE | WIDTH (IN) | HEIGHT (IN) | FREE AREA (SF) | DESIGN AIRFLOW (CFM) | MAX VELOCITY (FPM) | MATERIAL | FINISH | OPERATOR | MANUFACTURER & MODEL# | REMARKS |
| LV-1 | EXTERIOR WALL | PUMP RM | OUTSIDE AIR INTAKE FOR EF-1 | FIXED BLADE DRAINABLE, WITH INTEGRAL MOTORIZED DAMPER | 102 | 48 | 16.13 | 11,300 | 701 | ALUMINUM | KYNAR 2-COATS MINIMUM | 120 VAC | GREENHECK #ECD-601-102X48 WITH CONTROL ACTUATOR(S) | PROVIDE LOW-LEAKAGE MOTORIZED DAMPER, PROVIDE ALL RELAYS AND WIRING NECESSARY TO HARD-WIRE INTERLOCK DAMPER MOTOR WITH EF-1; PROVIDE CONTROLS TRANSFORMER AS NECESSARY TO COORDINATE DAMPER MOTOR VOLTAGE WITH FAN MOTOR VOLTAGE. COORDINATE FINAL LOUVER COLOR AND FINISH WITH ARCHITECT; PROVIDE INTERNAL ALUMINUM BIRD AND INSECT SCREEN. |
| LV-2 | EXTERIOR WALL | PUMP RM | OUTSIDE AIR INTAKE FOR SF-1 | WIND-DRIVEN FIXED BLADE DRAINABLE | 18 | 14 | 0.38 | 260 | 510 | ALUMINUM | KYNAR 2-COATS MINIMUM | NA | GREENHECK #EHH-601-18X14 | COORDINATE FINAL LOUVER COLOR AND FINISH WITH ARCHITECT; PROVIDE ALUMINUM INSECT SCREEN ON INSIDE. |



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DETAILS AND SCHEDULES

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|-------------------------|---------------------------|--------------------|
| Designed By: RS | Drawn By: EE | Checked By: NS |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

| ELECTRICAL ABBREVIATIONS | |
|--------------------------|--|
| A | AMPERE |
| AC | ALTERNATING CURRENT |
| AF | AMPERE FRAME |
| AFF/G | ABOVE FINISHED FLOOR/GRADE |
| AIC | AMPERE INTERRUPTING CAPACITY |
| AT | AMPERE TRIP |
| AUX | AUXILIARY |
| A/V | AUDIBLE/VISUAL |
| AWG | AMERICAN WIRE GAUGE |
| BB | BACKBOARD |
| BCW | BARE COPPER WIRE |
| BATT | BATTERY |
| BTM | BOTTOM |
| BKR | BREAKER |
| BLDG | BUILDING |
| C | CONDUIT |
| CAB | CABINET |
| CATV | COMMUNITY ACCESS TELEVISION (CABLE TELEVISION) |
| CB | CIRCUIT BREAKER |
| CIR | CIRCUIT |
| CKT | CIRCUIT |
| CL | CENTERLINE |
| CO | COMPANY |
| COMM | COMMUNICATIONS |
| CONN | CONNECTION, CONNECT |
| CUH | CABINET UNIT HEATER |
| CT | CURRENT TRANSFORMER |
| CU | COPPER |
| CWA | CONSTANT WATTAGE AUTOTRANSFORMER |
| Δ | DELTA CONNECTION |
| DB | DEEP |
| DET | DECIBEL |
| DIA | DIAMETER |
| DISC | DISCONNECT |
| DIST | DISTRIBUTION |
| DIV | DIVISION |
| DN | DOWN |
| DWG | DRAWING |
| EA | EACH |
| EBH | ELECTRIC BASEBOARD HEATER |
| EF | EXHAUST FAN |
| EL | ELEVATION |
| ELEC | ELECTRIC(AL) |
| EMER | EMERGENCY |
| ENCL | ENCLOSURE |
| EQUIP | EQUIPMENT |
| EWC | ELECTRIC WATER COOLER |
| EXT | EXTERIOR |
| F | FUSE(D) |
| FA | FIRE ALARM |
| FACP | FIRE ALARM CONTROL PANEL |
| FC | FOOTCANDLES |
| FIXT | FIXTURE |
| FLR | FLOOR |
| FLUOR | FLUORESCENT |
| FT | FOOT(FEET) |
| FUT | FUTURE |
| G, GND | GROUND |
| GALV | GALVANIZE(D) |
| GC | GENERAL CONTRACTOR |
| GFI | GROUND FAULT CIRCUIT INTERRUPTER |
| GFP | GROUND FAULT PROTECTION |
| HD | HEAVY DUTY |
| HGT | HEIGHT |
| HID | HIGH INTENSITY DISCHARGE |
| HO | HIGH OUTPUT |
| HOA | HAND-OFF-AUTOMATIC |
| HP | HORSEPOWER |
| HPF | HORSE POWER FACTOR |
| HPS | HIGH PRESSURE SODIUM |
| HTR | HEATER |
| HV | HIGH VOLTAGE |
| HW | HOT WATER |
| ID | IDENTIFY, IDENTIFICATION |
| INCAND | INCANDESCENT |
| J-BOX | JUNCTION BOX |
| J.C. | JANITOR CLOSET |
| JCT | JUNCTION |
| KCMKmil | THOUSAND CIRCULAR MILS |
| KVA | KILO VOLT AMPERE |
| KW | KILOWATT |
| LGT | LIGHTING |
| LT(S) | LIGHT(S) |
| LED | LIGHT EMITTING DIODE |
| L | LOUVER |
| MAX | MAXIMUM |
| MCB | MAIN CIRCUIT BREAKER |
| MC | METAL CLAD CABLE |
| MFR | MANUFACTURER |
| MH | METAL HALIDE |
| MECH | MECHANICAL |
| MIN | MINIMUM |
| ML | MOTORIZED LOUVER |
| MLO | MAIN LUGS ONLY |
| MT | MOUNT |
| MTD | MOUNTED |
| MTR | MOTOR |
| N | NORTH |
| NEC | NATIONAL ELECTRICAL CODE |
| NF | NON-FUSED |
| NL | NIGH LIGHT |
| NO# | NUMBER |
| OC | OVER COUNTER |
| OL | OVERLOAD |
| P | POLE(S) |
| PA | PUBLIC ADDRESS |
| PNL | PANEL |
| PR | PAIR |
| PR1 | PRIMARY |
| PWR | POWER |
| PT | PHASE |
| | PRESSURE TREATED |
| RECEPT | RECEPTACLE |
| RGS | RIGID GALVANIZED STEEL |
| RM | ROOM |
| WP | WEATHER PROOF |

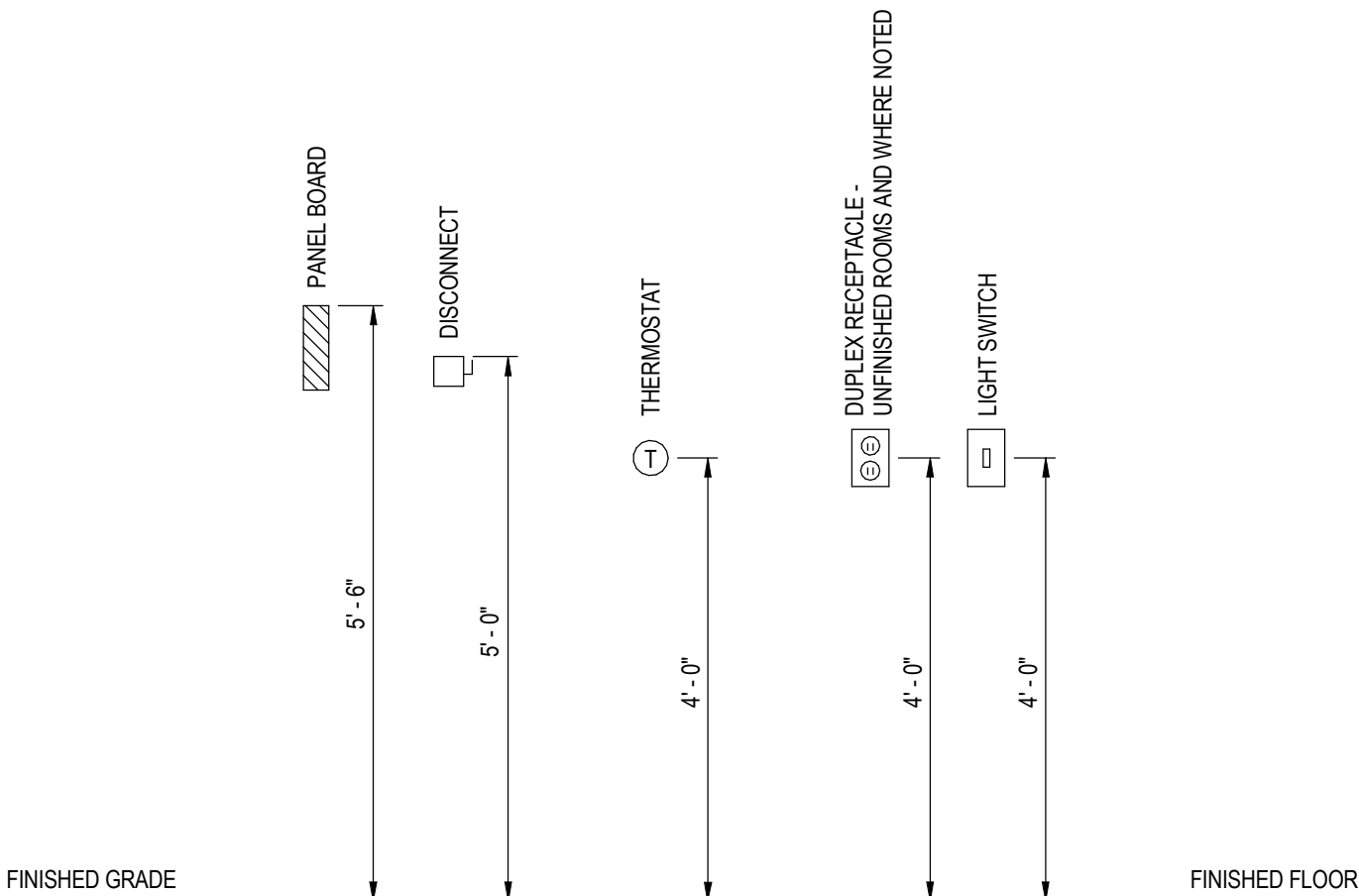
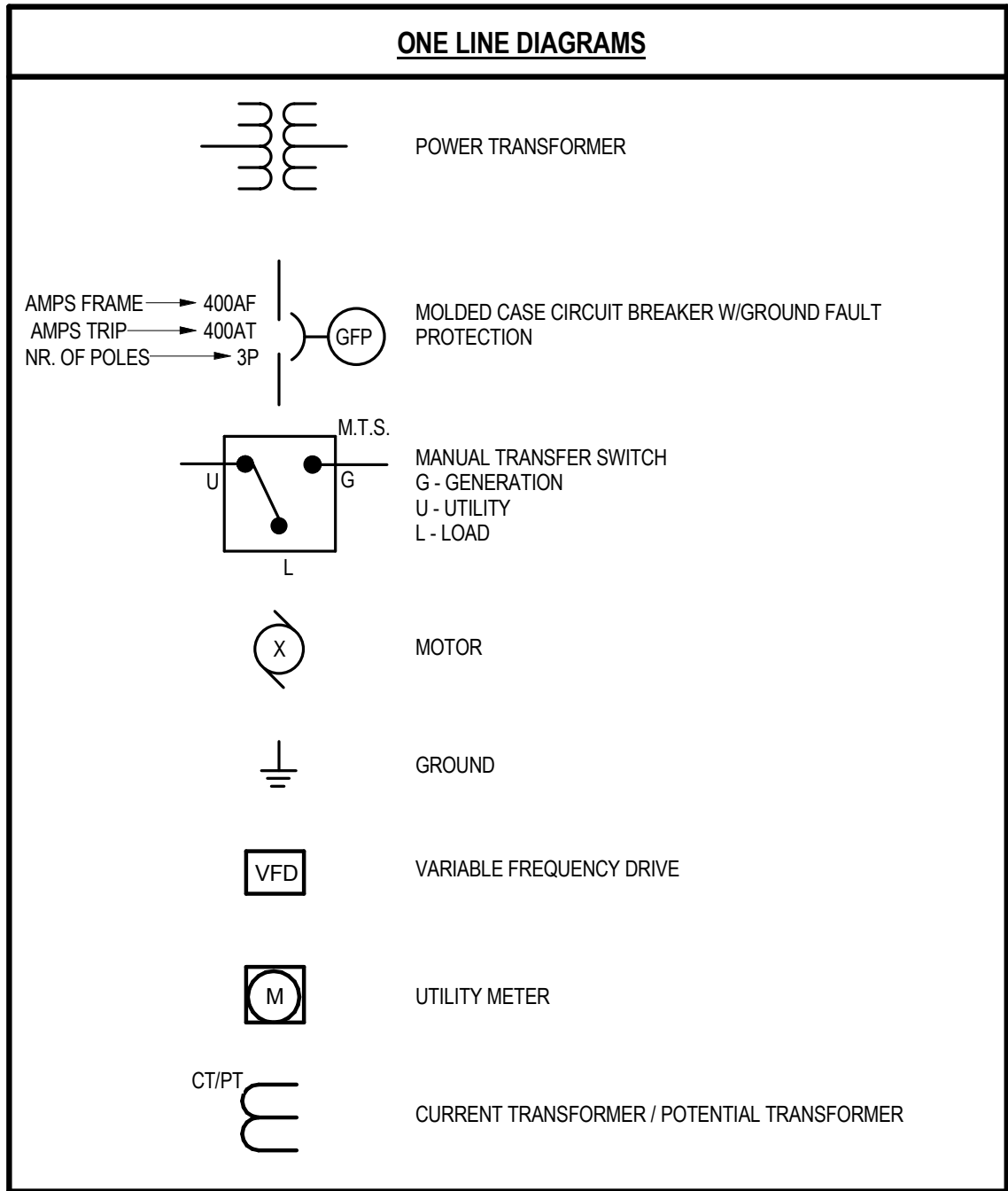
| ELECTRICAL ABBREVIATIONS CON'T | |
|--------------------------------|--------------------------|
| SEC | SECONDARY |
| SH | SHIELDED |
| SPKR | SPEAKER |
| SPD | SURGE PROTECTION DEVICE |
| SW | SWITCH |
| TEMP | TEMPORARY/TEMPERATURE |
| T-STAT | THERMOSTAT |
| TB | TERMINAL BOARD |
| TYP | TYPICAL |
| UH | UNIT HEATER |
| UON | UNLESS OTHERWISE NOTED |
| V | VOLT, VOLTS |
| VA | VOLT-AMPERES |
| VFD | VARIABLE FREQUENCY DRIVE |
| W | WATT, WIRE |
| W/ | WITH |
| WP | WEATHERPROOF |
| XFMR/T | TRANSFORMER |
| Y | WYE CONNECTION |

| DEVICES AND APPURTENANCES | |
|---------------------------|--|
| SM | MOTOR RATED TOGGLE SWITCH WITH THERMAL OVERLOADS SIZED PER NEC |
| | ALL RECEPTACLES TO BE MOUNTED AT 48" ABOVE FINISHED FLOOR DUPLX RECEPTACLE, SUBSCRIPT DENOTES -WP=WEATHER PROOF -GFI=GROUND FAULT CURRENT INTERRUPTER |
| | COMBINATION SMOKE / HEAT DETECTOR ALARM, CEILING MOUNTED, 120V WITH 9 VOLT BATTERY BACKUP, WITH AUX CONTACTS TO BE MONITORED VIA P.L.C.S.C.A.D.A. UL LISTED, MANUFACTURED BY GENTEX, 9123 SERIES OR APPROVED EQUAL. |

| POWER DISTRIBUTION EQUIPMENT | |
|------------------------------|---|
| | SURFACE MOUNTED BRANCH CIRCUIT PANELBOARD 480/277V, 3Ø, 4W, UON |
| | SURFACE MOUNTED BRANCH CIRCUIT PANELBOARD 480/277V, 3Ø, 4W, UON |
| | DISTRIBUTION PANEL |
| | VARIABLE FREQUENCY DRIVE |
| | COMBINATION MOTOR STARTER/FUSED DISCONNECT NEMA-4X |
| | DISCONNECT SWITCH, NON-FUSED |
| | DISCONNECT SWITCH, FUSED |

| LIGHTING | |
|---|---|
| REFER TO LIGHTING FIXTURE SCHEDULE FOR TYPE, LAMP, BALLAST, POWER REQUIREMENTS, MOUNTING HEIGHT AND MANUFACTURER. | |
| \$ | SINGLE POLE LIGHT SWITCH, SUBSCRIPT DENOTES: -3=3 WAY SWITCH -4=4 WAY SWITCH O=OCCUPANCY WALL SWITCH -D=DIMMER SWITCH -K=KEYED SWITCH #=LOWER CASE LETTER DENOTES CONTROL OF FIXTURE (S) AND/OR LAMPS WITH MATCHING LETTER |
| | 1X4 LIGHT FIXTURE |
| | EXTERIOR LIGHT |
| | EXIT SIGN |
| | EMERGENCY WALL PACK |
| | EXTERIOR LIGHTING |

| GENERAL | |
|---------|---|
| | NUMBER IN CIRCLE, WITH OR WITHOUT ARROW OR LEADER, REFER TO MATCHING NUMBERED CODED NOTE |
| | NUMBER IN DIAMOND, WITH OR WITHOUT ARROW OR LEADER, REFER TO THE DEMOLITION CODED NOTE WITH THE MATCHING NUMBER |
| | DETAIL CALLOUT |



MOUNTING ELEVATIONS NOTES:

- COORDINATE MOUNTING HEIGHTS WITH ARCHITECTURAL PLANS, ELEVATIONS AND CASEWORK DETAILS.
- IN LOCATIONS WHERE DIVICES ARE MOUNTED AT THE SAME HEIGHT, DIVICES SHALL BE PROPERLY "GAUGED" WHEN FEASIBLE AND SHALL HAVE A SINGLE COVER PLATE.
- IN LOCATIONS WHERE DIFFERENT DEVICES ARE MOUNTED AT DIFFERENT HEIGHTS WITHIN FOUR FEET OF ONE ANOTHER, DEVICES SHALL BE MOUNTED SUCH THAT THEY HAVE A COMMON CENTERLINE. IF THERE ARE THREE OR MORE DEVICES, THE CONTRACTOR SHALL REQUEST A DETAIL FROM THE ARCHITECT.
- ELEVATIONS SHOWN ARE TYPICAL, EXCEPTIONS ARE NOTED ON PLANS

TYPICAL DEVICE MOUNTING ELEVATIONS

NOT TO SCALE

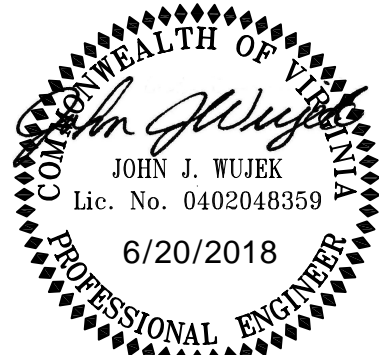
GENERAL NOTES

- GENERAL NOTES APPLY TO ALL CONTRACT DRAWINGS.
- REFER TO ARCHITECTURAL, CIVIL, INSTRUMENTATION, MECHANICAL AND STRUCTURAL DRAWINGS FOR SYMBOLS ASSOCIATED WITH WORK OF OTHER TRADES.
- CONDUIT RUNS SHOWN ARE DIAGRAMMATIC. EXACT LOCATION OF ALL CONDUIT RUNS SHALL BE DETERMINED IN THE FIELD. COORDINATE INSTALLATIONS AND AVOID CONFLICT WITH UTILITIES, FOUNDATIONS, EQUIPMENT, PIPING, DUCTWORK, ACCESS DOORS AND WORK BY OTHER TRADES.
- UNLESS OTHERWISE INDICATED, CIRCUITS SHALL BE 3/4"C.-2#12, 1#12 G. SINGLE PHASE AND 3/4"C.-3# 12, 1#12 G. THREE PHASE. ALL EXPOSED EXTERIOR CONDUITS FOR POWER CIRCUITS SHALL BE RGS CONDUITS.
- PROVIDE TEMPORARY POWER AND LIGHTING FOR CONSTRUCTION WORK.
- THE CONTRACTOR SHALL PROVIDE A DETAILED SET OF RECORD DRAWINGS, FOR THE BUILDINGS, SITE, AND DETAILS, CONSISTENT WITH PROVISIONS IN THE SPECIFICATIONS.
- WHERE PRACTICAL, I/O WIRING CAN BE COMBINED (ROUTED IN A COMMON RACEWAY) BY SIGNAL TYPE PROVIDED THE RACEWAY DOES NOT EXCEED 40% INSIDE AREA OF CONDUCTOR FILL AS PER NEC REQUIREMENTS OF RACEWAY FILL. RACEWAYS CAN BE CONDUIT, WIREWAY OR CABLE TRAY. ALL EXTERIOR EXPOSED RACEWAYS SHALL BE RGS CONDUIT. DO NOT MIX SIGNAL TYPES IN A COMMON RACEWAY.
- PROVIDE ONE #12AWG (MIN.) GROUNDING CONDUCTOR IN EACH WIRING RACEWAY INCLUDING CONTROL AND I/O WIRING RACEWAYS. PROVIDE PROPER GROUNDING OF ALL EQUIPMENT AS REQUIRED BY THE NEC.
- WIRING REQUIREMENTS MAY VARY PER INSTRUMENT, VALVE OR DEVICE MANUFACTURER. PROVIDE POWER AND CONTROL WIRING, POWER SUPPLIES ETC. AS REQUIRED BY THE FINAL SELECTED EQUIPMENT MANUFACTURER'S REQUIREMENTS.
- CONCEAL CONDUITS AND/OR WIRING WITHIN WALLS, UNDERFLOORS AND/OR ABOVE CEILINGS EXCEPT FOR ELECTRICAL ROOMS, MECHANICAL ROOMS, GARAGE SPACES AND AS NOTED IN CONTRACT DOCUMENTS.
- CONDUIT TYPE AS FOLLOWS: UNDERGROUND - SCHEDULE 80 PVC; EXTERIOR, WET/DAMP - RIGID GALVANIZED STEEL; PUMP ROOM - RIGID GALVANIZED STEEL; DRY, ELECTRICAL/CONTROL ROOM - EMT.
- NO WELDING OR DRILLING OF THE BUILDING STEEL IS PERMITTED WITHOUT PRIOR STRUCTURAL ENGINEER'S APPROVAL. CLAMPING IS TO BE USED EXCLUSIVELY.
- TO PREVENT THE TRANSFER OF TEMPERATURE, MOISTURE AND GASES, PROVIDE POLYWATER FST DUCT SEALANT FOR ANY CONDUIT ENTERING AN ELECTRICAL ENCLOSURE IN THE BUILDING INTERIOR FROM OUTDOORS OR FROM BELOW GRADE. ELECTRICAL ENCLOSURES INCLUDE ELECTRICAL POWER DISTRIBUTION PANELS, BRANCH CIRCUIT PANELS, MOTOR CONTROL CENTERS, TRANSFORMERS, CONTROL PANELS, SAFETY SWITCHES, ENCLOSED CIRCUIT BREAKERS, TRANSFER SWITCHES ETC.
- PROVIDE WIRING AND GROUNDING OF VFD'S AND MOTORS PER MANUFACTURER'S RECOMMENDATIONS. SEE VARIABLE FREQUENCY DRIVE GROUNDING DETAIL FOR GROUNDING REQUIREMENTS.
- USE XLPE DRIVE CABLE FOR MOTOR FEEDERS FROM VFD TO MOTOR. EACH VFD MOTOR FEEDER SHALL BE ROUTED IN A SEPARATE DEDICATED RACEWAY WITH GROUND CONDUCTOR AND NOT COMBINED WITH ANY OTHER CIRCUITS. THIS IS TO AVOID HARMONIC NOISE AND REFLECTIVE WAVE INTERFERENCES.
- PROVIDE ALL REQUIRED PROGRAMMING OF VFD'S. PROVIDE A HARD COPY OF EACH VFD'S PROGRAMMING PARAMETERS TO THE OWNER AND ENGINEER. PROGRAM VFD'S TO RESET RATHER THAN FAULT AFTER A POWER FAILURE CONDITION.
- ALL ETHERNET CAT 6 NETWORKING CABLE SHALL BE ROUTED IN A DEDICATED RACEWAY/CONDUIT 1" MINIMUM.
- PROVIDE PROPER GROUNDING FOR ALL EQUIPMENT PER THE NATIONAL ELECTRICAL CODE (NEC) REQUIREMENTS.
- PROVIDE A HOUSEKEEPING/EQUIPMENT PAD FOR ALL SLAB/FLOOR MOUNTED ELECTRICAL AND CONTROL EQUIPMENT, INCLUDING BUT NOT LIMITED TO POWER DISTRIBUTION EQUIPMENT SWICHGEAR, PANELS, MOTOR CONTROL CENTERS, VFD'S, AUTOMATIC TRANSFER SWITCHES, TRANSFORMERS, AND CONTROL PANELS. HOUSINGKEEPING PADS TO BE A MINIMUM OF 4" THICK, SEE DETAIL.
- THE TRANSFORMER PAD AND ELECTRICAL SERVICE REQUIREMENTS MUST CONFORM TO THE ELECTRICAL UTILITY REQUIREMENTS AND STANDARDS. THE ELECTRICAL UTILITY SERVICING THIS PROJECT SITE IS THE TOWN OF BEDFORD, VIRGINIA. CONTRACTOR IS RESPONSIBLE FOR PAYING ALL UTILITY FEES REQUIRED FOR THE ELECTRICAL SERVICE. FOR ADDITIONAL INFORMATION CONCERNING THE UTILITY SERVICE APPLICATION, CONTACTS, AND REQUIREMENTS, VISIT [HTTP://WWW.BEDFORDVA.GOV/1174/SERVICE-STANDARDS](http://www.BEDFORDVA.GOV/1174/SERVICE-STANDARDS).

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ROUTE 460 PUMP STATION
BEDFORD, VA.

| No. | Submittal / Revision | App'd. | By | Date |
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ELECTRICAL LEGEND, ABBREVIATIONS AND SYMBOLS

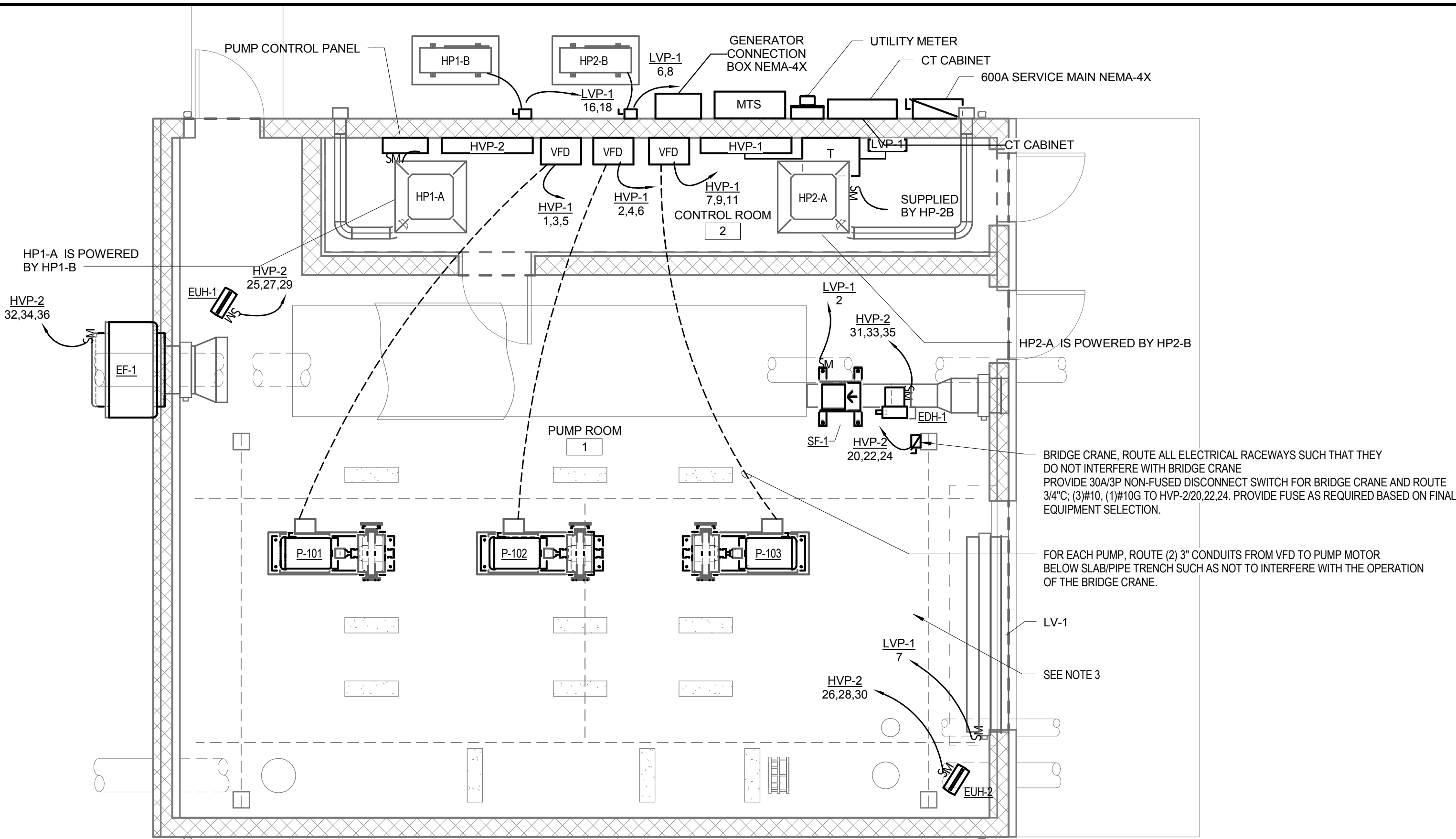
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| Designed By: NS | Drawn By: CJE | Checked By: JJW |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

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E-001

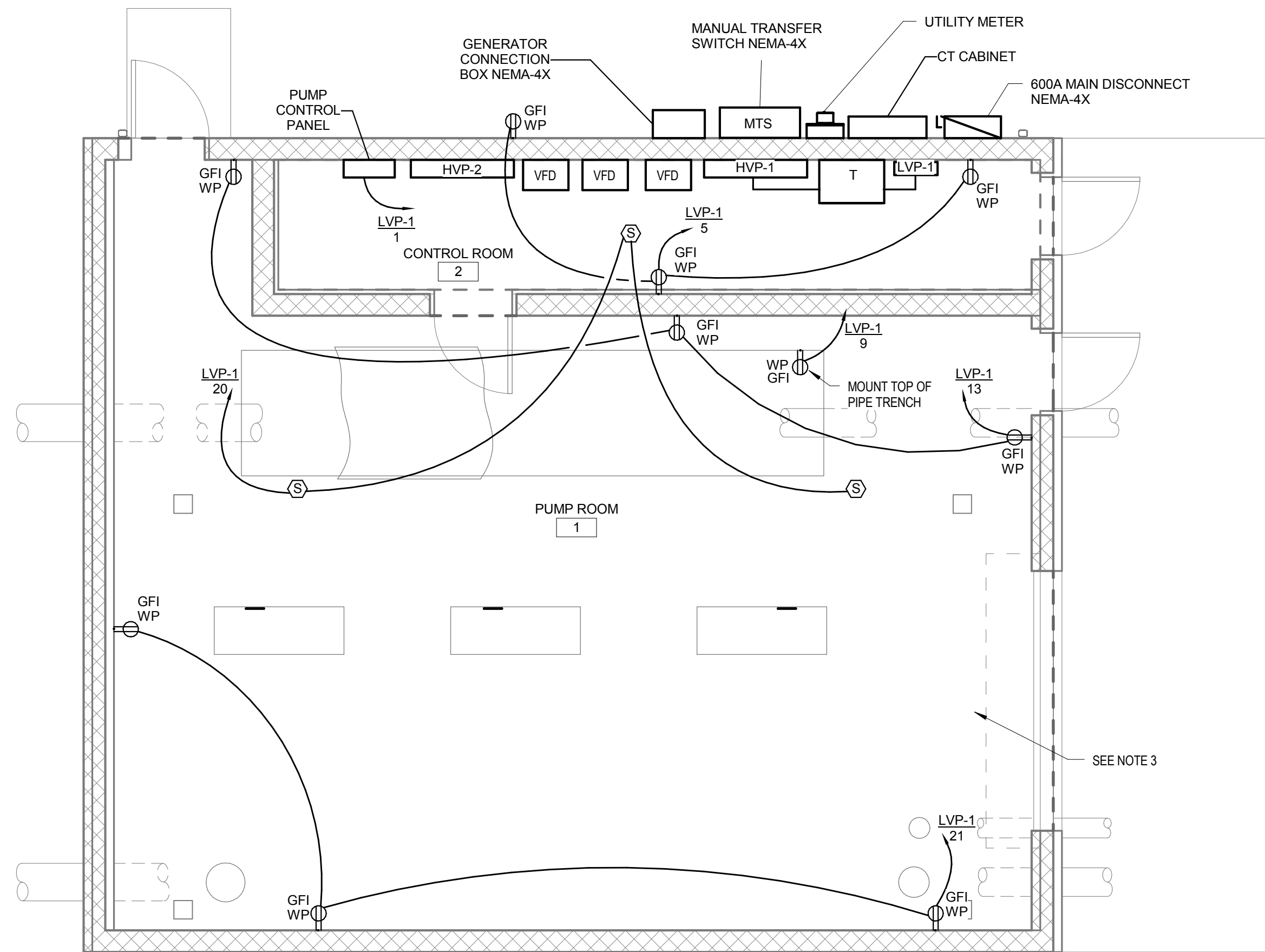


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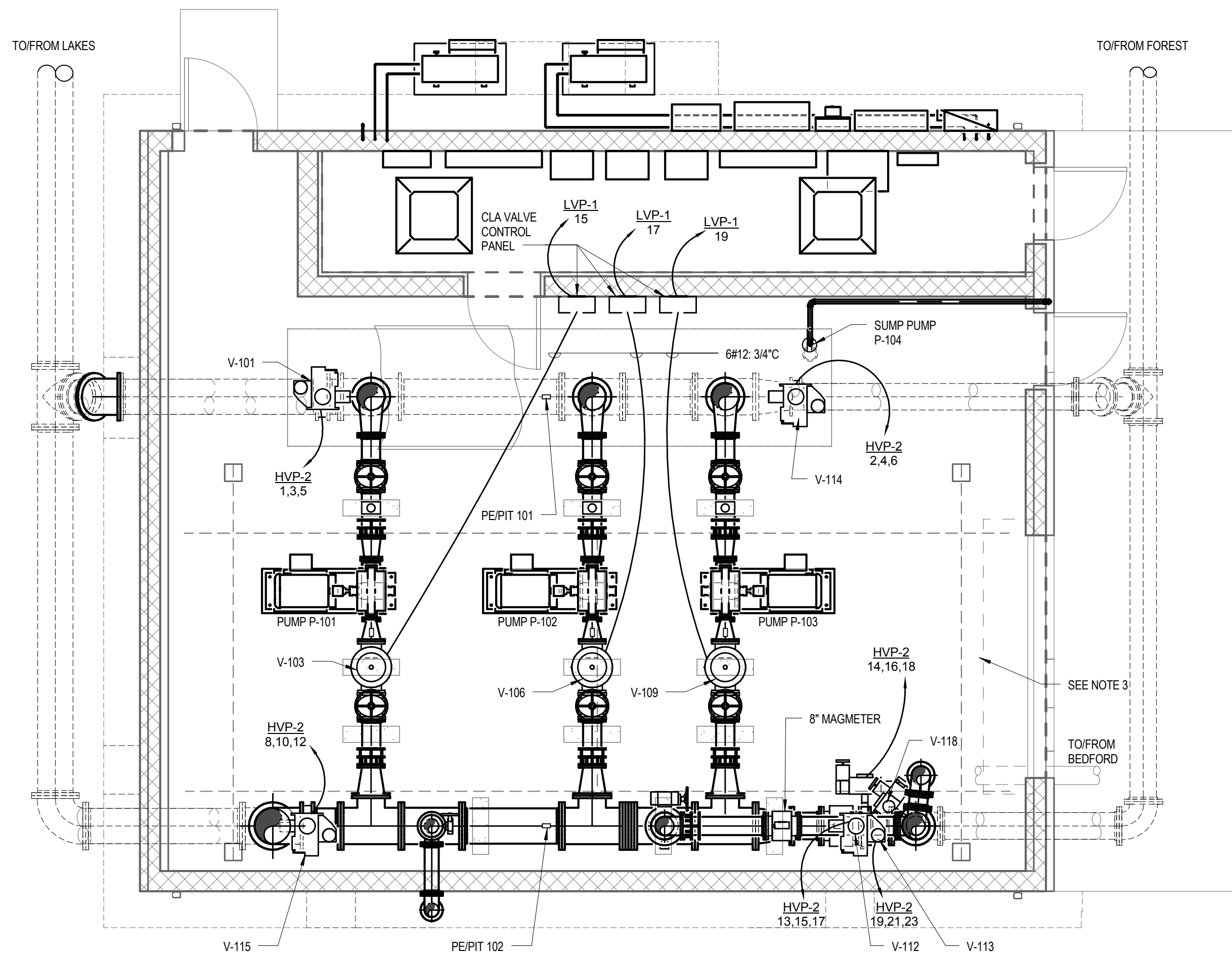
1 PUMP STATION - MECHANICAL - ELECTRICAL POWER PLAN

1/4" = 1'-0"



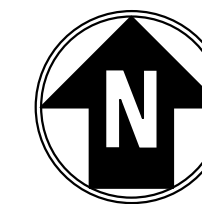
2 PUMP STATION - POWER PLAN

1/4" = 1'-0"



3 PUMP STATION - PROCESS AUTOMATION ELECTRICAL PLAN

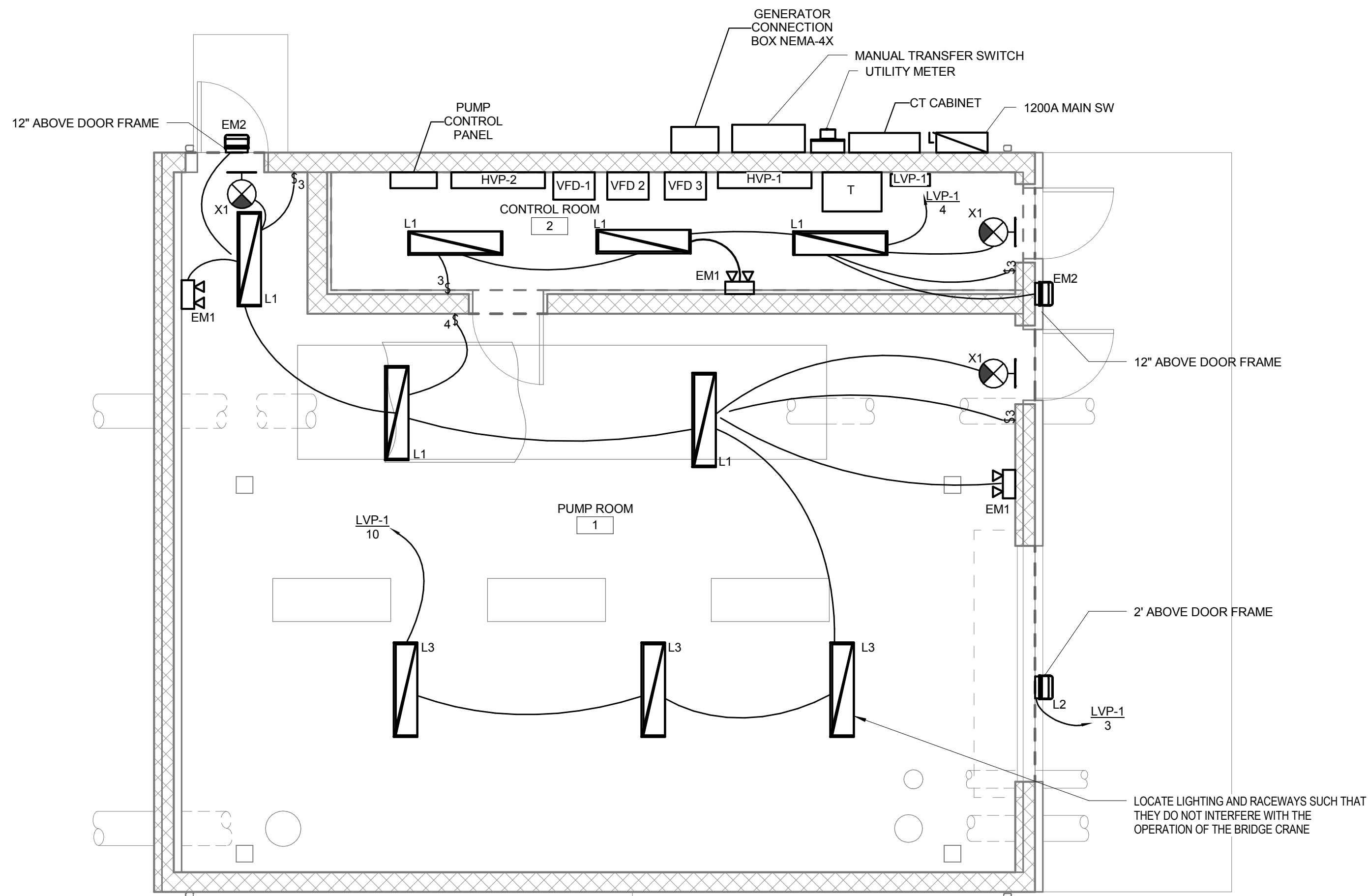
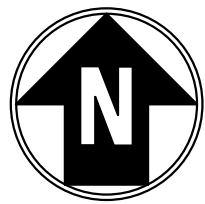
1/4" = 1'-0"



GENERAL NOTES

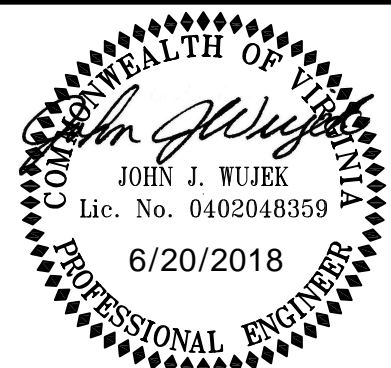
- FOR LOCATION OF PROCESS EQUIPMENT SUCH AS CONTROL VALVES AND INSTRUMENTATION, SEE SHEET M-101.
- SEE SHEET E-704 FOR ADDITIONAL WIRING REQUIREMENT INFORMATION.
- CONDUITS ROUTED TO DEVICES MOUNTED BENEATH BRIDGE CRANE MUST BE ROUTED BENEATH FLOOR SLAB SUCH AS NOT TO INTERFERE WITH THE OPERATION OF THE BRIDGE CRANE.

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1 FINISHED FLOOR - LIGHTING PLAN

1/4" = 1'-0" 0' 2' 4' 8'



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LIGHTING PLAN

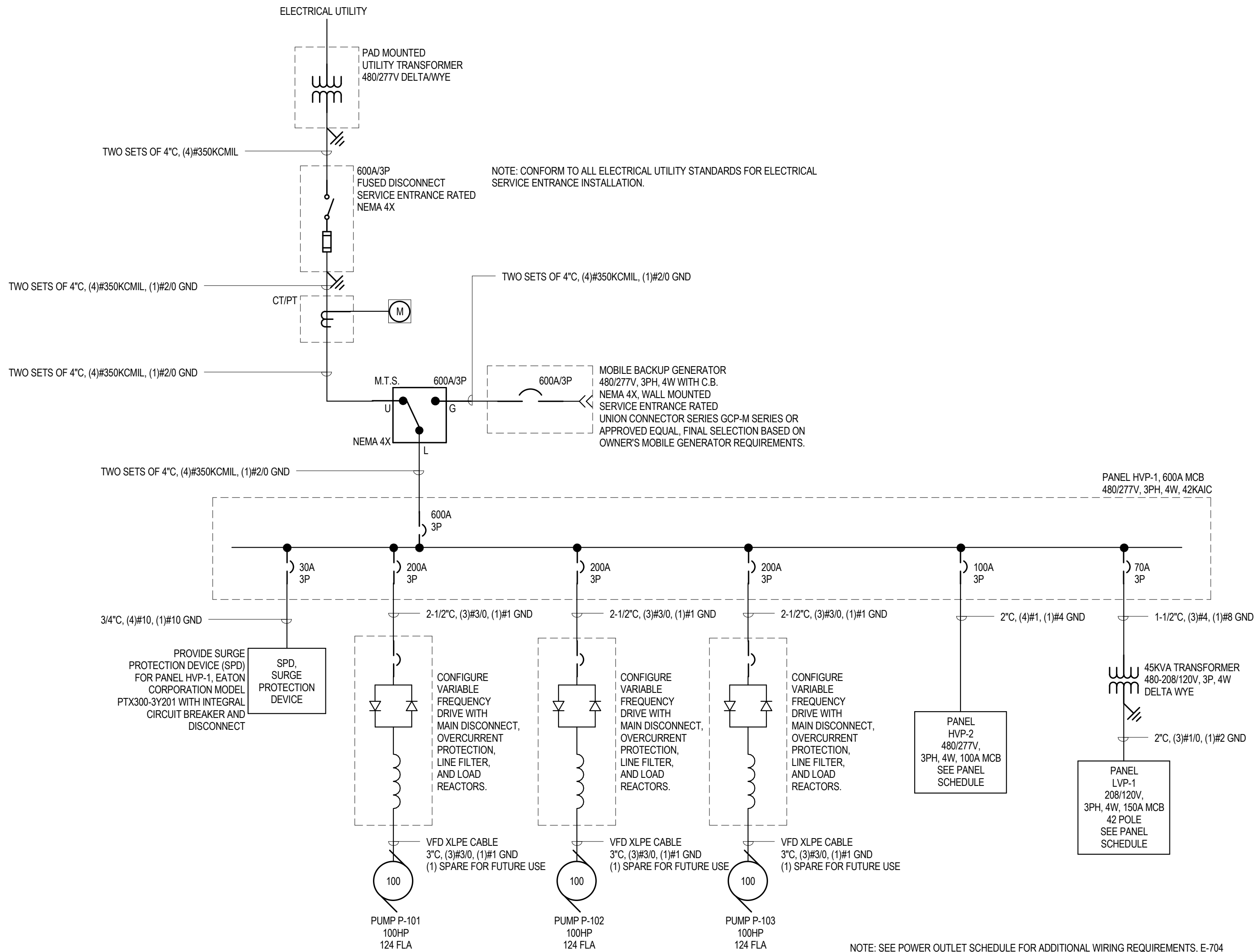
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| Designed By: NS | Drawn By: CJE | Checked By: JJW |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

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E-201

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| Lighting Fixture Schedule | | | | | | | | |
|---------------------------|--------------|---|---------------------------------|-------|-------|---------|---|----------|
| FIXTURE TAG | FIXTURE TYPE | DESCRIPTION | FIXTURE MOUNTING | VOLTS | LAMPS | WATTAGE | MANUFACTURER CATALOG NUMBER | COMMENTS |
| EM1 | LED | EMERGENCY BATTERY BACKUP LIGHT; 3000K COLOR TEMPERATURE | WALL, 8' AFF | 120V | LED | 20 W | LITHONIA INDX618 SEL | |
| EM2 | LED | EXTERIOR EMERGENCY WALL MOUNTED LED FIXTURE WITH AMBIENT LIGHT SENSOR & MOTION CONTROL; 3000K COLOR TEMPERATURE | WALL | 120V | LED | 20 W | LITHONIA WSTLED-1-10A700/30K-SR4-MVOLT-PIR-COLOR BY ARCH-ELOW | |
| L1 | LED | ENCLOSED AND GASKETED RATED INDUSTRIAL FIXTURE; 3000K COLOR TEMPERATURE | SUSPENDED, 9' AFF TO BOTTOM | 120V | 1 | 39 W | LITHONIA FEM4 LED 3L IMAFL 120 | |
| L2 | LED | EXTERIOR WALL MOUNTED LED FIXTURE; 3000K COLOR TEMPERATURE | WALL | 120V | LED | 20 W | LITHONIA WSTLED2-10A700/30K-SR4-MVOLT-PIR-COLOR BY ARCH | |
| L3 | LED | ENCLOSED AND GASKETED RATED INDUSTRIAL FIXTURE; 3000K COLOR TEMPERATURE | SUSPENDED, 16' 8" AFF TO BOTTOM | 120V | 1 | 78 W | LITHONIA FEM86L LED 3L IMAFL 120 | |
| X1 | LED | EMERGENCY BATTERY BACK-UP AND LED EXIT LIGHT, UL LISTED WET; 3000K COLOR TEMPERATURE | WALL | 120V | LED | 3 W | LITHONIA LV S W 1 R 120 EL N 4X | |



1 ELECTRICAL ONE-LINE

NOT TO SCALE

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CHA

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BEDFORD
REGIONAL WATER
AUTHORITY

COMMONWEALTH OF VIRGINIA

John J. Wujek

Lic. No. 0402048359

6/20/2018

PROFESSIONAL ENGINEER

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ROUTE 460 PUMP STATION
BEDFORD, VA

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| No. | Submittal / Revision | App'd. | By | Date |
| 1 | BID ISSUE | ETA | CTB | 06/20/18 |

ONE-LINE DIAGRAM

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| Designed By: NS | Drawn By: CJE | Checked By: JJW |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

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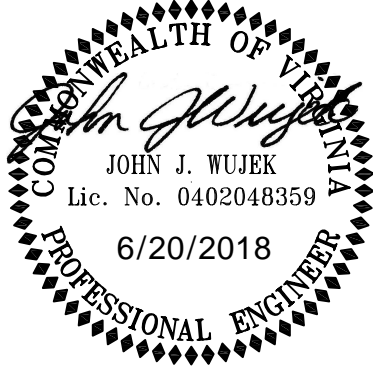
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| | | | | | | | | | | | | | | |
|---|--------------------------------------|--------------------------------------|---|-----------|----------|-----------|----------|-----------|----------|---|----------|--------------------------------------|------|----|
| LOCATION: CONTROL ROOM | | <div>PANEL ID</div> <div>HVP-1</div> | | | | | | | | VOLTS, PHASE, WIRE: 480/277V, 3 PHASE, 4 WIRE | | | | |
| MOUNTING: SURFACE | | | | | | | | | | MAINS: 600A MCB | | | | |
| SOURCE: UTILITY | | | | | | | | | | SHORT CIRCUIT RATING: 22kAIC | | | | |
| CKT | LOAD DESCRIPTION | CB/ AMPS | P | A | | B | | C | | P | CB/ AMPS | LOAD DESCRIPTION | CKT | |
| 1 | VARIABLE FREQUENCY DRIVE, PUMP P-101 | 200 A | 3 | 34333 VA | 34333 VA | 34333 VA | 34333 VA | | | 3 | 200 A | VARIABLE FREQUENCY DRIVE, PUMP P-102 | 2 | |
| 3 | | | | | | | | 34333 VA | 34333 VA | | | | 4 | |
| 5 | | | | | | | | | | | | | | 6 |
| 7 | VARIABLE FREQUENCY DRIVE, PUMP P-103 | 200 A | 3 | 34333 VA | 11923 VA | 34333 VA | 11923 VA | | | 3 | 100 A | HVP-2 | 8 | |
| 9 | | | | | | | | | | | | | 10 | |
| 11 | | | | | | | | 34333 VA | 11923 VA | | | | | 12 |
| 13 | PANEL LVP-1 VIA 45KVA TRANSFORMER | 70 A | 3 | 4843 VA | 0 VA | 3843 VA | 0 VA | | | 3 | 30 A | SURGE PROTECTION DEVICE | 14 | |
| 15 | | | | | | | | 5740 VA | 0 VA | | | | 16 | |
| 17 | | | | | | | | | | | | | | 18 |
| 19 | PREPARED SPACE | 0 A | 3 | 0 VA | 0 VA | 0 VA | 0 VA | | | 3 | 0 A | PREPARED SPACE | 20 | |
| 21 | | | | | | | | 0 VA | 0 VA | | | | 22 | |
| 23 | | | | | | | | | | | | | | 24 |
| 25 | PREPARED SPACE | 0 A | 3 | 0 VA | 0 VA | 0 VA | 0 VA | | | 3 | 0 A | PREPARED SPACE | 26 | |
| 27 | | | | | | | 0 VA | 0 VA | | | | | | 28 |
| 29 | | | | | | | | | 0 VA | | | | 0 VA | |
| TOTAL LOAD: | | | | 119766 VA | | 118766 VA | | 120663 VA | | | | | | |
| TOTAL AMPS: | | | | 433 A | | 429 A | | 436 A | | | | | | |
| NOTES: SEE ONE-LINE DIAGRAM FOR CONDUIT AND CABLE FOR FEEDERS. | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|--|---|-------------------|---|----------|---------|----------|---------|----------|---------|---|----------|--|-----|----|
| LOCATION: CONTROL ROOM | | PANEL ID HVP-2 | | | | | | | | VOLTS, PHASE, WIRE: 480/277V, 3 PHASE, 4 WIRE | | | | |
| MOUNTING: SURFACE | | | | | | | | | | MAINS: 100A MLO | | | | |
| SOURCE: HVP-1 | | | | | | | | | | SHORT CIRCUIT RATING: 22kAIC | | | | |
| CKT | LOAD DESCRIPTION | CB/ AMPS | P | A | | B | | C | | P | CB/ AMPS | LOAD DESCRIPTION | CKT | |
| 1 | LAKES SUCTION SIDE ISOLATION VALVE V-101 | 15 A | 3 | 570 VA | 570 VA | | | | | 3 | 15 A | FOREST SUCTION SIDE ISOLATION / CONTROL VALVE V-114 | 2 | |
| 3 | | | | | | 570 VA | 570 VA | | | | | | | 4 |
| 5 | | | | | | | | 570 VA | 570 VA | | | | | |
| 7 | SPARE | 15 A | 3 | 0 VA | 570 VA | | | | | 3 | 15 A | LAKES DISCHARGE SIDE ISOLATION / CONTROL VALVE V-115 | 8 | |
| 9 | | | | | | 0 VA | 570 VA | | | | | | | 10 |
| 11 | | | | | | | | 0 VA | 570 VA | | | | | |
| 13 | BEDFORD FLOW METER CONTROL VALVE V-112 | 15 A | 3 | 570 VA | 570 VA | | | | | 3 | 15 A | BEDFORD METER ISOLATION VALVE V-118 | 14 | |
| 15 | | | | | | 570 VA | 570 VA | | | | | | | 16 |
| 17 | | | | | | | | 570 VA | 570 VA | | | | | |
| 19 | FOREST DISCHARGE SIDE ISOLATION / CONTROL VALVE V-113 | 15 A | 3 | 570 VA | 1333 VA | | | | | 3 | 30 A | BRIDGE CRANE | 20 | |
| 21 | | | | | | 570 VA | 1333 VA | | | | | | | 22 |
| 23 | | | | | | | | 570 VA | 1333 VA | | | | | |
| 25 | PUMP ROOM ELECTRIC UNIT HEATER EUH-1 | 15 A | 3 | 1667 VA | 1667 VA | | | | | 3 | 15 A | PUMP ROOM ELECTRIC UNIT HEATER EUH-2 | 26 | |
| 27 | | | | | | 1667 VA | 1667 VA | | | | | | | 28 |
| 29 | | | | | | | | 1667 VA | 1667 VA | | | | | |
| 31 | PUMP ROOM ELECTRIC DUCT HEATER EDH-1 | 15 A | 3 | 2000 VA | 1267 VA | | | | | 3 | 15 A | PUMP ROOM EXHAUST FAN EF-1 | 32 | |
| 33 | | | | | | 2000 VA | 1267 VA | | | | | | | 34 |
| 35 | | | | | | | | 2000 VA | 1267 VA | | | | | |
| 37 | SPARE | 15 A | 3 | 0 VA | 570 VA | | | | | 3 | 15 A | PS BYPASS VALVE V-130 | 38 | |
| 39 | | | | | | 0 VA | 570 VA | | | | | | | 40 |
| 41 | | | | | | | | 0 VA | 570 VA | | | | | |
| TOTAL LOAD: | | | | 11923 VA | | 11923 VA | | 11923 VA | | | | | | |
| TOTAL AMPS: | | | | 43 A | | 43 A | | 43 A | | | | | | |
| NOTES: 1. PROVIDE 3/4"C, (3)#12, (1)#12G FOR EACH 15A/3P CIRCUIT BREAKER. 2. PROVIDE 3/4"C, (3)#10, (1)#10G FOR EACH 30A/3P CIRCUIT BREAKER. | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | |
|--|------------------------------|--------------------------------------|----|---------|---------|---------|---------|---------|---------|----|----------|---|-----|
| LOCATION: CONTROL ROOM | | <div>PANEL ID</div> <div>LVP-1</div> | | | | | | | | | | VOLTS, PHASE, WIRE: 208/120V, 3 PHASE, 4 WIRE | |
| MOUNTING: SURFACE | | | | | | | | | | | | MAINS: 150A MCB | |
| SOURCE: HVP-1 VIA 45KVA TRANSFORMER | | | | | | | | | | | | SHORT CIRCUIT RATING: 10kAIC | |
| CKT | LOAD DESCRIPTION | CB/ AMPS | P | A | | B | | C | | P | CB/ AMPS | LOAD DESCRIPTION | CKT |
| 1 | PUMP CONTROL PANEL | 20 A | 1 | 0 VA | 700 VA | | | | | 1 | 20 A | SF-1 RM. 1 | 2 |
| 3 | LIGHTING: EXTERIOR WALL PACK | 20 A | 1 | | | 55 VA | 117 VA | | | 1 | 20 A | LIGHTING | 4 |
| 5 | RECEPTACLE CONTROL ROOM | 20 A | 1 | | | | | 540 VA | 2600 VA | 2 | 40 A | HP2-A and HP2-B | 6 |
| 7 | LV-1 | 20 A | 1 | 1000 VA | 2600 VA | | | | | | 8 | | |
| 9 | RECEPTACLE SUMP PUMP | 20 A | 1 | | | 180 VA | 351 VA | | | 1 | 20 A | LIGHTING | 10 |
| 11 | SPARE | 20 A | 1 | | | | | 0 VA | 0 VA | 1 | 20 A | SPARE | 12 |
| 13 | RECP. PUMP ROOM | 20 A | 1 | 540 VA | 0 VA | | | | | 1 | 20 A | SPARE | 14 |
| 15 | CLA VALVE V-103 | 20 A | 1 | | | 0 VA | 2600 VA | | | 2 | 40 A | HP1-A and HP1-B | 16 |
| 17 | CLA VALVE V-106 | 20 A | 1 | | | | | 0 VA | 2600 VA | | 18 | | |
| 19 | CLA VALVE V-109 | 20 A | 1 | 0 VA | 3 VA | | | | | 1 | 20 A | SMOKE DETECTOR | 20 |
| 21 | RECEPTACLE | 20 A | 1 | | | 540 VA | 0 VA | | | 1 | 20 A | SPARE | 22 |
| 23 | SPARE | 20 A | 1 | | | | | 0 VA | 0 VA | 1 | 20 A | SPARE | 24 |
| 25 | SPARE | 20 A | 1 | 0 VA | 0 VA | | | | | -- | -- | SPACE | 26 |
| 27 | SPARE | 20 A | 1 | | | 0 VA | 0 VA | | | -- | -- | SPACE | 28 |
| 29 | SPACE | -- | -- | | | | | 0 VA | 0 VA | -- | -- | SPACE | 30 |
| 31 | SPACE | -- | -- | 0 VA | 0 VA | | | | | -- | -- | SPACE | 32 |
| 33 | SPACE | -- | -- | | | 0 VA | 0 VA | | | -- | -- | SPACE | 34 |
| 35 | SPACE | -- | -- | | | | | 0 VA | 0 VA | -- | -- | SPACE | 36 |
| 37 | SPACE | -- | -- | 0 VA | 0 VA | | | | | -- | -- | SPACE | 38 |
| 39 | SPACE | -- | -- | | | 0 VA | 0 VA | | | -- | -- | SPACE | 40 |
| 41 | SPACE | -- | -- | | | | | 0 VA | 0 VA | -- | -- | SPACE | 42 |
| | | TOTAL LOAD: | | 4843 VA | | 3843 VA | | 5740 VA | | | | | |
| | | TOTAL AMPS: | | 42 A | | 32 A | | 49 A | | | | | |
| NOTES: 1. PROVIDE 3/4"C, (2)#12, (1)#12G FOR EACH 20A/1P CIRCUIT BREAKER. 2. PROVIDE 3/4"C, (3)#8, (1)#8G FOR EACH 40A/2P CIRCUIT BREAKER. | | | | | | | | | | | | | |



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| No. | Submittal / Revision | App'd. | By | Date |
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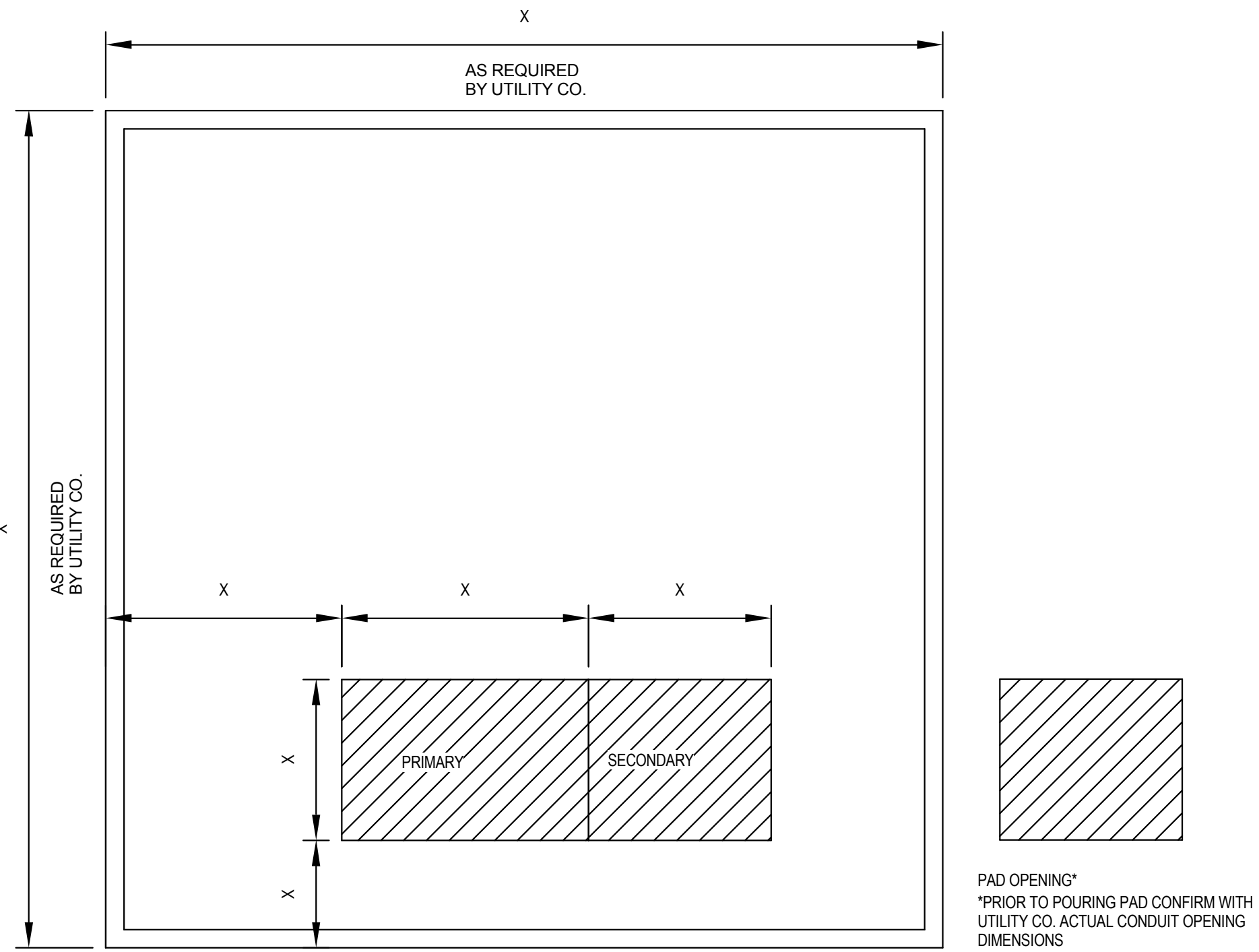
PANEL SCHEDULES

| | | |
|-------------------------|---------------------------|--------------------|
| Designed By: NS | Drawn By: CJE | Checked By: JJW |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

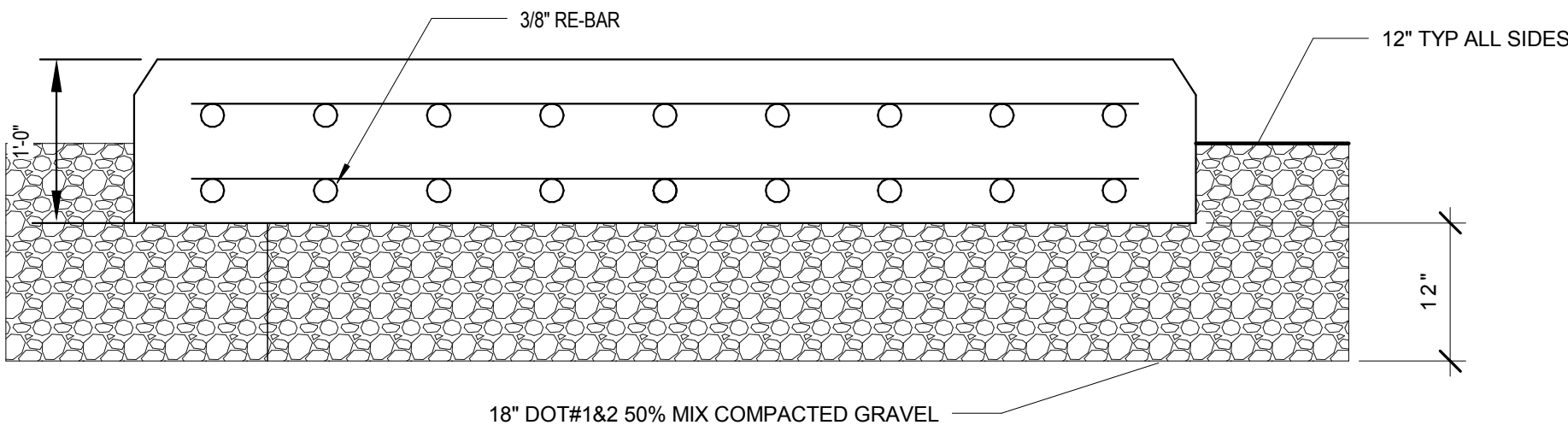
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E-602

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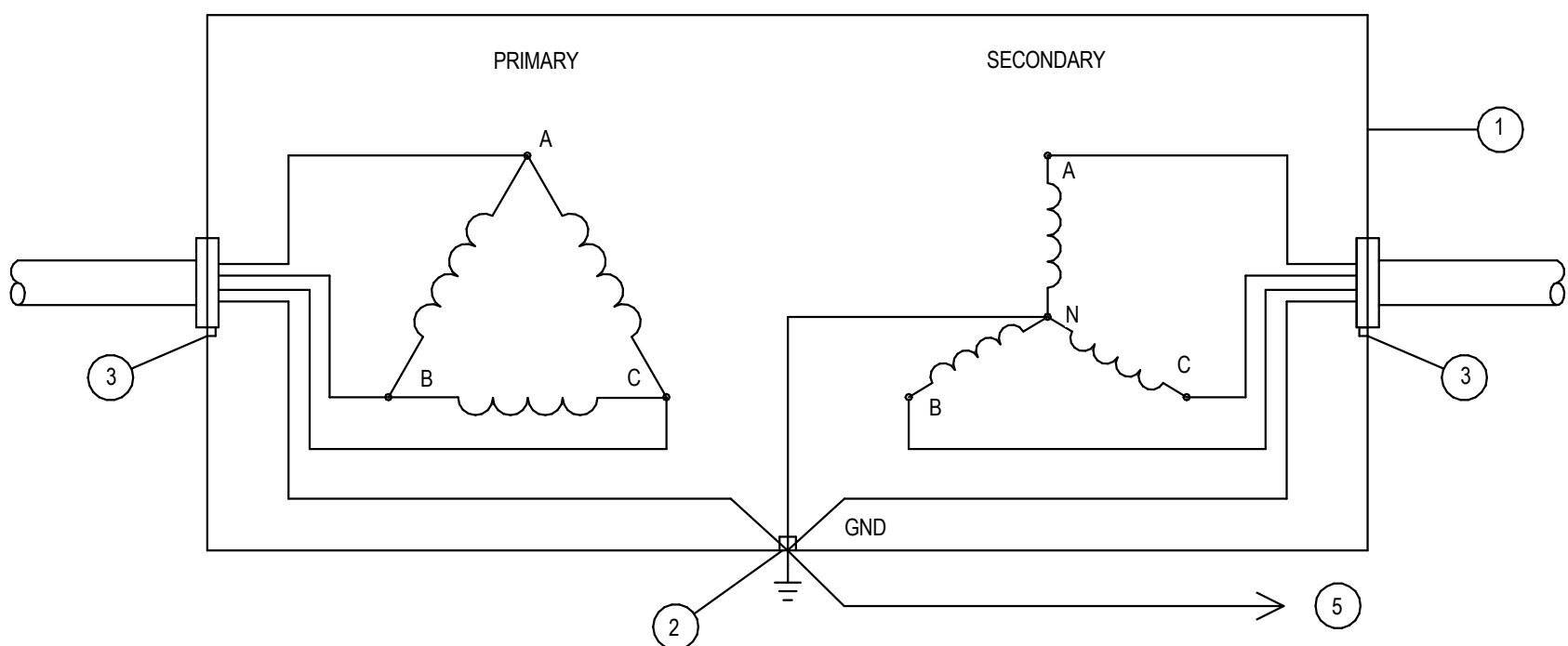


FRONT OF TRANSFORMER



TRANSFORMER PAD DETAIL

NOT TO SCALE



CODED NOTES

- TRANSFORMER SIZE AND TYPE AS NOTED ON PLANS.
- TRANSFORMER HOUSING GROUNDING LUGS/BAR.
- GROUND TO CONDUIT BUSHINGS IF REQUIRED.
- ALL CONDUCTOR AND CONDUIT SIZES AS NOTED ON PLANS.
- 4/0 BARE COPPER WIRE TO BUILDING STEEL OR WATER SERVICE PER NEC 250. IF WATER SERVICE UTILIZES NONE CONDUCTIVE TYPE PIPE, GROUND TO BUILDING STEEL OR 5/8" DIA. x 10' LONG GROUND ROD. PROVIDE ADDITIONAL GROUNDING POINTS TO OBTAIN 25 OHMS OR LESS RESISTANCE.

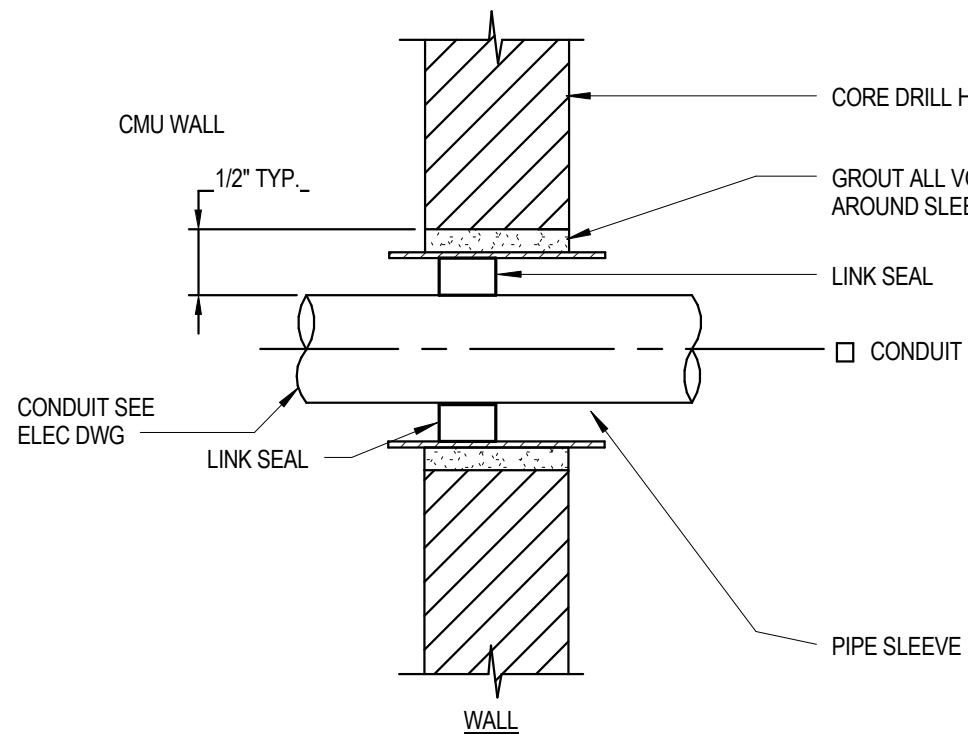
SEPARATELY DERIVED GROND DETAIL

NOT TO SCALE

CONCRETE PAD REQUIREMENTS FOR PAD MOUNT TRANSFORMERS.

- THE CONCRETE PAD IS TO BE FURNISHED BY THE ELECTRICAL CONTRACTOR FOR THE ELECTRICAL UTILITY REQUIREMENTS.
- MINIMUM PAD THICKNESS SHALL BE 12", WITH 3/8" RE-BAR ON 12" CENTERS, INSTALLED BOTH WAYS THROUGHOUT CONCRETE PAD.
- CORNERS AND EDGES OF FOUNDATION TO BE BEVELED.
- THE ELEVATIONS OF THE PAD TOP SHALL BE A MINIMUM OF 4" ABOVE FINISHED GRADE.
- THE PAD MUST BE LOCATED SUCH THAT THE MINIMUM CLEARANCE BETWEEN THE PAD AND ANY STRUCTURES OR FENCES IS 3 FEET ALONG THE SIDES AND BACK AND 10 FEET ALONG THE FRONT; THE AREA MUST BE EASILY ACCESSIBLE BY HEAVY TRUCKS FOR MAINTENANCE.
- IF THE PAD IS LOCATED IN A TRAFFIC AREA, GUARD POSTS MUST BE FURNISHED AND INSTALLED AT THE CORNER OF THE PAD.
- BEFORE POURING CONCRETE, THE CONTRACTOR SHOULD CONTACT THE ELECTRICAL UTILITY FOR INSPECTION OF FOUNDATION.

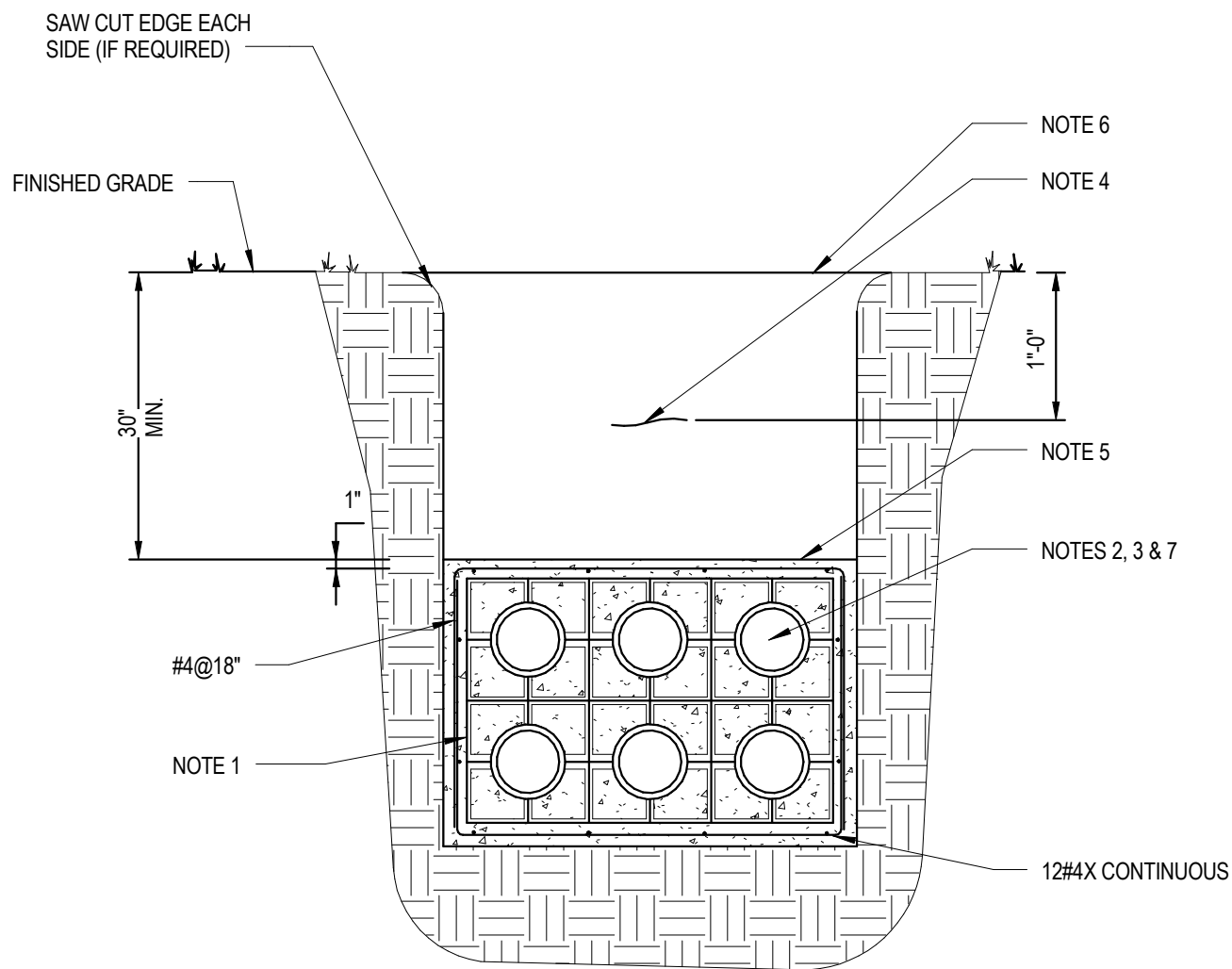
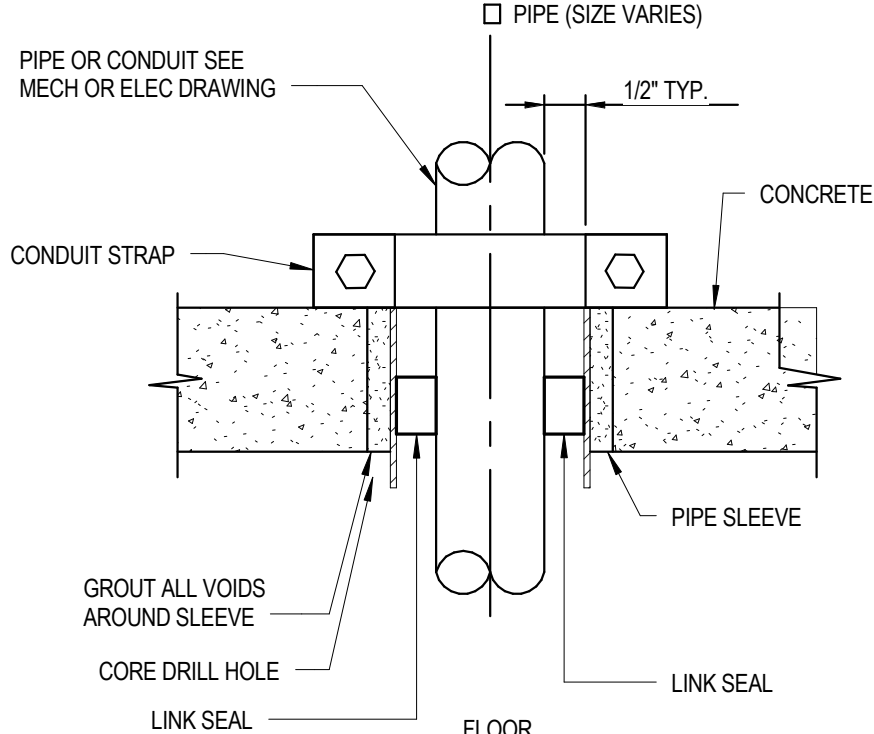
NOTE:
THE TRANSFORMER PAD AND ELECTRICAL SERVICE REQUIREMENTS MUST CONFORM TO THE ELECTRICAL UTILITY REQUIREMENTS AND STANDARDS. THE ELECTRICAL UTILITY SERVICING THIS PROJECT SITE IS THE TOWN OF BEDFORD, VIRGINIA. CONTRACTOR IS RESPONSIBLE FOR PAYING ALL UTILITY FEES REQUIRED FOR THE ELECTRICAL SERVICE. FOR ADDITIONAL INFORMATION CONCERNING THE UTILITY SERVICE APPLICATION, CONTACTS, AND REQUIREMENTS, VISIT [HTTP://WWW.BEDFORDVA.GOV/1174/SERVICE-STANDARDS](http://www.bedfordva.gov/1174/SERVICE-STANDARDS).



NOTE: ANCHOR PIPE AS REQUIRED TO PREVENT MOVEMENT THRU PENETRATION.

CONDUIT PENETRATIONS WITH LINK SEAL

NOT TO SCALE

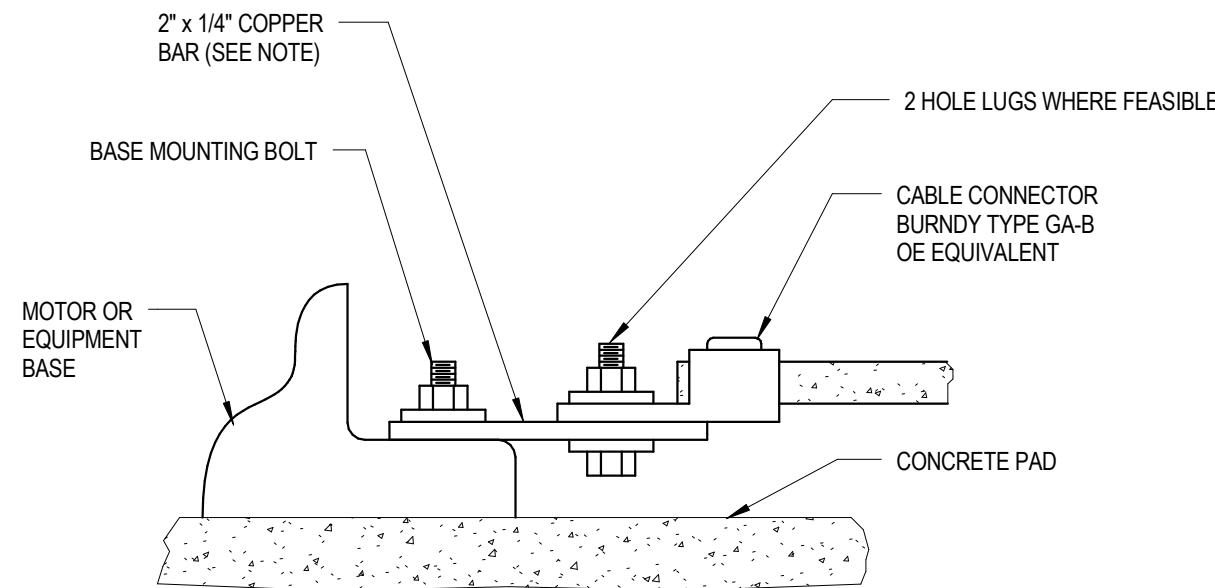


DUCT NOTES

- PROVIDE BASE SPACERS AND INTERMEDIATE SPACERS AT 5'-0" ON CENTER.
- PROVIDE WIRING IN CONDUITS AS INDICATED ON PLANS AND/OR ON FEEDER SCHEDULE AND PROVIDE PULL WIRE IN EACH SPARE CONDUIT.
- MINIMUM 48" RADIUS FOR CONDUIT BENDS.
- PROVIDE RED 6" WIDE CONDUCTIVE MARKING TAPE LABELED: 'DANGER - BURIED HIGH VOLTAGE CABLE', AND BLUE MARKING TAPE LABELED: 'COMMUNICATION CONDUITS' (INSTALL ABOVE THE ENTIRE LENGTH OF THE DUCTBANK).
- UNDER PAVED AREAS ENCASE CONDUITS WITH 3" COVER, ALL SIDES 4000 PSI CONCRETE. THE SLOPE OF DUCTBANK SHALL BE LIMITED TO 5% MAXIMUM. SAND ENVELOPE MAY BE USE IN LIEU OF CONCRETE UNDER NON-PAVED AREAS. DUCTBANK SHALL BE SLOPED TOWARDS MANHOLE FOR DRAINAGE.
- REPLACE EXISTING SURFACE CONDITIONS IN KIND TO INCLUDE, BUT NOT LIMITED TO: CONCRETE, CRUSHED STONE, SELECT GRAVEL, ASPHALT, TOPSOIL, GRASS, ETC. REPLACE SELECT BACKFILL IN 6" LIFTS, COMPACT EACH PLACEMENT.
- CONDUIT SIZE AND QUANTITY AS INDICATED ON PLAN(S) AND/OR ON SCHEDULES.

DUCT BANK CONSTRUCTION DETAIL

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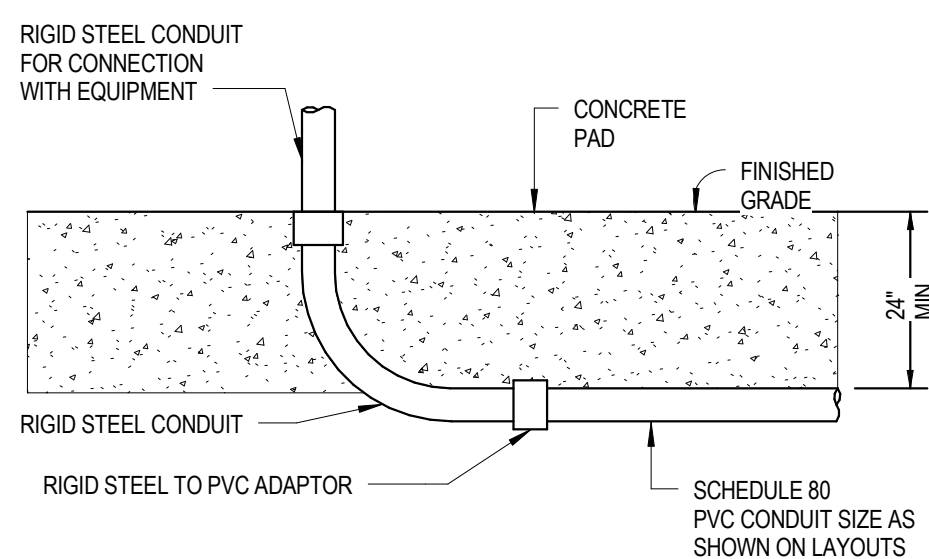


NOTE

- WHERE FEASIBLE, CONNECT CABLE CONNECTOR TO BASE MOUNTING BOLT AND OMIT COPPER BAR.

GROUNDING EQUIPMENT CONNECTION

NOT TO SCALE



CONDUIT RISER THRU FLOOR/SLAB DETAIL

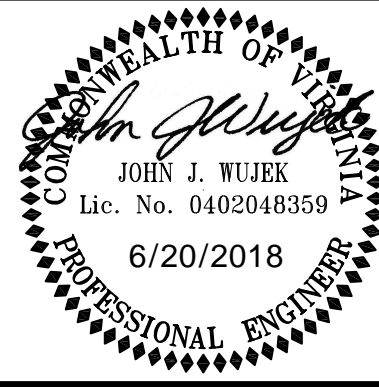
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ROUTE 460 PUMP STATION
BEDFORD, VA.

| No. | Submittal / Revision | App'd. | By | Date |
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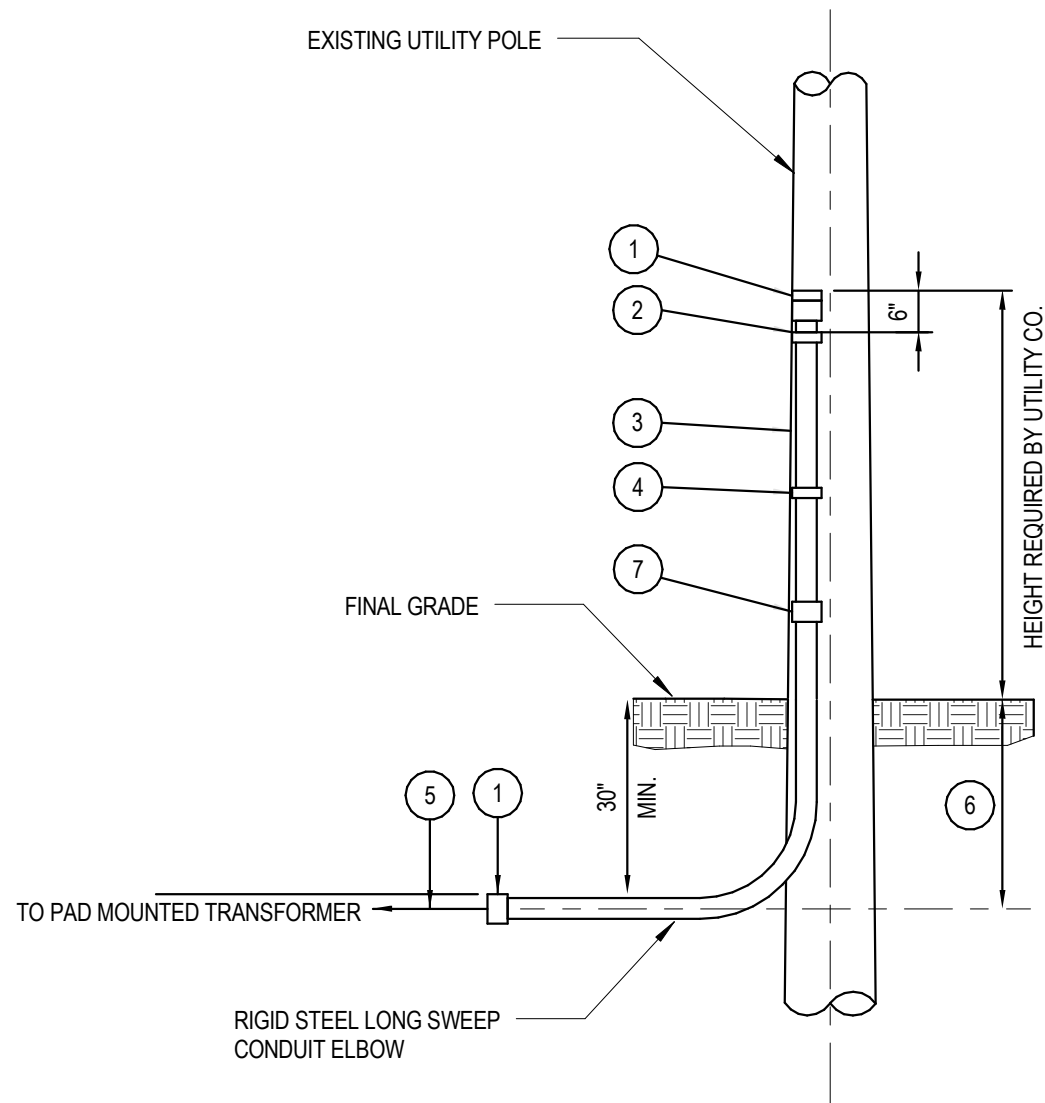
DETAILS

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| Designed By: NS | Drawn By: CJE | Checked By: JJW |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

Drawing No:

E-701

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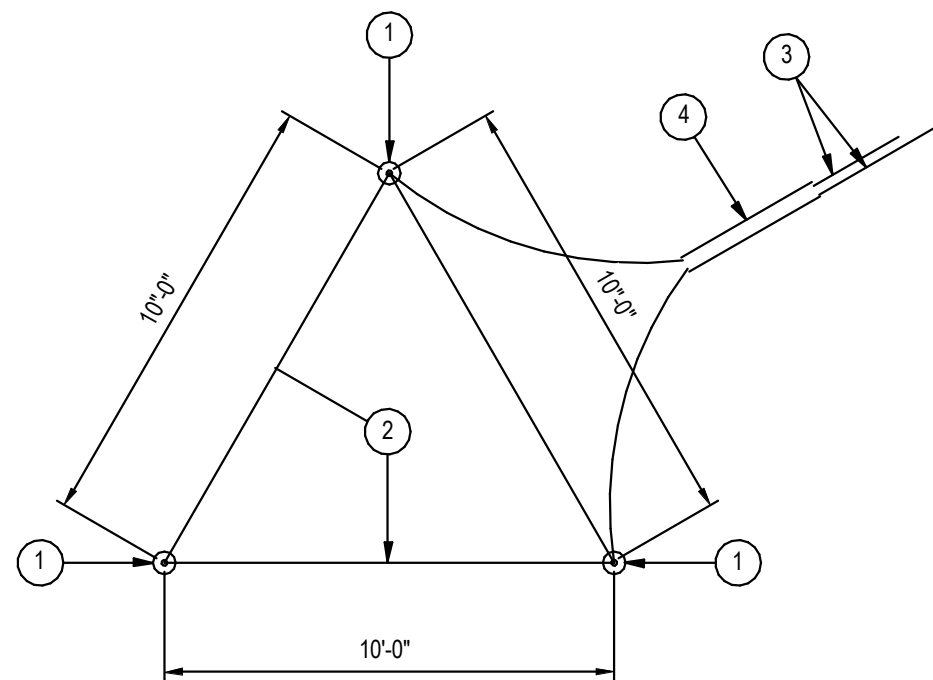
CODED NOTES

- 1 INSULATING BUSHING.
- 2 FOR GALVANIZED STEEL CONDUIT ELBOWS, THEY SHALL BE GROUNDED BY BONDING TO AN APPROVED V-BOLT TYPE GROUND CLAMP 6" (150 MM) FROM TOP OF THE CONDUIT. A CONDUCTOR OF SUFFICIENT LENGTH SHALL BE PROVIDED TO EXTEND 24" (600 MM) BEYOND THE UTILITY COMPANY'S SECONDARY NEUTRAL. THE CONDUCTOR SHALL BE SIZED AS REQUIRED BY THE NATIONAL ELECTRICAL CODE, ARTICLE 250, BUT IN NO CASE SHALL IT BE SMALLER THAN #4 AWG COPPER. RECOMMEND USE OF CORROSION RESISTANT BEND IN LOCATIONS SUBJECT TO HIGHWAY SALTING.
- 3 PROVIDE RIGID GALVANIZED STEEL RISER CONDUIT. THE CONDUIT SHALL RISE ON THE SIDE OF THE POLE AWAY FROM TRAFFIC. CONSULT UTILITY COMPANY FOR PROPER LOCATION ON POLE.
- 4 PIPE STRAPS, INSTALL AT NOT MORE THAN 30" (750 MM) INTERVALS.
- 5 PRIMARY SERVICE LATERAL IN CONCRETE DUCTBANK TO TRANSFORMER.
- 6 THE BURIAL DEPTH SHALL BE 30" (760 MM) MINIMUM.
- 7 ROUTE SPARE CONDUIT 12" ABOVE FINISHED GRADE. CAP AND SEAL WATERTIGHT.

1

RISER POLE PRIMARY

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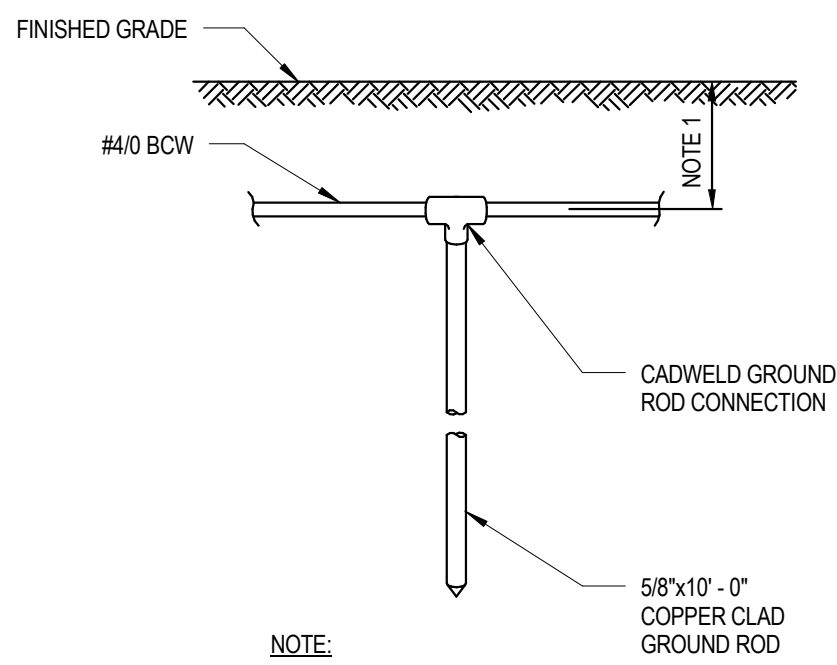
CODED NOTES

- 1 5/8"x10'-0" COPPERWELD GROUND ROD. TOP OF GROUND ROD SHALL BE 12" MINIMUM BELOW FINISHED GRADE.
- 2 #4/0 BARE STRANDED COPPER GROUND GRID CONDUCTOR.
- 3 #4/0 BARE STRANDED COPPER GROUNDING ELECTRODE CONDUCTOR.
- 4 2" PVC SCHEDULE 40 CONDUIT FROM GROUNDING GRID TO EQUIPMENT.

3

ELECTRICAL SERVICE GROUNDING GRID DETAIL

NOT TO SCALE



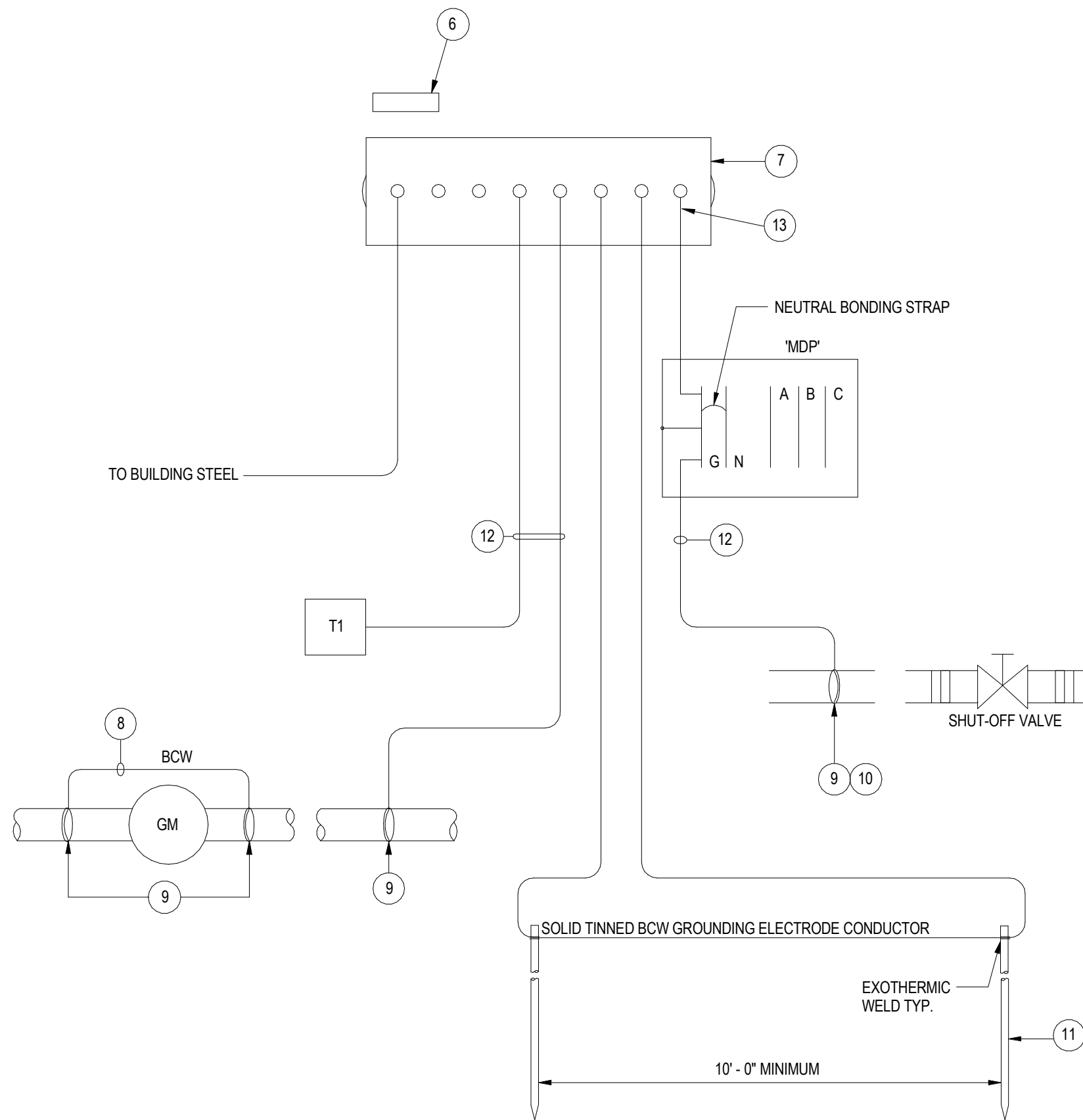
NOTE:

1. 30" MINIMUM.

4

GROUND ROD DETAIL

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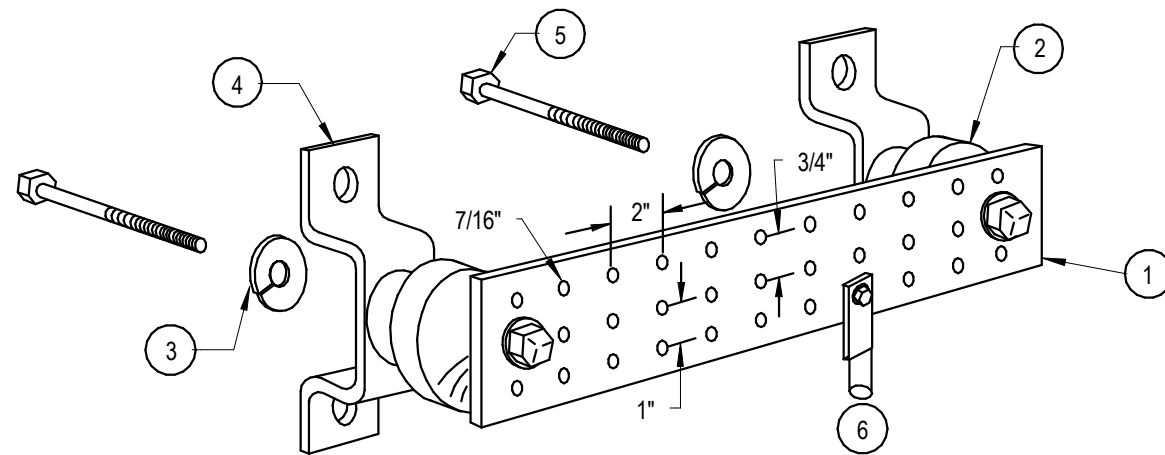
NOTES

1. UNLESS OTHERWISE NOTED, GROUNDING CONDUCTORS SHALL BE #4/0 AWG.
2. UNLESS OTHERWISE NOTED, PROVIDE INSULATED GROUNDING CONDUCTORS.
3. PROVIDE GROUNDING SYSTEM AS INDICATED AND PER NEC.

2

GROUNDING SYSTEM - SCHEMATIC DIAGRAM

NOT TO SCALE



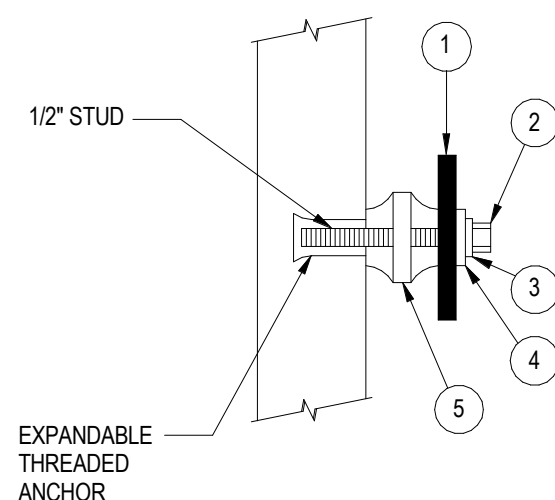
CODED NOTES

- 1 COPPER GROUND BAR, 1/4"x4"x20", NEWTON INSTRUMENT CO. CAT. NO. B-6142. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
- 2 INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4
- 3 5/8" LOCKWASHERS, NEWTON INSTRUMENTS CO. CAT NO. 3015-8
- 4 WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6065
- 5 5/8-11 X 1" H.H.C.S.BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1
- 6 #6CU GROUND CONDUCTOR W/ COMPRESSION LUG FITTING. ROUTE IN 1" BACK TO NEAREST PANELBOARD AND TERMINATE ON GROUND BUS.

6

GROUNDING BUS BAR DETAIL

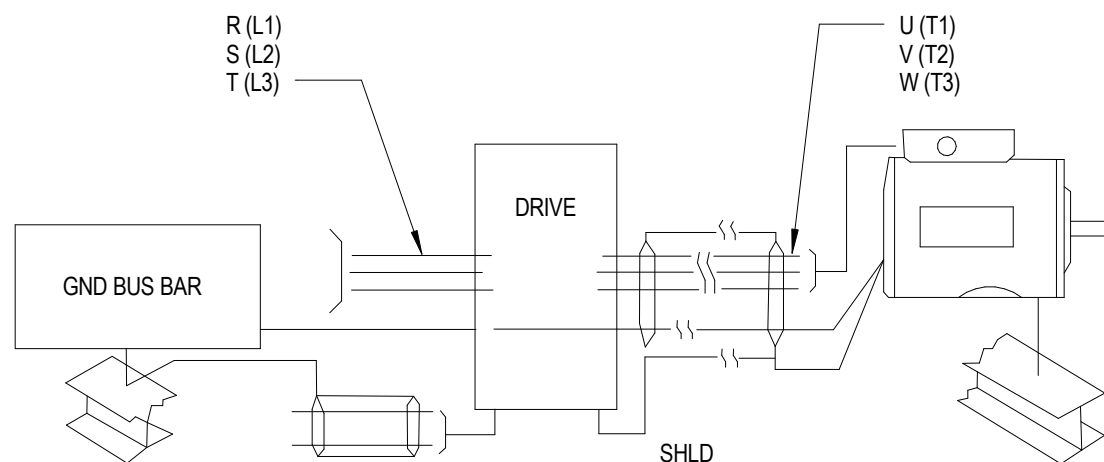
NOT TO SCALE



GROUND BUS BAR - SIDE VIEW
(SEE DETAIL BELOW)

GROUND DIAGRAM CODED NOTES

- 1 COPPER BUS 1/4" x 2".
- 2 CAP SCREW 1/2" - 13 x 1.
- 3 LOCK WASHER.
- 4 INSULATED WASHER.
- 5 FIBERGLASS REINFORCED POLYESTER INSULATED WITH 1/2" - 13 THREADED HOLE BOTH ENDS.
- 6 ENGRAVED PHENOLIC PERMANENTLY ATTACHED LABEL READING "BUILDING GROUND BUS".
- 7 BUILDING GROUND BUS LOCATED IN ELECTRIC RM. IN THE VICINITY OF "MDP". INSTALL ON WALL WITH INSULATING STAND OFF. SEE SIDE VIEW.
- 8 GROUND JUMPER AROUND WATER METER, GAS METER AND INSULATING JOINTS.
- 9 T&B 3900 'BU' SERIES GROUND CLAMP WITH CABLE CLAMP.
- 10 METALLIC COLD WATER SERVICE. USE T&B 'BU' SERIES GROUND CLAMP WITH 3/4" CONDUIT HUB AND CABLE CLAMP.
- 11 DRIVEN GROUND ROD ON BUILDING EXTERIOR (TYP. OF 3).
- 12 PROVIDE GROUNDING CONDUCTOR IN CONDUIT.
- 13 PROVIDE (2) HOLE COMPRESSION LUG CONNECTION.



NOTES:

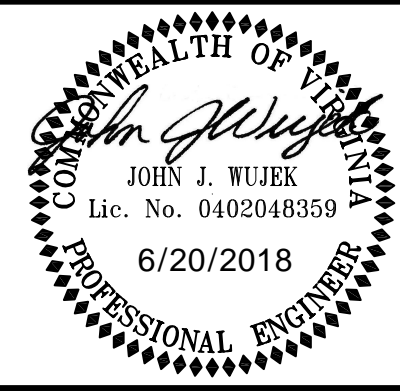
1. FOR INSTALLATION WITHIN A CABINET, A SINGLE SAFETY GROUND POINT, OR GROUND BUS BAR CONNECTED DIRECTLY TO BUILDING STEEL SHOULD BE USED. ALL CIRCUITS INCLUDING THE AC INPUT GROUND CONDUCTOR SHOULD BE GROUNDED INDEPENDENTLY AND DIRECTLY TO THIS POINT/BAR.
2. SAFETY GROUND-PE. THIS IS THE SAFETY GROUND FOR THE DRIVE THAT IS REQUIRED BY CODE. THIS POINT MUST BE CONNECTED TO ADJACENT BUILDING STEEL (GIRDER, JOIST), A FLOOR GROUND ROD, OR BUS BAR (SEE ABOVE). GROUNDING POINTS MUST COMPLY WITH NATIONAL AND LOCAL SAFETY REGULATIONS AND/OR ELECTRICAL CODES. GROUND IMPEDENCE MUST CONFORM TO THE REQUIREMENTS OF NATIONAL AND LOCAL INDUSTRIAL SAFETY REGULATIONS AND/OR ELECTRICAL CODES. THE INTEGRITY OF ALL GROUND CONNECTIONS SHOULD BE PERIODICALLY CHECKED.

7

VARIABLE FREQUENCY DRIVE - GND DETAIL

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ROUTE 460 PUMP STATION
BEDFORD, VA.

| No. | Submittal / Revision | App'd. | By | Date |
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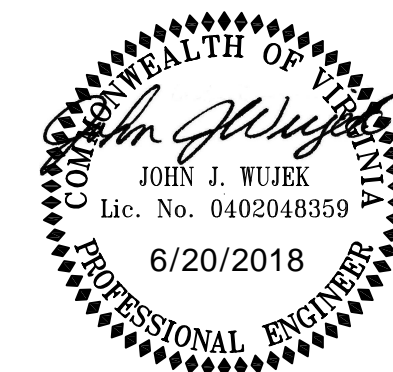
DETAILS

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| Designed By: NS | Drawn By: CJE | Checked By: JJW |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

Drawing No:

E-702

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ROUTE 460 PUMP STATION
BEDFORD, VA.

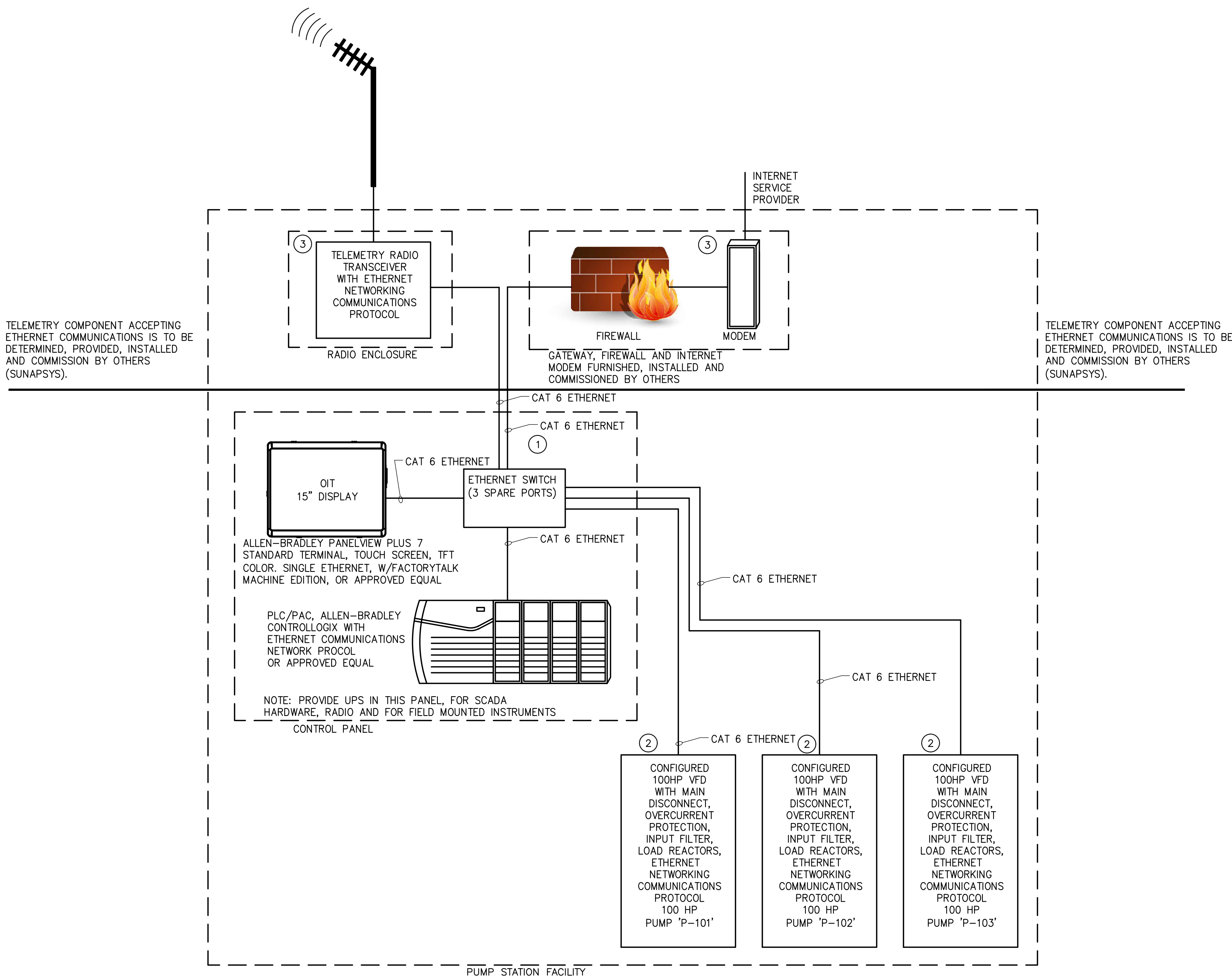
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| | BID ISSUE | ETA | CTB | 06/20/17 |

CONTROL SYSTEM ARCHITECTURE

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| Designed By: MEW | Drawn By: MEW | Checked By: JJD |
| Issue Date: 08/01/17 | Project No: 27872-3002 | Scale: AS SHOWN |

Drawing No.

E-703



CODED NOTES

- ① PLC, OPERATOR INTERFACE, TERMINAL, ETHERNET SWITCH WITH UPS WITH PROGRAMMING BY PUMPING EQUIPMENT SUPPLIER, REFER TO SPECIFICATION 432113.01 – PUMPING EQUIPMENT
- ② CONFIGURED PACKAGED VFD AND PROGRAMMING BY PUMPING EQUIPMENT SUPPLIER, REFER TO SPECIFICATION 432113.01 – PUMPING EQUIPMENT
- ③ RADIO OR INTERNET TELEMETRY (GATEWAY, FIREWALL AND MODEM) WITH UPS. DETERMINED, FURNISHED, INSTALLED AND COMMISSIONED BY OTHERS/OWNER/SUNAPSYS.

CONTROL SYSTEM ARCHITECTURE AND COMMUNICATIONS RISER DIAGRAM

SCALE: N.T.S.

| DEVICE TAG | DEVICE DESCRIPTION | I/O SIGNAL TYPE | CONTROLLER INTERFACE | CONTROL WIRING | POWER/EXTERNAL POWER SOURCE | POWER WIRING | REMARKS |
|----------------|--|-----------------|--------------------------------|-----------------|--------------------------------|----------------------|---------|
| FE-101/FIT-101 | FLOW ELEMENT/FLOW INDICATING TRANSMITTER - BEDFORD, 8" | AI, 4-20mA | PLC CONTROL PANEL | 2 #18TSP; 3/4"C | N/A, LOOP POWERED | | |
| FE-101/FIT-101 | FLOW ELEMENT/FLOW INDICATING TRANSMITTER - FOREST, 8" | AI, 4-20mA | PLC CONTROL PANEL | 2 #18TSP; 3/4"C | N/A, LOOP POWERED | | |
| PE-101/PIT-101 | PRESSURE ELEMENT/PRESSURE INDICATING TRANSMITTER - SUCTION | AI, 4-20mA | PLC CONTROL PANEL | 2 #18TSP; 3/4"C | N/A, LOOP POWERED | | |
| PE-102/PIT-102 | PRESSURE ELEMENT/PRESSURE INDICATING TRANSMITTER - DISCHARGE | AI, 4-20mA | PLC CONTROL PANEL | 2 #18TSP; 3/4"C | N/A, LOOP POWERED | | |
| P-101 | PUMP P-101 VFD | ETHERNET | PLC CONTROL PANEL | CAT 6; 1"C | 480V/3PH, PER ONE LINE DIAGRAM | | |
| P-102 | PUMP P-102 VFD | ETHERNET | PLC CONTROL PANEL | CAT 6; 1"C | 480V/3PH, PER ONE LINE DIAGRAM | | |
| P-103 | PUMP P-103 VFD | ETHERNET | PLC CONTROL PANEL | CAT 6; 1"C | 480V/3PH, PER ONE LINE DIAGRAM | | |
| V-101A | VALVE V-101, LAKES SUCTION SIDE ISOLATION, OPEN/CLOSE COMMAND | AO, 4-20mA | PLC CONTROL PANEL | 2 #18TSP; 3/4"C | 480V/3PH, 15A/3P C.B., HVP-2 | 3 #12*#12GND.; 3/4"C | |
| V-101B | VALVE V-101, LAKES SUCTION SIDE ISOLATION, OPEN/CLOSE POSITION FEEDBACK | AI, 4-20mA | PLC CONTROL PANEL | 2 #18TSP; 3/4"C | | | |
| V-101C | VALVE V-101, LAKES SUCTION SIDE ISOLATION, CLOSED LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-101D | VALVE V-101, LAKES SUCTION SIDE ISOLATION, OPEN LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-101E | VALVE V-101, LAKES SUCTION SIDE ISOLATION, HOA, HAND POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-101F | VALVE V-101, LAKES SUCTION SIDE ISOLATION, HOA, AUTO POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-101G | VALVE V-101, LAKES SUCTION SIDE ISOLATION, OVER TORQUE | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-103A | CLA VALVE V-103-PUMP P-101 REMOTE START COMMAND | DO | PLC PANEL TO CLA VALVE PANEL | 2 #14AWG; 3/4"C | 120V/1PH, 20A/1P | 2 #12*#12GND.; 3/4"C | |
| V-103B | CLA VALVE V-103-PRESSURE SWITCH FOR PUMP P-101 | DI | CLA VALVE CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-103C | CLA VALVE V-103-LIMIT SWITCH FOR PUMP P-101 | DI | CLA VALVE CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-103D | CLA VALVE V-103-SOLENOID VALVE FOR PUMP P-101 | DO | CLA VALVE CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-103E | CLA VALVE V-103 PUMP P-101 START RELAY | DI | PLC PANEL FROM CLA VALVE PANEL | 2 #14AWG; 3/4"C | | | |
| V-106A | CLA VALVE V-106-PUMP P-102 REMOTE START COMMAND | DO | PLC PANEL TO CLA VALVE PANEL | 2 #14AWG; 3/4"C | 120V/1Ph, 20A/1P | 2 #12*#12GND.; 3/4"C | |
| V-106B | CLA VALVE V-106-PRESSURE SWITCH FOR PUMP P-102 | DI | CLA VALVE CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-106C | CLA VALVE V-106-LIMIT SWITCH FOR PUMP P-102 | DI | CLA VALVE CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-106D | CLA VALVE V-106-SOLENOID VALVE FOR PUMP P-102 | DO | CLA VALVE CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-106E | CLA VALVE V-106 PUMP P-102 START RELAY | DI | PLC PANEL FROM CLA VALVE PANEL | 2 #14AWG; 3/4"C | | | |
| V-109A | CLA VALVE V-109-PUMP P-103 REMOTE START COMMAND | DO | PLC PANEL TO CLA VALVE PANEL | 2 #14AWG; 3/4"C | 120V/1Ph, 20A/1P | 2 #12*#12GND.; 3/4"C | |
| V-109B | CLA VALVE V-109-PRESSURE SWITCH FOR PUMP P-103 | DI | CLA VALVE CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-109C | CLA VALVE V-109-LIMIT SWITCH FOR PUMP P-103 | DI | CLA VALVE CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-109D | CLA VALVE V-109-SOLENOID VALVE FOR PUMP P-103 | DO | CLA VALVE CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-109E | CLA VALVE V-109 PUMP P-103 START RELAY | DI | PLC PANEL FROM CLA VALVE PANEL | 2 #14AWG; 3/4"C | | | |
| V-112A | VALVE V-112, BEDFORD FLOW METER CONTROL, OPEN/CLOSE COMMAND | AO, 4-20mA | PLC CONTROL PANEL | 2 #18TSP; 3/4"C | 480V/3PH, 15A/3P C.B., HVP-2 | 3 #12*#12GND.; 3/4"C | |
| V-112B | VALVE V-112, BEDFORD FLOW METER CONTROL, OPEN/CLOSE POSITION FEEDBACK | AI, 4-20mA | PLC CONTROL PANEL | 2 #18TSP; 3/4"C | | | |
| V-112C | VALVE V-112, BEDFORD FLOW METER CONTROL, CLOSED LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-112D | VALVE V-112, BEDFORD FLOW METER CONTROL, OPEN LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-112E | VALVE V-112, BEDFORD FLOW METER CONTROL, HOA, HAND POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-112F | VALVE V-112, BEDFORD FLOW METER CONTROL, HOA, AUTO POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-112G | VALVE V-112, BEDFORD FLOW METER CONTROL, OVER TORQUE | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-113A | VALVE V-113, FOREST DISCHARGE SIDE ISOLATION/CONTROL, OPEN/CLOSE COMMAND | AO, 4-20mA | PLC CONTROL PANEL | 2 #18TSP; 3/4"C | 480V/3PH, 15A/3P C.B., HVP-2 | 3 #12*#12GND.; 3/4"C | |
| V-113B | VALVE V-113, FOREST DISCHARGE SIDE ISOLATION/CONTROL, OPEN/CLOSE POSITION FEEDBACK | AI, 4-20mA | PLC CONTROL PANEL | 2 #18TSP; 3/4"C | | | |
| V-113C | VALVE V-113, FOREST DISCHARGE SIDE ISOLATION/CONTROL, CLOSED LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-113D | VALVE V-113, FOREST DISCHARGE SIDE ISOLATION/CONTROL, OPEN LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-113E | VALVE V-113, FOREST DISCHARGE SIDE ISOLATION/CONTROL, HOA, HAND POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-113F | VALVE V-113, FOREST DISCHARGE SIDE ISOLATION/CONTROL, HOA, AUTO POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-113G | VALVE V-113, FOREST DISCHARGE SIDE ISOLATION/CONTROL, OVER TORQUE | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-114A | VALVE V-114, FOREST SUCTION SIDE ISOLATION/CONTROL, OPEN COMMAND | DO | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | 480V/3PH, 15A/3P C.B., HVP-2 | 3 #12*#12GND.; 3/4"C | |
| V-114B | VALVE V-114, FOREST SUCTION SIDE ISOLATION/CONTROL, CLOSE COMMAND | DO | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-114C | VALVE V-114, FOREST SUCTION SIDE ISOLATION/CONTROL, CLOSED LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-114D | VALVE V-114, FOREST SUCTION SIDE ISOLATION/CONTROL, OPEN LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-114E | VALVE V-114, FOREST SUCTION SIDE ISOLATION/CONTROL, HOA, HAND POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-114F | VALVE V-114, FOREST SUCTION SIDE ISOLATION/CONTROL, HOA, AUTO POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-114G | VALVE V-114, FOREST SUCTION SIDE ISOLATION/CONTROL, OVER TORQUE | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-115A | VALVE V-115, LAKES DISCHARGE SIDE ISOLATION/CONTROL, OPEN COMMAND | DO | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | 480V/3PH, 15A/3P C.B., HVP-2 | 3 #12*#12GND.; 3/4"C | |
| V-115B | VALVE V-115, LAKES DISCHARGE SIDE ISOLATION/CONTROL, CLOSE COMMAND | DO | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-115C | VALVE V-115, LAKES DISCHARGE SIDE ISOLATION/CONTROL, CLOSED LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-115D | VALVE V-115, LAKES DISCHARGE SIDE ISOLATION/CONTROL, OPEN LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-115E | VALVE V-115, LAKES DISCHARGE SIDE ISOLATION/CONTROL, HOA, HAND POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-115F | VALVE V-115, LAKES DISCHARGE SIDE ISOLATION/CONTROL, HOA, AUTO POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-115G | VALVE V-115, LAKES DISCHARGE SIDE ISOLATION/CONTROL, OVER TORQUE | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-118A | VALVE V-118, BEDFORD FLOW METER ISOLATION, OPEN COMMAND | DO | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | 480V/3PH, 15A/3P C.B., HVP-2 | 3 #12*#12GND.; 3/4"C | |
| V-118B | VALVE V-118, BEDFORD/FOREST ISOLATION, CLOSE COMMAND | DO | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-118C | VALVE V-118, BEDFORD FLOW METER ISOLATION, CLOSED LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-118D | VALVE V-118, BEDFORD/FOREST ISOLATION, OPEN LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-118E | VALVE V-118, BEDFORD/FOREST ISOLATION, HOA, HAND POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-118F | VALVE V-118, BEDFORD/FOREST ISOLATION, HOA, AUTO POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-118G | VALVE V-118, BEDFORD/FOREST ISOLATION, OVER TORQUE | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-130A | VALVE V-130, BEDFORD PS BYPASS VALVE, OPEN COMMAND | DO | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | 480V/3PH, 15A/3P C.B., HVP-2 | 3 #12*#12GND.; 3/4"C | |
| V-130B | VALVE V-130, BEDFORD PS BYPASS VALVE, CLOSE COMMAND | DO | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-130C | VALVE V-130, BEDFORD PS BYPASS VALVE, CLOSED LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-130D | VALVE V-130, BEDFORD PS BYPASS VALVE, OPEN LIMIT SWITCH | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-130E | VALVE V-130, BEDFORD PS BYPASS VALVE, HOA, HAND POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-130F | VALVE V-130, BEDFORD PS BYPASS VALVE, HOA, AUTO POSITION | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |
| V-130G | VALVE V-130, BEDFORD PS BYPASS VALVE, OVER TORQUE | DI | PLC CONTROL PANEL | 2 #14AWG; 3/4"C | | | |

| EQUIPMENT TAG | DESCRIPTION | LOCATION | CONTROLLER | DISCONNECT | REMARKS |
|---------------|----------------------|-------------------------|---------------------|---------------------|---|
| EDH-1 | ELECTRIC DUCT HEATER | PUMP ROOM | FURNISHED WITH UNIT | 30A/3P NON-FUSIBLE | T'STAT FURNISHED WITH UNIT, PROVIDE WIRING AND RACEWAY AS REQUIRED |
| EF-1 | EXHAUST FAN | PUMP ROOM | FURNISHED WITH UNIT | FURNISHED WITH UNIT | PROVIDE REQUIRED INTERLOCK WIRING AND RACEWAY BETWEEN EXHAUST FAN AND LOUVER, T'STAT AND SUPPLY FAN |
| EUH-1 | ELECTRIC UNIT HEATER | PUMP ROOM | FURNISHED WITH UNIT | 30A/3P NON-FUSIBLE | T'STAT FURNISHED WITH UNIT, PROVIDE WIRING AND RACEWAY AS REQUIRED |
| EUH-2 | ELECTRIC UNIT HEATER | PUMP ROOM | FURNISHED WITH UNIT | 30A/3P NON-FUSIBLE | T'STAT FURNISHED WITH UNIT, PROVIDE WIRING AND RACEWAY AS REQUIRED |
| HP-1A/1B | DUCTLESS HEAT PUMP | ELECTRICAL/CONTROL ROOM | FURNISHED WITH UNIT | 60A/3P NON-FUSIBLE | PROVIDE REQUIRED INTERLOCK AND POWER WIRING AND RACEWAY BETWEEN A/C UNIT AND CONDENSING UNIT |
| HP-2A/2B | DUCTLESS HEAT PUMP | ELECTRICAL/CONTROL ROOM | FURNISHED WITH UNIT | 60A/3P NON-FUSIBLE | PROVIDE REQUIRED INTERLOCK AND POWER WIRING AND RACEWAY BETWEEN A/C UNIT AND CONDENSING UNIT |
| SF-1 | SUPPLY FAN | PUMP ROOM | FURNISHED WITH UNIT | FURNISHED WITH UNIT | PROVIDE REQUIRED INTERLOCK WIRING AND RACEWAY BETWEEN EXHAUST FAN AND LOUVER, T'STAT AND SUPPLY FAN |