

## GENERAL NOTES

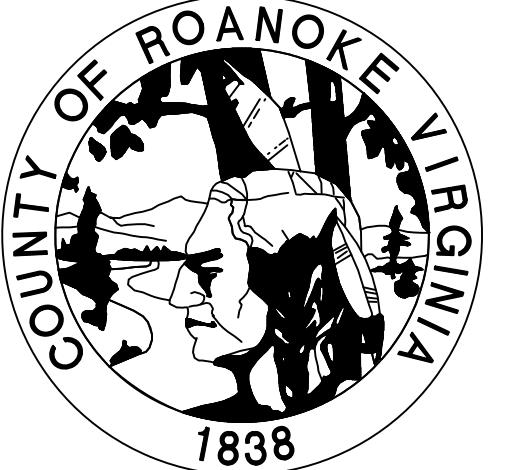
### PRE-CONSTRUCTION MEETING AND CONSTRUCTION COMMENCEMENT:

- All construction methods and materials shall conform to the Construction Standards and Specifications of Roanoke County, the Western Virginia Water Authority, and the Virginia Department of Transportation.
- Stormwater Management Agreements with an attached 8 1/2" x 11" or 8 1/2" x 14" plat must be approved and recorded prior to the pre-construction meeting.
- Once all required items are submitted to the County of Roanoke, the developer must contact the Development Review Coordinator to indicate that a pre-construction meeting needs to be scheduled. The pre-construction meeting will be scheduled with the owner/developer two (2) working days later.
- All land disturbing projects that require approval of an erosion and sediment control plan, grading or clearing permit shall require that the applicant provide the name of an individual who will be responsible for land disturbing activities and that this individual hold a Responsible Land Disturber (RLD) Certificate from the Department of Environmental Quality. The Responsible Land Disturber can be anyone from the Project team that is certified by the Commonwealth of Virginia to be in charge of carrying out the land disturbing activity for the project.
- It is the responsibility of the owner/developer to notify the certified Responsible Land Disturber and the Utility Contractor to attend the pre-construction meeting.
- The Development Review Coordinator will schedule the pre-construction meeting with the County Review Engineer, the County Inspector, and the Western Virginia Water Authority and the Town of Vinton Public Works Department if applicable.
- An approved set of plans, Storm Water Pollution Prevention Plan (SWPPP), VSMP coverage letter, and all permits must be available at the construction site at all times.
- The developer and/or contractor shall supply all utility companies with copies of approved plans, advising them that all grading and installation shall conform to approved plans.
- The project engineer will inform the owner/developer verbally and in writing of the County's obligation to perform inspections on site. Everyone in the meeting will be required to sign a pre-construction checklist indicating their knowledge of Roanoke County's obligation to perform inspections on site.
- The Erosion Control Permit or Combined Erosion Control & VSMP Permit is given to the developer at this pre-construction meeting.
- Notify the County of Roanoke prior to beginning installation of ESC measures. The County will inspect initial installations to ensure compliance with approved plan prior to start of grading. The developer SHALL contact the project inspector 24 hours before beginning any grading or construction on the property.
- County inspectors must inspect storm drain / stormwater management / BMP installations during the process of installation. Please contact the site inspector 24 hours in advance.
- All work shall be subject to inspection by Roanoke County, the Western Virginia Water Authority and the Virginia Department of Transportation Inspectors.
- Contractors shall notify utilities of proposed construction at least two (2), but not more than ten (10) working days in advance. Area public utilities may be notified thru "Miss Utility": 1-800-552-7001 or VA 811.
- The 100 year Floodway shall be staked prior to any construction.
- Grade stakes shall be set for all curb and gutter, culvert, sanitary sewer and storm sewer at all times of construction.
- The Department of Community Development shall be notified when a spring is encountered during construction.
- Construction debris shall be containerized in accordance with the Virginia Litter Control Act. No less than one litter receptacle shall be provided on site.
- The contractor shall provide adequate means of cleaning mud from trucks and/or other equipment prior to entering public streets or rights of ways. It is the contractors responsibility to insure that the streets are in a clean, mud and dust free condition at all times.
- Plan approval in no way relieves the developer or contractors of the responsibilities contained within the erosion and sediment control or stormwater management policies.
- Field construction shall honor proposed drainage divides as shown on plans.
- Field corrections shall be approved by the Roanoke County Engineering Division and/or the Western Virginia Water Authority and the Professional of Record, prior to such construction.
- The developer or contractor shall supply the County and the Western Virginia Water Authority with correct As-Built plans before final acceptance.

### VIRGINIA DEPARTMENT OF TRANSPORTATION:

- Plan approval by Roanoke County does not guarantee issuance of any permits by the Virginia Department of Transportation.
- A permit must be obtained from the Virginia Department of Transportation, Salem Residency Office prior to construction in the highway right-of-way.
- The preliminary pavement designs should be based on a predicted sub-grade CBR value of 7.0 and with a Resiliency Factor (RF) of 2.0 as shown in Appendix I of the 2000 Virginia Department of Transportation Pavement Design Guide for Subdivision and Secondary Roads. The sub-grade soil is to be tested at an independent laboratory and the results submitted to the Virginia Department of Transportation prior to base construction. Should the sub-grade CBR value and/or the RF value be less than the predicted values, additional base material will be required in accordance with Departmental specifications. Refer to the same manual as the number and locations of the required soil samples to be tested. Pavement designs shall be submitted to the Department for review and approval. The sub-grade shall be approved by the Virginia Department of Transportation prior to placement of the base. Base shall be approved by the Virginia Department of Transportation for depth, template, and compaction before the surface is applied.
- Standard guardrail with safety mounds and sections may be required on fills or in areas where hazards exist as deemed necessary. After completion of rough grading operations, the County Engineer and Virginia Department of Transportation shall be contacted to schedule a field review. Where guard rail is warranted, the standard shoulder width shall be provided and the guard rail shall be installed in accordance with the 2001 VDOT Road and Bridge Standards as part of this development.
- Standard street and traffic control signs shall be erected at each intersection by the developer prior to final street acceptance.
- All traffic devices shall be in accordance with current edition of the "Manual on Uniform Traffic Control Devices" (MUTCD).
- All unsuitable material shall be removed from the construction limits of the roadway before placing embankment.

See Sheet N/A for Stormwater Site Statistics Table.  
See Sheet N/A for New BMP Information Table.



# COUNTY OF ROANOKE, VA

\*NOTE: THIS COST ESTIMATE TABLE IS PROVIDED FOR BONDING PURPOSES ONLY. VERIFICATION OF ALL QUANTITIES AND PRICES FOR BIDDING PURPOSES SHALL BE THE RESPONSIBILITY OF THE BIDDER.\*

### QUANTITY & COST ESTIMATE

ITEM	QUANTITY	UNIT	UNIT PRICE	COST	BONDABLE
CLEARING AND GRUBBING		ACRES			
S.W.M. EXCAVATION		C.Y.			
S.W.M. EMBANKMENT		C.Y.			
NYLOPLAST DROP INLET		EACH			
8" TYPE S HDPE PIPE		LIN. FT.			
10" TYPE S HDPE PIPE		LIN. FT.			
12" TYPE S HDPE PIPE		LIN. FT.			
15" TYPE S HDPE PIPE		LIN. FT.			
BOX CULVERT		LUMP SUM			
PAVED DITCH		LIN. FT.			
RIPRAP - CLASS		S.F.			
SODDED SWALE		S.Y.			
-IN. CONCRETE ENDWALL EW-		EACH			
PAVEMENT (INCLUDING SUB-BASE)					
CURB & GUTTER CG-6		LIN. FT.			
GRAVEL SHOULDER		S.Y.			
SURFACE TREATMENT		S.Y.			
-IN. BIT. CONC. TYPE B-		S.Y.			
-IN. BIT. CONC. TYPE S-		S.Y.			
-IN. BASE MATERIAL		C.Y.			
-IN. SUBBASE MATERIAL		C.Y.			
COMMERCIAL WATER METER (1") & Lateral		EACH			
FIRE HYDRANT ASSEMBLIES		EACH			
BLOW OFFS W/VAULT, FRAME & COVER		EACH			
8-IN. GATE VALVE, W/VAULT, FRAME & COVER		EACH			
-IN. GATE VALVE, W/VAULT, FRAME & COVER		EACH			
SANITARY SEWER MANHOLE		EACH			
8" PVC SANITARY SEWER MAIN		LIN. FT.			
6" SANITARY SEWER LATERAL & SAMPLING MANHOLE		EACH			
LANDSCAPING (SEE SHEET C-08)		LUMP SUM			
AS-BUILT PLANS - STORM SEWER		LUMP SUM			
SUB-TOTAL					
10% CONTINGENCY					
ESTIMATED TOTAL					

BY SEALING THE PLANS, THE DESIGN PROFESSIONAL HEREBY CERTIFIES THAT THE FOREGOING ESTIMATE REFLECTS THE CURRENT IMPROVEMENT COSTS OF THIS PROJECT.

**BALZER**  
AND ASSOCIATES, INC.  
**BVNE**

REFLECTING TOMORROW  
[www.balzer.cc](http://www.balzer.cc)

PLANNERS • ARCHITECTS  
ENGINEERS • SURVEYORS

1208 Corporate Circle  
Roanoke, Virginia 24018  
Phone: 540/772-9580  
FAX: 540/772-8050

15871 City View Drive  
Suite 200  
Midlothian, Virginia 23113  
Phone: 804/794-0571  
FAX: 804/794-2635

448 Peppers Ferry Road  
Christiansburg, Virginia 24073  
Phone: 540/381-4290  
FAX: 540/381-4291

1561 Commerce Road  
Suite 401  
Verona, Virginia 24482  
Phone: 540/248-3220  
FAX: 540/248-3221

128 W. Market Street  
Suite 301  
Harrisonburg, Virginia 22801  
Phone: 540/433-1908

DRAWN BY: CPB  
DESIGNED BY: CPB  
CHECKED BY: SMH  
DATE: 4/14/2017  
REVISIONS: 5/12/2017  
8/9/2017  
4/25/2018

**EXPLORE PARK  
LIFT STATION**  
County of Roanoke, Virginia

SHEET No.:

**C1**

CHRISTOPHER P. BURNS  
LIC. NO.047338  
4/25/18  
PROFESSIONAL ENGINEER

JOB No.: 04170002.00

## SITE SUMMARY

OWNER: VIRGINIA RECREATIONAL FACILITIES AUTHORITY  
C/O BRIAN CARTER – FINANCE  
P.O. BOX 29800  
ROANOKE, VA 24018

DEVELOPER: ROANOKE COUNTY PARKS, RECREATION, & TOURISM  
1206 KESSLER MILL ROAD  
SALEM, VA 24153

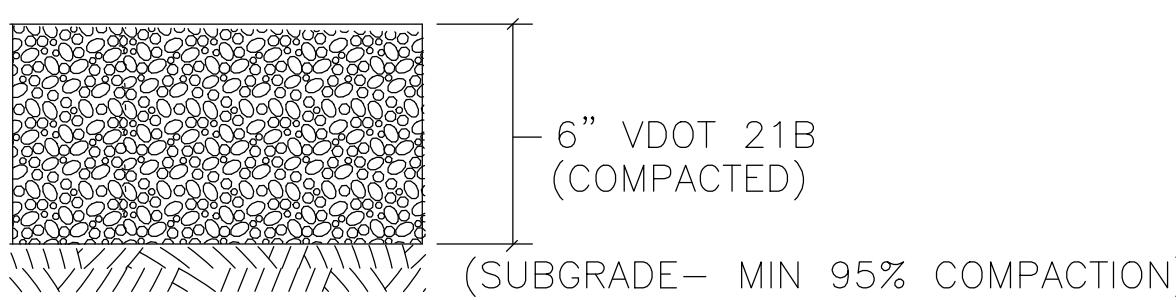
TAX MAP NUMBER: 080.00-05-24.00-0000

SITE AREA: APPROX. 431 ACRES

ZONING: EP

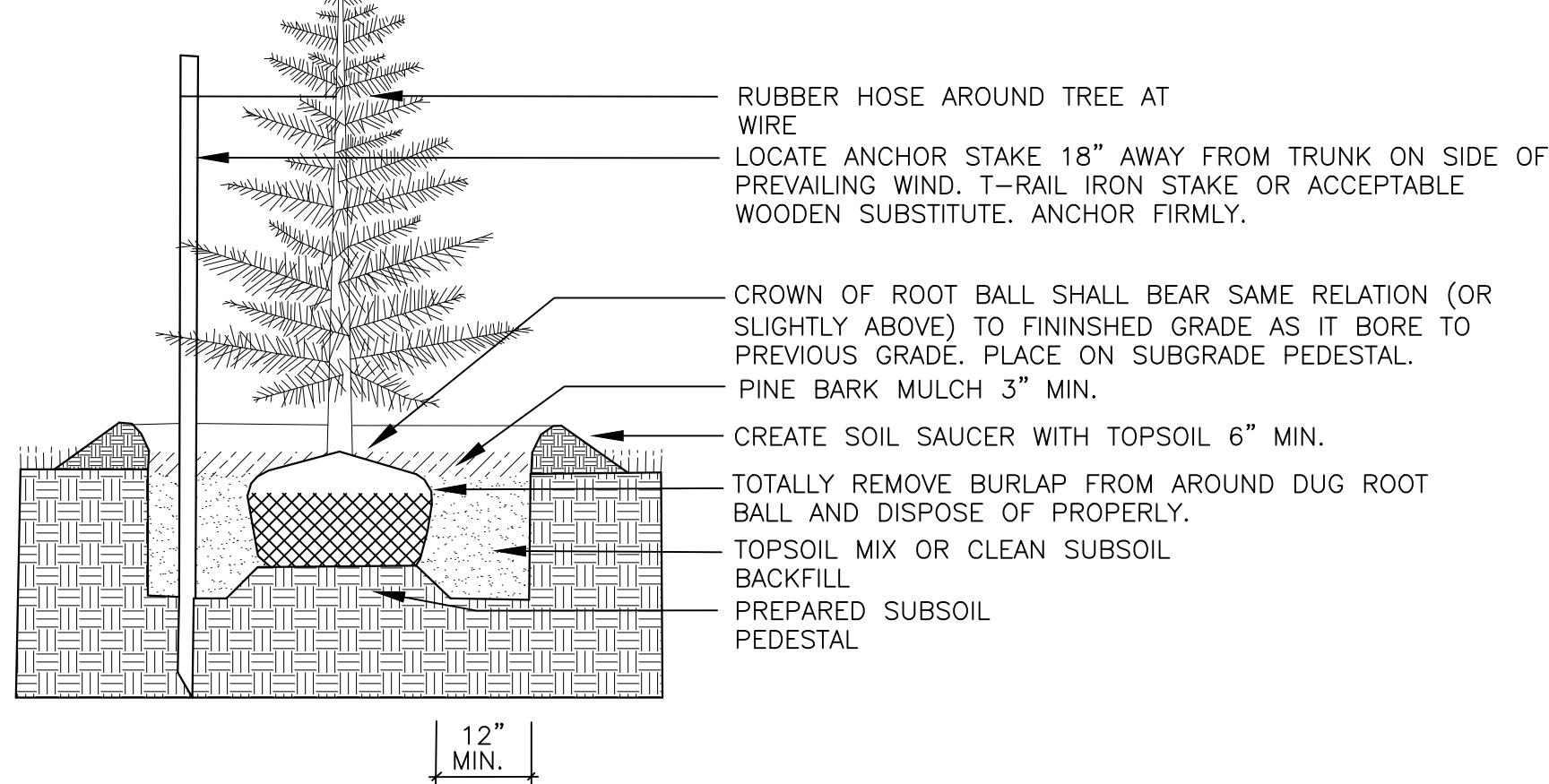
SITE NOTES:

1. G.C. SHALL ENSURE THAT ALL NECESSARY PERMITS ARE IN PLACE PRIOR TO THE START OF CONSTRUCTION.
2. NO CONSTRUCTION/FIELD CHANGES WITHOUT THE APPROVAL OF THE CONSULTING ENGINEER AND ROANOKE COUNTY.
3. ALL BUILDING DIMENSIONS SHALL BE COORDINATED WITH THE ARCHITECTURAL PLANS.
4. CONTRACTOR TO ENSURE POSITIVE DRAINAGE AWAY FROM THE PROPOSED BUILDING.
5. ALL GRADING WORK SHALL BE IN ACCORDANCE WITH THE GRADING NOTES ON SHEET C4.
6. ANY BUILDING LIGHTING SHALL BE FULL CUTOFF FIXTURES.
7. G.C. SHALL BE RESPONSIBLE FOR COORDINATING DIRECTLY WITH A.E.P. TO EXTEND 3-PHASE POWER TO THE LIFT STATION AND FOR TEMPORARY POWER DURING THE CONSTRUCTION PROCESS. G.C. SHALL BE RESPONSIBLE FOR INSTALLING ANY CONDUIT REQUIRED.
8. PROPOSED EVERGREEN SCREENING TREES SHALL BE THUJA X 'GIGANTEOIDES' (GREEN GIANT ARBORVITAE) AND SHALL BE A MINIMUM 6' HEIGHT AT PLANTING.
9. REFER TO SHEET C6 FOR BUILDING AND FOUNDATION DETAILS AND SPECS.
10. REFER TO SHEETS C7 THROUGH C11 FOR LIFT STATION DETAILS AND SPECS.

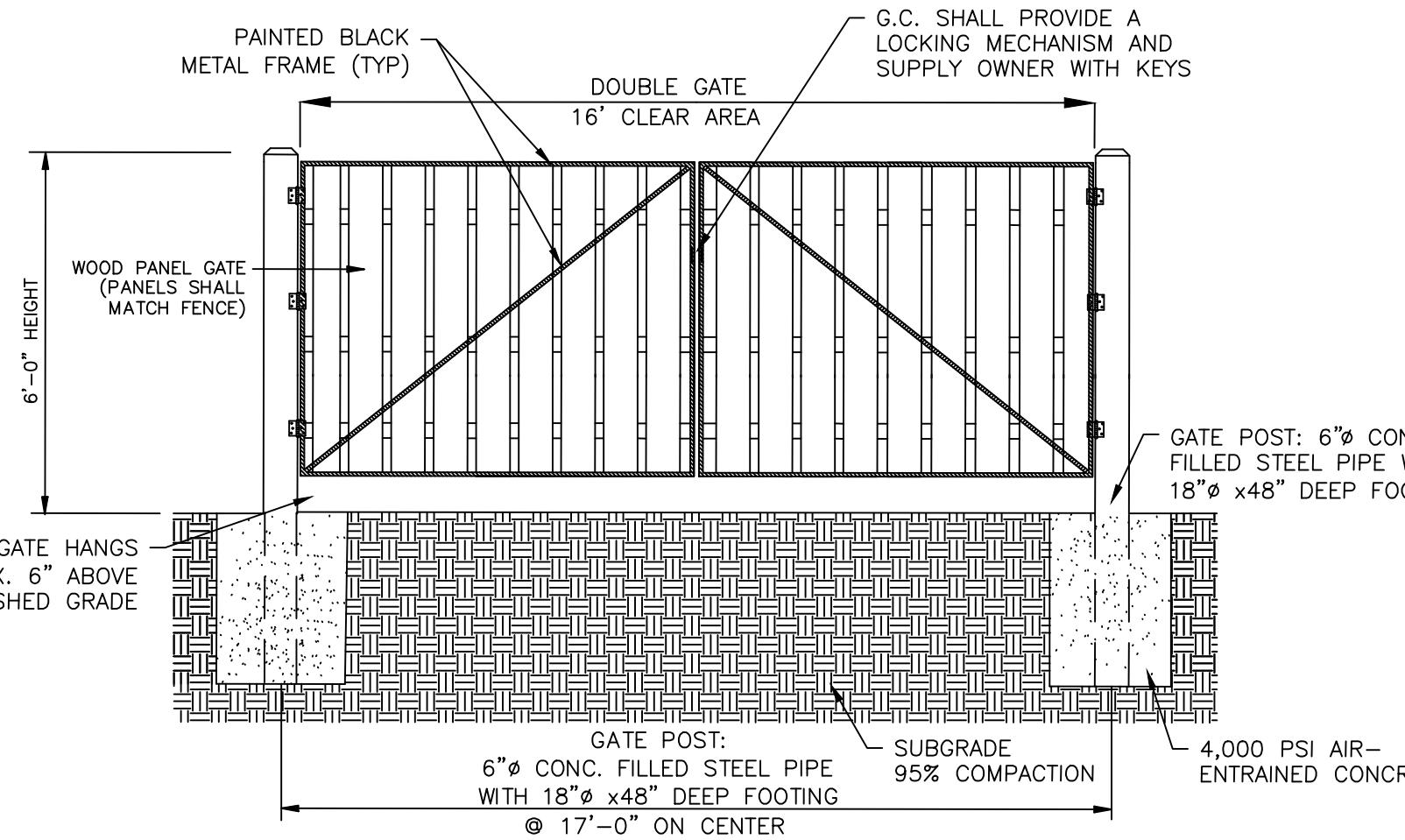


## GRAVEL PAVEMENT SECTION

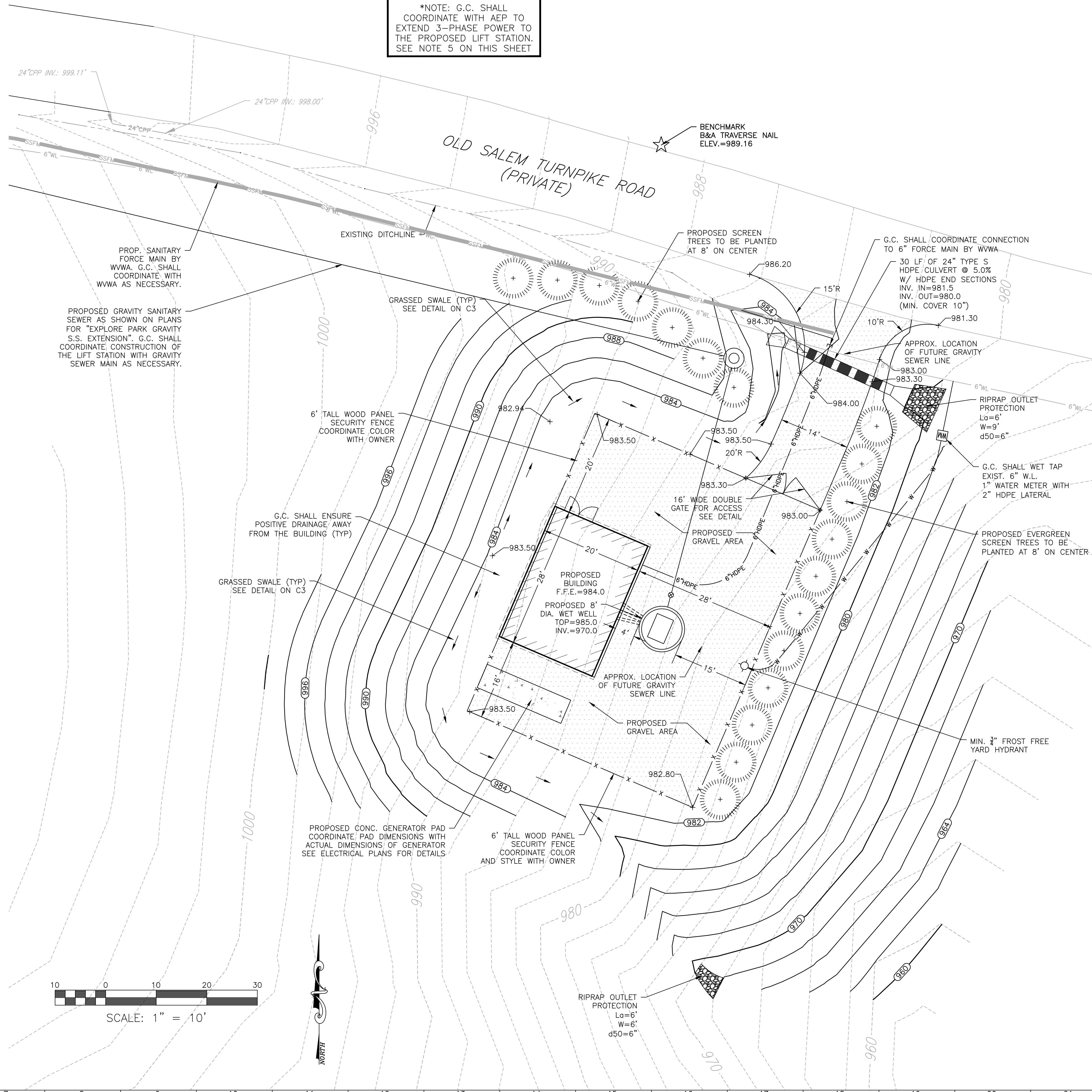
6" STONE BASE MUST BE PLACED IN TWO LIFTS OF NO MORE THAN 4" EACH.  
G.C. TO ENSURE A MINIMUM OF 95% COMPACTION OF THE SUBGRADE PRIOR TO  
STONE/ASPHALT PLACEMENT.

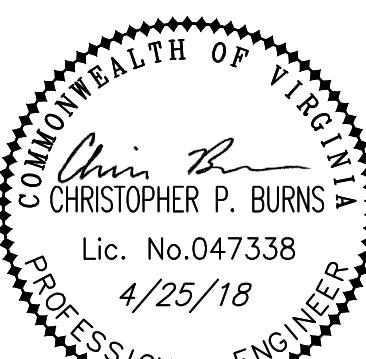


## EVERGREEN TREE PLANTING DETAIL



\*NOTE: G.C. SHALL  
COORDINATE WITH AEP TO  
EXTEND 3-PHASE POWER TO  
THE PROPOSED LIFT STATION.  
SEE NOTE 5 ON THIS SHEET





**EXPLORE PARK LIFT STATION**  
EXPLORE PARK  
VINTON DISTRICT  
ROANOKE COUNTY, VIRGINIA

DRAWN BY CPB  
DESIGNED BY CPB  
CHECKED BY SMH  
DATE 4/14/2017  
SCALE 1"=10'  
REVISIONS:  
5/5/2017  
5/12/2017  
8/9/2017  
4/25/2018

SHEET NO.

**C3**

JOB NO. 04170002.00

**CONSTRUCTION SEQUENCING NOTES:**

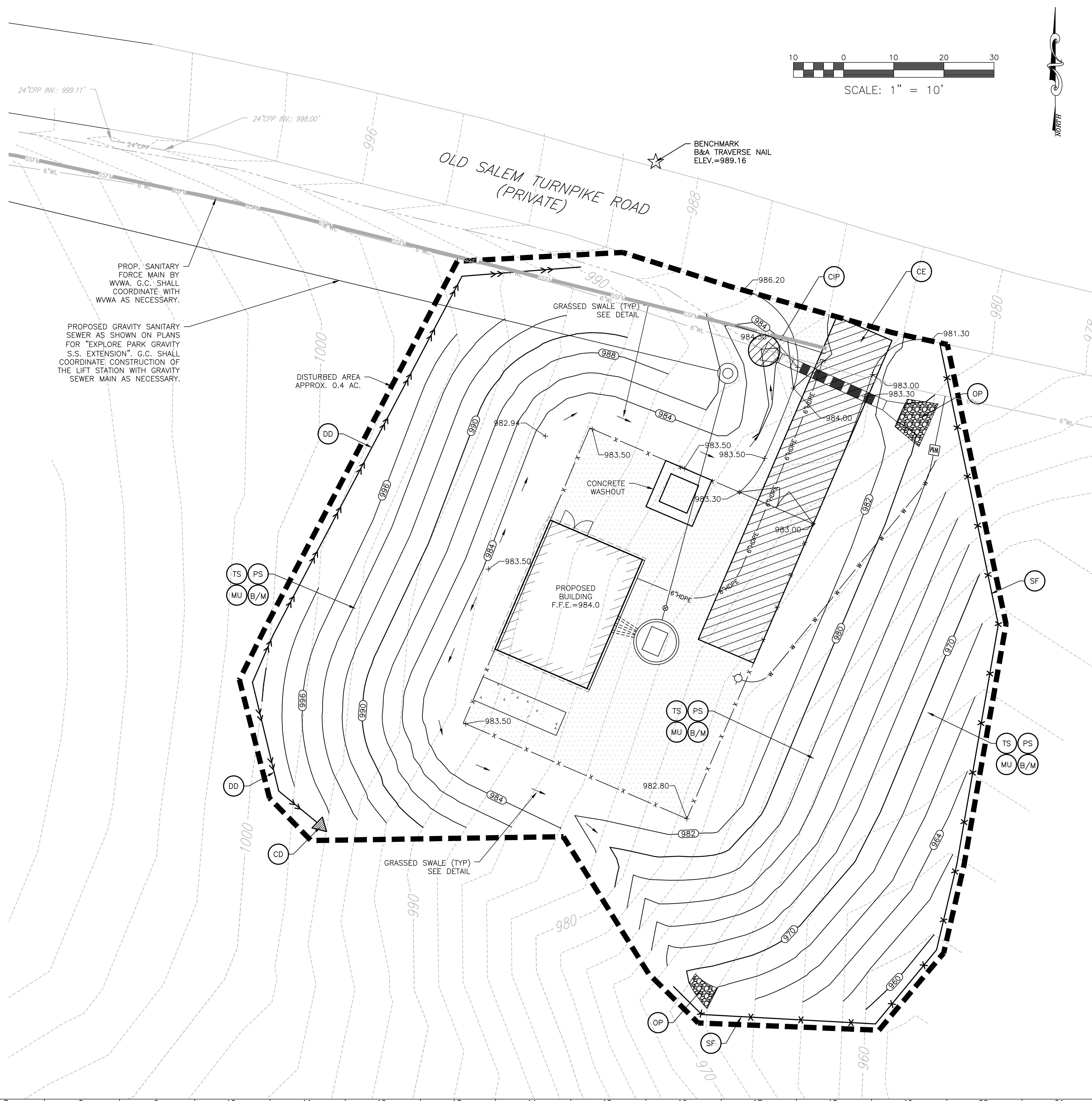
- THE ENTRANCE CULVERT AND CONSTRUCTION ENTRANCE SHALL BE INSTALLED AS THE FIRST STEPS. G.C. SHALL PAY SPECIAL ATTENTION TO ENSURE THERE IS NO MUD 'TRACKING' FROM THE CONSTRUCTION AREA ONTO THE ROADWAY. THE ENTRANCE CULVERT SHALL RECEIVE CULVERT INLET PROTECTION AND OUTLET PROTECTION AS INDICATED ON THE PLAN.
- PERIMETER DIVERSION DIKES SHALL BE INSTALLED WITH CHECK DAM TO CONVEY UPSTREAM RUNOFF AROUND THE CONSTRUCTION AREA.
- SILT FENCE SHALL BE INSTALLED WHERE APPLICABLE AROUND THE PERIMETER OF THE SITE AND MAINTAINED THROUGHOUT THE PROJECT.
- EXISTING TREES MAY BE REMOVED AT THIS TIME AND TOPSOIL STOCKPILED ON-SITE.
- MAJOR GRADING OPERATIONS AND SITE CONSTRUCTION SHALL TAKE PLACE AT THIS TIME. THE SWALES SHALL BE ESTABLISHED TO PROVIDE POSITIVE DRAINAGE AROUND THE PROPOSED BUILDING AND GRAVEL ACCESS AREA. OUTLET PROTECTION SHALL BE INSTALLED WHERE APPLICABLE.
- THE CONCRETE WASHOUT SHALL BE INSTALLED AND MADE FUNCTIONAL PRIOR TO ANY CONCRETE IMPROVEMENTS ON-SITE. IT SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT.
- ALL SLOPES THAT ARE 3:1 OR GREATER SHALL RECEIVE BLANKET MATTING AND PERMANENT STABILIZATION AS SOON AS POSSIBLE AFTER REACHING FINAL GRADE.
- CONSTRUCTION OF THE LIFT STATION AND OTHER SITE IMPROVEMENTS SHALL TAKE PLACE AT THIS TIME.
- AFTER LIFT STATION CONSTRUCTION IS COMPLETE, THE GRAVEL PAVEMENT SHALL BE INSTALLED AND THE CONSTRUCTION ENTRANCE REMOVED.
- FENCING AND LANDSCAPING SHALL BE INSTALLED ANY REMAINING AREAS OF THE SITE SHALL RECEIVE PERMANENT STABILIZATION.
- AFTER PERMANENT STABILIZATION OF THE SITE, THE DIVERSION DIKES, CHECK DAM, AND SILT FENCE MAY BE REMOVED.
- \*NOTE: ROANOKE COUNTY INSPECTION AND APPROVAL IS REQUIRED PRIOR TO THE REMOVAL OF EROSION AND SEDIMENT CONTROL MEASURES.
- G.C. SHALL ENSURE THAT THE LIMITS OF DISTURBANCE ARE STRICTLY ADHERED TO DURING THE PROJECT.
- NO DEVIATIONS TO THE PLANS SHALL TAKE PLACE UNLESS PRIOR APPROVAL FROM THE OWNER, PROJECT ENGINEER, AND THE APPROPRIATE REVIEW AGENCIES.

**ESC LEGEND:**

3.02	TEMPORARY STONE CONSTRUCTION ENTRANCE	CE
3.05	SILT FENCE	SF
3.08	CULVERT INLET PROTECTION	CIP
3.09	TEMPORARY DIVERSION DIKE	DD
3.18	OUTLET PROTECTION	OP
3.20	ROCK CHECK DAM	CD
3.31	TEMPORARY SEEDING	TS
3.32	PERMANENT SEEDING	PS
3.35	MULCHING	MU
3.36	SOIL STABILIZATION BLANKETS & MATTING	B/M

DITCH SHALL RECEIVE  
VDOT STD. EC-2 LINING  
SEE DETAIL ON SHEET C5  
MAX 2:1  
MAX 2:1  
MIN. DEPTH  
=1'

**GRASSED SWALE DETAIL**  
N.T.S.





Erosion & Sediment Control Technical Bulletin No. 4  
Nutrient Management for Development Sites

C. When applying maintenance fertilizer on established sod.

Month	Type of Grass			
	Tall Fescue	Kentucky Bluegrass	Bermudagrass	Zoysia grass
September	1	0	0	0
October	1	0	0	0
Early November	0	0	0	0
April	0	0	0	0
May	0.05	0.05	1	1
June	0	0	1	0
July/August	0	0	0	1
Yearly Lbs. N/1000 sq. ft.	2.5	2.5	2	2

Pounds of nitrogen per 1,000 sq. ft. if the fertilizer is less than 50 percent WIN

Month	Type of Grass			
	Tall Fescue	Kentucky Bluegrass	Bermudagrass	Zoysia grass
August 15	1.5	1.5	0	0
October 1	1.5	1.5	0	0
April	0	0	1.5	1.5
May 15	0	0	0	0
June	0	0	1.5	1.5
Yearly Lbs. N/1000 sq. ft.	3	3	3	3

**FERTILIZER SPECIFICATIONS AND RATES FOR MANAGEMENT**

TABLE 3.32-C  
(Revised June 2003)  
PERMANENT SEEDING SPECIFICATIONS FOR APPALACHIAN/MOUNTAIN AREA

LAND USE	SPECIES	APPLICATION RATES
Minimum Care Lawn (Commercial or Residential)	Tall Fescue <sup>1</sup> Perennial Ryegrass <sup>2</sup> Kentucky Bluegrass <sup>3</sup>	90-100% 0-10% 0-10%
		TOTAL: 200-250 lbs.
High-Maintenance Lawn	Minimum of three (3) up to five (5) varieties of Kentucky Bluegrass from approved list for use in Virginia <sup>4</sup>	TOTAL: 125 lbs.
General Slope (3:1 or less)	Tall Fescue <sup>1</sup> Red Top Grass or Creeping Red Fescue Seasonal Nurse Crop <sup>3</sup>	128 lbs. 2 lbs. 20 lbs. TOTAL: 150 lbs.
Low-Maintenance Slope (Steeper than 3:1)	Tall Fescue <sup>1</sup> Red Top Grass or Creeping Red Fescue Seasonal Nurse Crop <sup>3</sup> Crownvete <sup>4</sup>	2 lbs. 2 lbs. 20 lbs. 20 lbs. TOTAL: 150 lbs.

1 - When selecting varieties of turfgrass, use the Virginia Crop Improvement Association (VICA) recommended turfgrass varieties listed for each category. Contact the VICA at 804-748-4844 or at <http://vudcn.cses.vt.edu/htmt/Turf/turfpublications/publications2.htm>  
2 - Perennial Ryegrass will germinate faster and at lower soil temperatures than Tall Fescues, thereby providing cover and erosion resistance more quickly.  
3 - Use seasonal nurse crop in mixtures with seeding data as stated below.  
4 - All legume seed must be properly inoculated. If Flapeta is used, increase to 30 lbs/acre. If Weeping Lovegrass is used, include in any slope or low maintenance mixture during winter seeding periods, increase to 50-60 lbs/acre.

**PS PERMANENT SEEDING SPECIFICATIONS**

**FERTILIZER & LIME**

- Apply 10-10-10 fertilizer at a rate of 500 lbs. / acre (or 12 lbs. / 1,000 sq. ft.)
- Apply Pulverized Agricultural Limestone at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:

- A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.

- Incorporate the lime and fertilizer into the top 4-6 inches of the soil by disk or by other means.

- When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin #4.2003 Nutrient Management for Development Sites at <http://www.dcr.state.va.us/sw/e&s/htm#pubs>

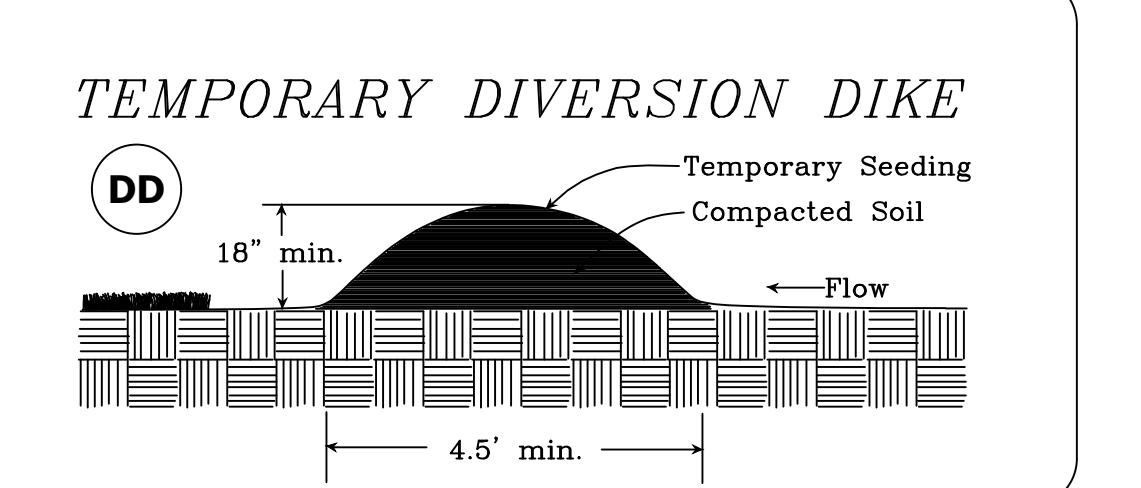


TABLE 3.31-B  
(Revised June 2003)  
TEMPORARY SEEDING SPECIFICATIONS  
QUICK REFERENCE FOR ALL REGIONS

APPLICATION DATES	SPECIES	APPLICATION RATES
Sept. 1 - Feb. 15	50/50 Mix of Annual Ryegrass ( <i>loliu multi-florum</i> ) & Cereal (Winter) Rye ( <i>Secale cereale</i> )	50 - 100 (lbs/acre)
Feb. 16 - Apr. 30	Annual Ryegrass ( <i>loliu multi-florum</i> )	60 - 100 (lbs/acre)
May 1 - Aug. 31	German Millet	50 (lbs/acre)

**FERTILIZER & LIME**

- Apply 10-10-10 fertilizer at a rate of 450 lbs. / acre (or 10 lbs. / 1,000 sq. ft.)
- Apply Pulverized Agricultural Limestone at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:

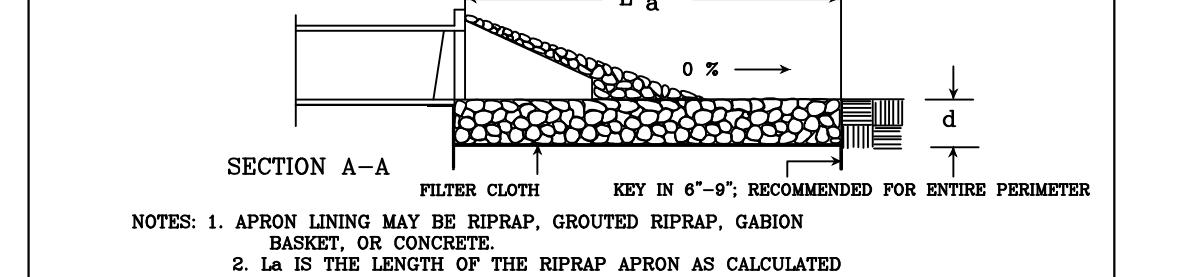
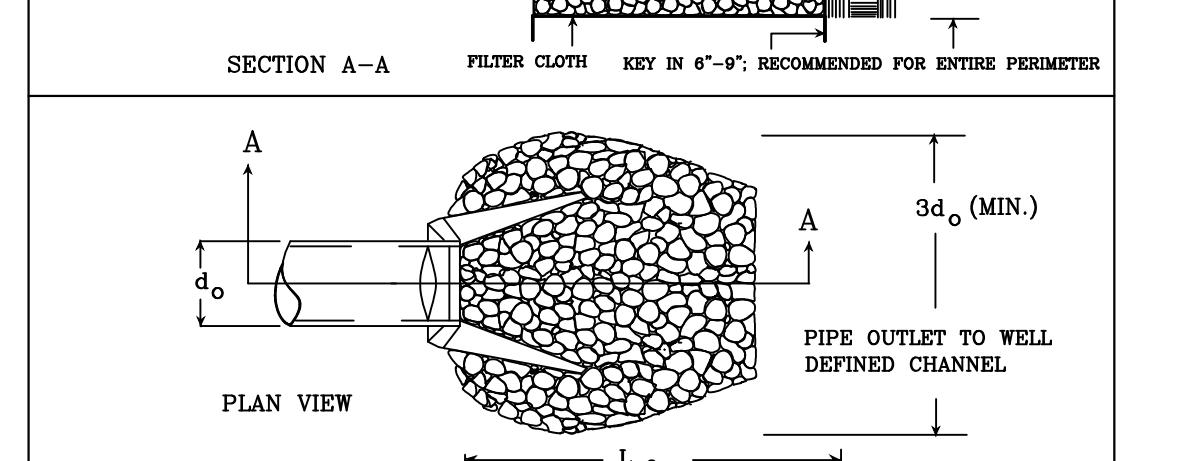
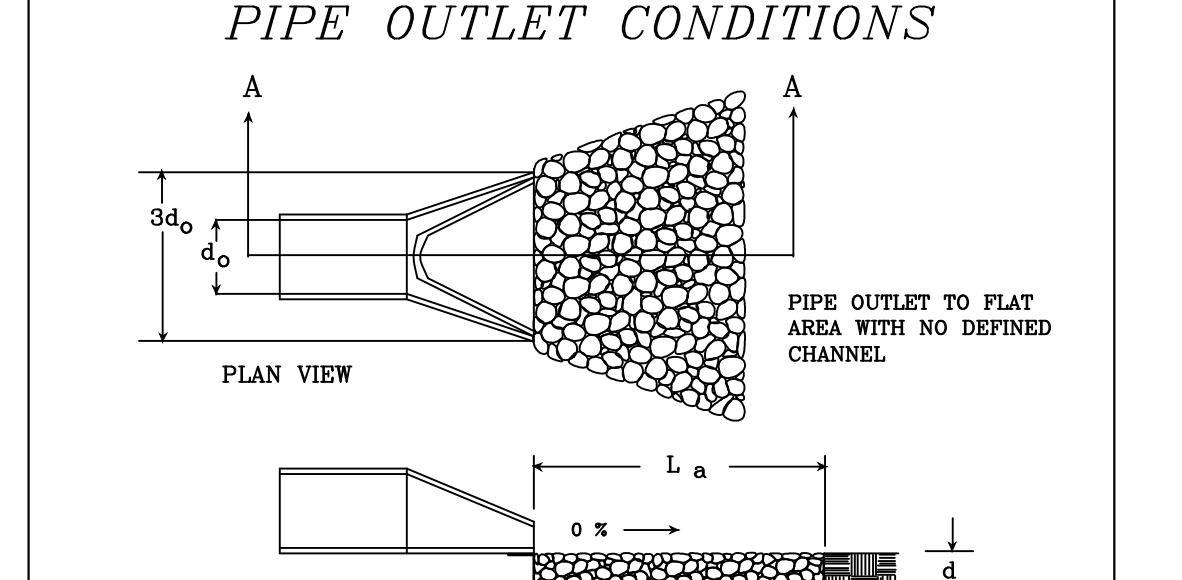
1 - A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.

2 - Incorporate the lime and fertilizer into the top 4-6 inches of the soil by disk or by other means.

3 - When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin #4.2003 Nutrient Management for Development Sites at <http://www.dcr.state.va.us/sw/e&s/htm#pubs>

**TS TEMPORARY SEEDING SPECIFICATIONS**

**PIPE OUTLET CONDITIONS**

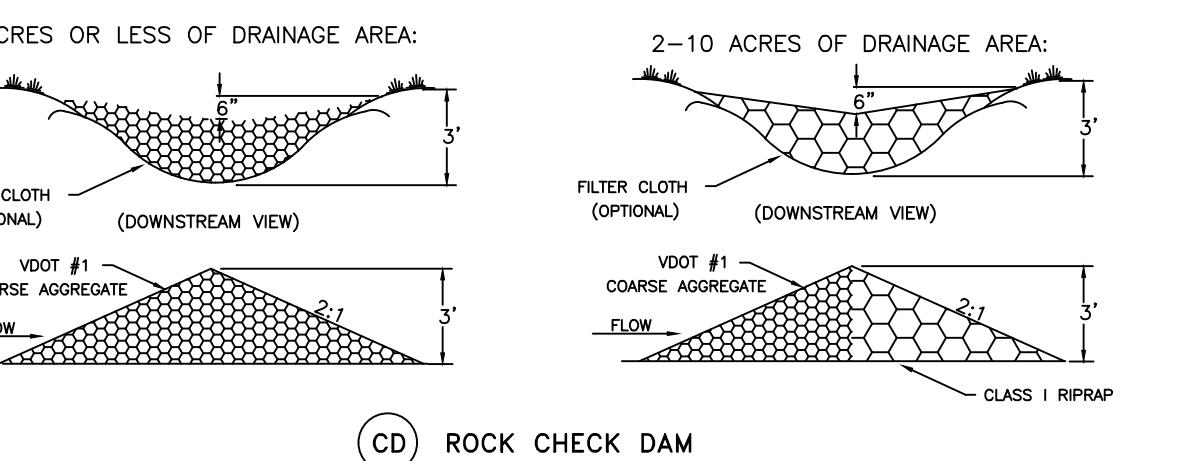


NOTES: 1. APRON LINING MAY BE RIPRAP, GROUTED RIPRAP, GABION  
2. BASKET, OR CONCRETE  
2. L<sub>a</sub> IS THE LENGTH OF THE RIPRAP APRON AS CALCULATED  
USING PLATES 3.1B-3 AND 3.1B-4.  
3. L<sub>a</sub> IS THE MAXIMUM STONE DIAMETER, BUT NOT  
LESS THAN 6 INCHES.

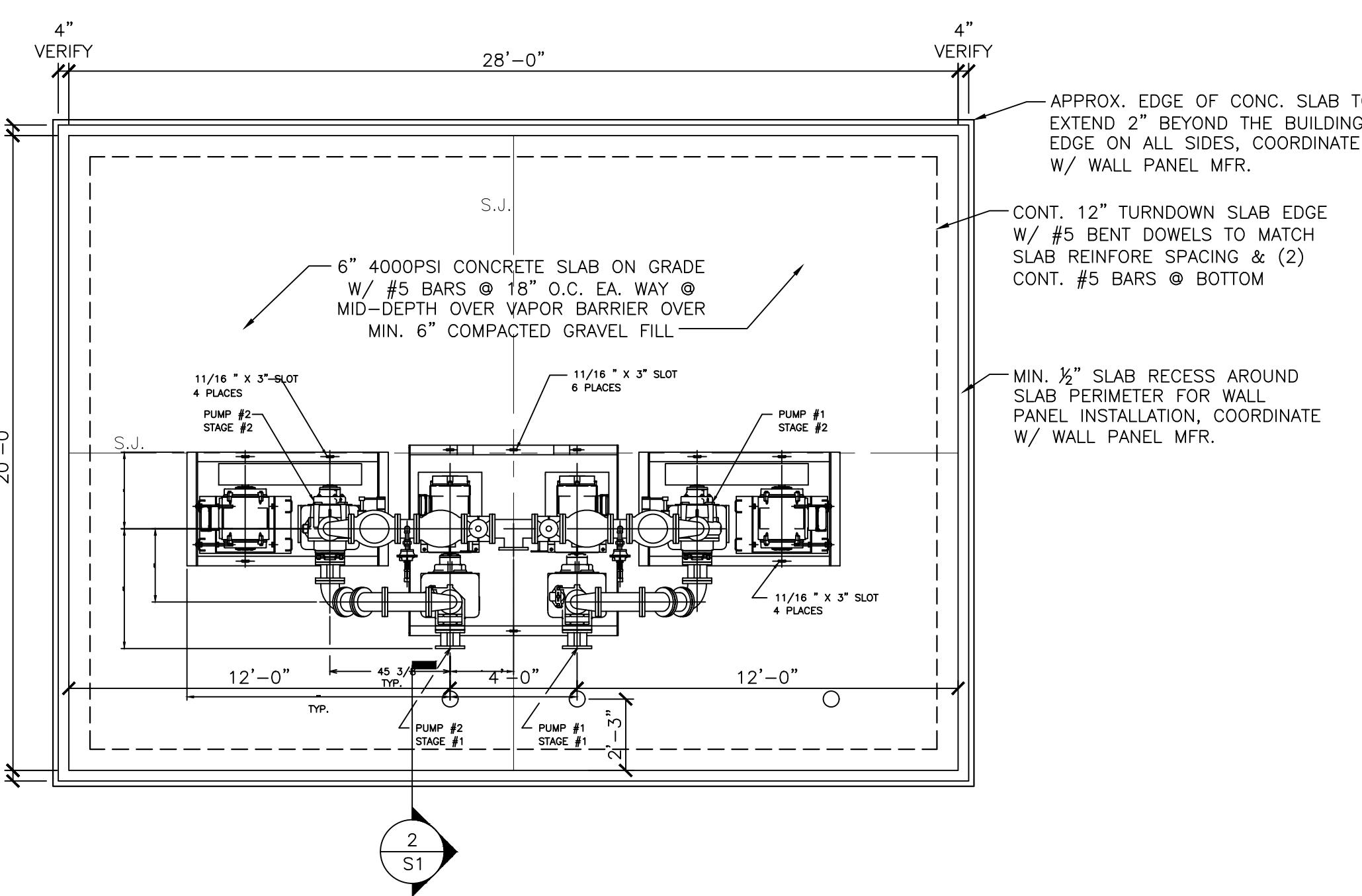
Source: Va. DSWC

Plate 3.1B-1

OP OUTLET PROTECTION

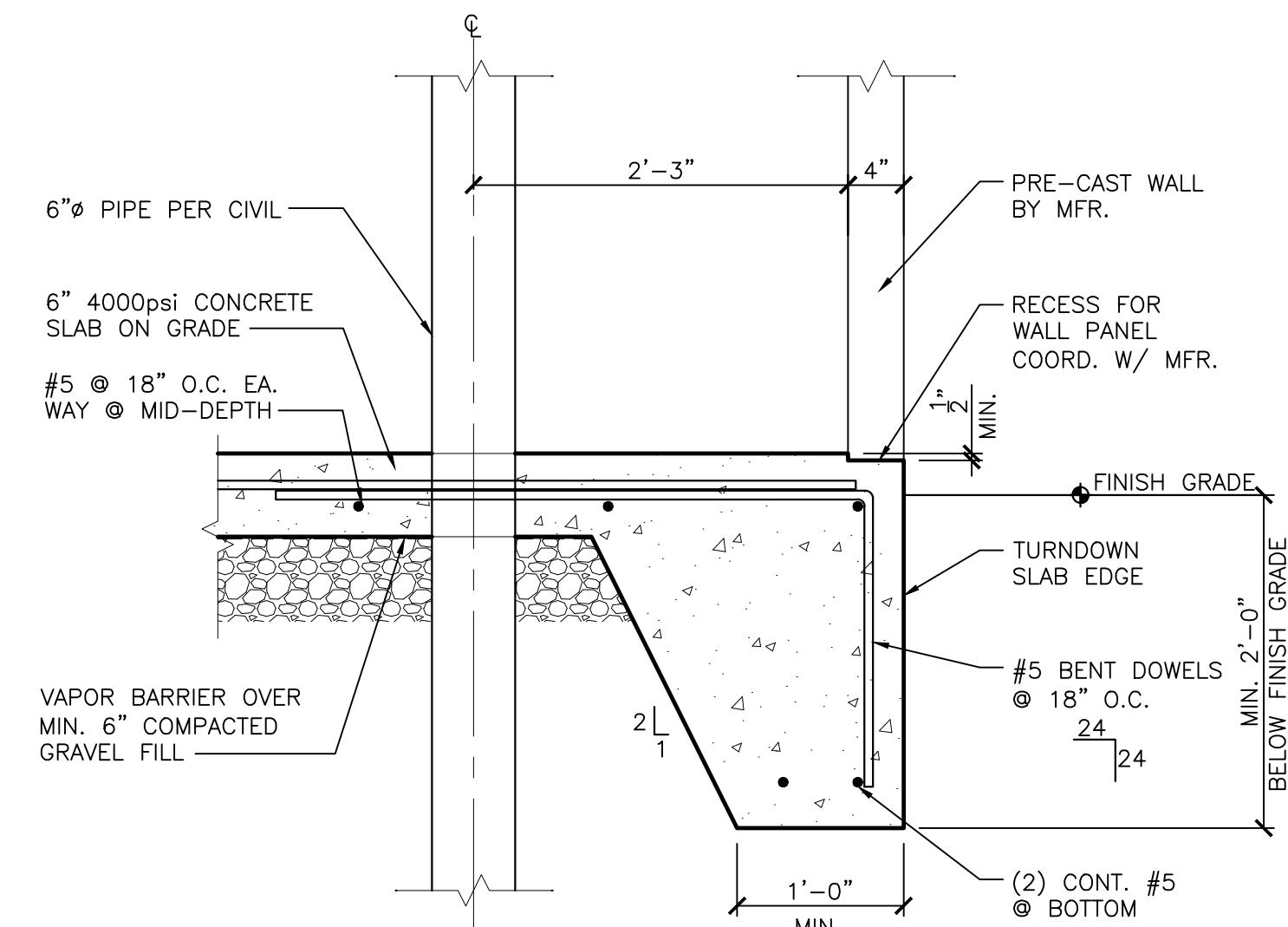


GENERAL NOTES:  
1. ROLLED EROSION CONTROL PRODUCT IS TO BE LOCATED AS INDICATED ON THE TYPICAL SECTION.  
2. THE WIDTH OF OTHER MATERIALS IS DETERMINED BY THE STAKES SHOWN.  
3. WIDTH OF MATERIAL MAY VARY FROM MINIMUM SHOWN DUE TO THE TYPICAL SECTION.  
4. COPY OF THE ORIGINAL AND SEALED DRAWING IS ON FILE IN THE CENTRAL OFFICE.  
5. ROAD AND BRIDGE STANDARDS  
6. D-2  
7. 2016 ROAD & BRIDGE STANDARDS  
8. A COPY OF THE ORIGINAL AND SEALED DRAWING IS ON FILE IN THE CENTRAL OFFICE.  
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84.



**FOUNDATION PAD PLAN**

1  
S1  
SCALE = 1/4"=1'-0"



**FOOTING SECTION**

2  
S1  
SCALE = 1"=1'-0"

**BUILDING NOTES AND SPECIFICATIONS**

**GENERAL NOTES**

- A. THE GENERAL CONTRACTOR SHALL FURNISH AND INSTALL A PRECAST, EASI-SET CONCRETE BUILDING, OR APPROVED EQUAL. SEE BUILDING SPECIFICATIONS LISTED ON THIS SHEET.
- B. INTERIOR DIMENSIONS OF THE BUILDING SHALL BE 28'-0"L x 20'-0"W x 12'-0"H.
- C. BUILDING SHALL BE PLACED ON POURED-IN-PLACE FOUNDATION AND FLOOR SLAB. SEE DETAILS ON THIS SHEET.
- D. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY BUILDING PERMITS PRIOR TO CONSTRUCTION.
- E. GENERAL CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE AWAY FROM THE PROPOSED BUILDING.

**QUALITY ASSURANCE**

- A. ACI-318-02, "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE". CONCRETE REINFORCING INSTITUTE, "MANUAL OF STANDARD PRACTICE".
- B. ANSI/ASCE-7-02 "BUILDING CODE REQUIREMENT FOR MINIMUM DESIGN LOADS IN BUILDINGS AND OTHER STRUCTURES".
- C. 2012 VIRGINIA CONSTRUCTION CODE (VCC)
- D. CONCRETE REINFORCING INSTITUTE, "MANUAL OF STANDARD PRACTICE".
- E. FABRICATOR MUST BE CERTIFIED PRODUCER/MEMBER OF THE PRECAST/PRESTRESSED CONCRETE INSTITUTE (PCI), NATIONAL PRECAST CONCRETE ASSOCIATION (NPCA) OR EQUAL.

**DESIGN REQUIREMENTS**

- A. DESIGN LOADS:
  - 2. SEISMIC LOAD PERFORMANCE CATEGORY 'C', EXPOSURE GROUP III
  - 3. STANDARD LIVE ROOF LOAD - 20 PSF
  - 4. STANDARD ROOF GROUND SNOW LOAD - 30 PSF
  - 5. STANDARD FLOOR LOAD - 250 PSF (IF PRECAST FLOOR PROVIDED BY BUILDING MANUFACTURER)
  - 6. STANDARD WIND LOADING - 115 MPH
- B. ROOF: ROOF PANEL SHALL HAVE A MINIMUM OF 8" SLOPE FROM PEAK TO EDGE. THE ROOF SHALL EXTEND 4" BEYOND THE WALL PANEL AND HAVE A TURNDOWN DESIGN WHICH EXTENDS  $\frac{1}{2}$ " BELOW THE TOP EDGE OF THE WALL PANELS TO PREVENT WATER MIGRATION INTO THE BUILDING ALONG TOP OF WALL PANELS. ROOF SHALL ALSO HAVE AN INTEGRAL ARCHITECTURAL RIBBED EDGE.
- C. KEYWAY ROOF JOINTS: GROUT IN KEYWAYS SHALL BE POLYMER CONCRETE PLACED AFTER COATING KEYWAYS WITH METHYL METHACRYLATE RESIN AND ISOCYANATE RESIN. TOP OF KEYWAY MUST BE COATED WITH PRIMER FOLLOWED BY A FIBERGLASS RESIN FABRIC FOLLOWED BY A SECOND COAT OF POLYMERIC JOINT SEALANT.
- D. CONTRACTOR SUPPLIED POURED-IN-PLACE SLAB MUST HAVE A  $\frac{1}{2}$ " STEP-DOWN AROUND THE ENTIRE PERIMETER TO PREVENT WATER MIGRATION INTO THE BUILDING ALONG THE BOTTOM WALL PANELS.

**SUBMITTALS**

- A. ENGINEERING CALCULATIONS THAT ARE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER, LICENSED TO PRACTICE IN VIRGINIA, SHALL BE SUBMITTED FOR APPROVAL.

**MATERIALS**

- A. CONCRETE: STEEL-REINFORCED, 5000 PSI MINIMUM 28-DAY COMPRESSIVE STRENGTH, AIR-ENTRAINED (ASTM C260).
- B. REINFORCING STEEL: ASTM A615, GRADE 60 UNLESS OTHERWISE SPECIFIED.
- C. POST-TENSIONING STRAND: ROOF SHALL BE POST-TENSIONED IN FIELD AFTER GROUT KEYWAY IS FILLED AND HAS CURED TO REQUIRED PSI STRENGTH. POST-TENSIONING CABLE SHALL BE 41K POLYSTRAND CP50,.50", 270 KSI, 7-WIRE STRAND, ENCLOSED WITHIN A GREASED PLASTIC SHEATH (ASTMA416), OR APPROVED EQUAL. THERE WILL BE A MINIMUM OF THREE POST-TENSIONING CABLES CONNECTING ROOFS AND FLOORS TOGETHER TO PROVIDE A WATERTIGHT JOINT.
- D. CAULKING: ALL JOINTS BETWEEN PANELS SHALL BE CAULKED ON THE EXTERIOR AND INTERIOR SURFACE OF JOINTS. CAULKING SHALL BE ELASTIC SEALANT OR EQUAL. EXTERIOR CAULK JOINT TO BE 3/8" X 3/8" SQUARE SO THAT SIDES OF JOINT ARE PARALLEL FOR CORRECT CAULK TO PARALLEL SIDES OF JOINT AND NOT THE BACK.
- E. PANEL CONNECTIONS: ALL PANELS SHALL BE SECURELY FASTENED TOGETHER WITH A 3/8" THICK STEEL BRACKETS. STEEL IS TO BE STRUCTURAL QUALITY, HOT-ROLLED CARBON COMPLYING WITH ASTM A283, GRADE C AND HOT DIPPED GALVANIZED AFTER FABRICATION. ALL FASTENERS TO BE  $\frac{1}{2}$ " DIAMETER BOLTS COMPLYING WITH ASTM A307 FOR LOW-CARBON STEEL BOLTS. CAST-IN ANCHORS USED FOR PANEL CONNECTIONS TO BE DAYTONOSUPERIOR #63 OR EQUAL. ALL INSERTS FOR CORNER CONNECTIONS MUST BE BOLTED DIRECTLY TO FORM BEFORE CASTING PANELS. NO FLOATING-IN OF CONNECTION INSERTS SHALL BE ALLOWED. WALL PANELS SHALL BE CONNECTED TO FLOOR SLAB WITH 4" EXPANSION ANCHORS BY MANUFACTURER.

**ACCESSORIES**

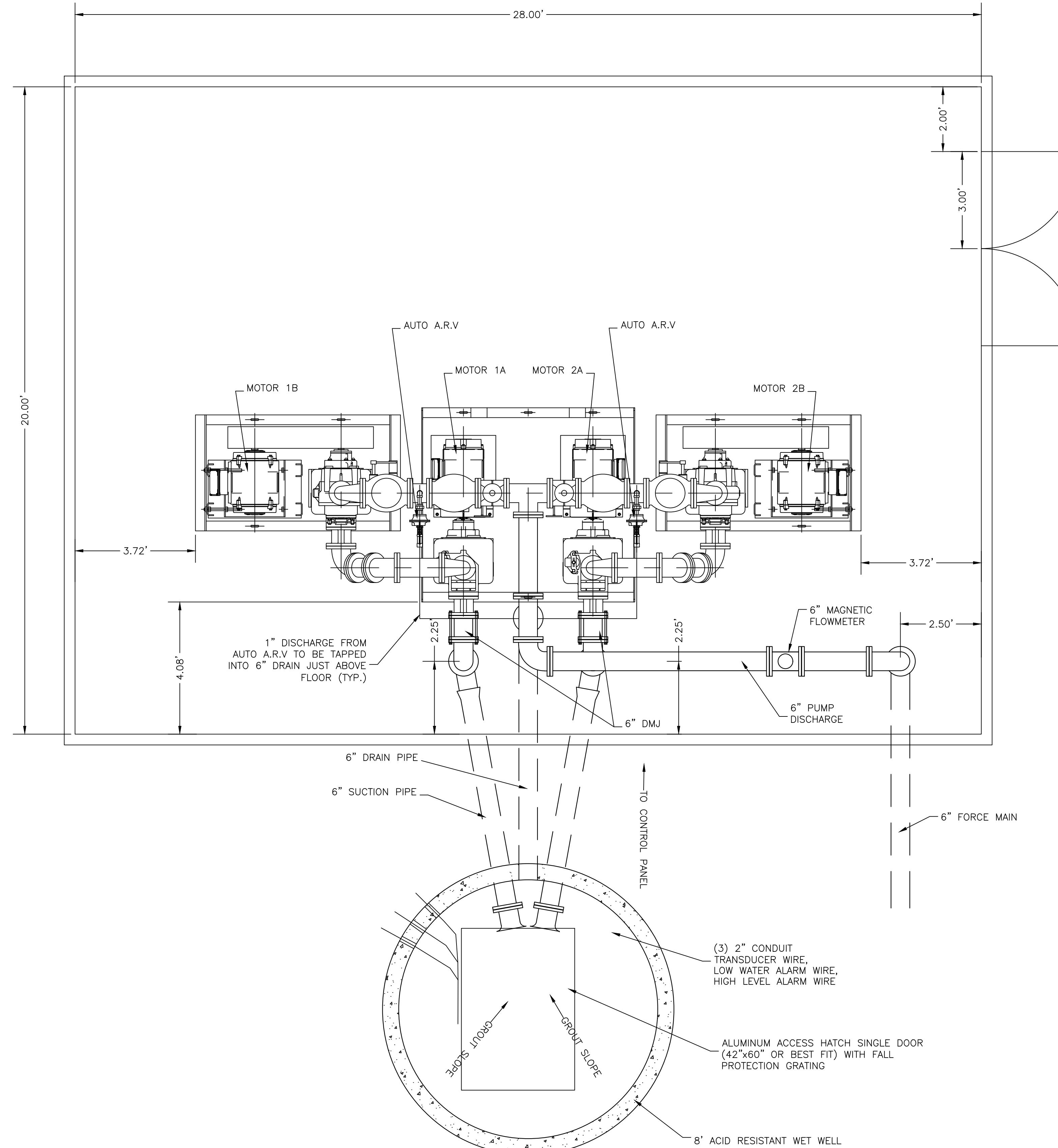
- A. DOORS AND FRAMES: SHALL COMPLY WITH STEEL DOOR INSTITUTE "RECOMMENDED SPECIFICATIONS FOR STANDARD STEEL DOORS AND FRAMES" (SDI-100) AND AS HEREIN SPECIFIED. THE BUILDING SHALL BE EQUIPPED WITH DOUBLE 3'-0" X 8'-0" X 1-3/4", 18-GAUGE GALVANIZED/INSULATED DOMINION IMPERIAL RIGHT HAND REVERSE METAL DOORS WITH 16-GAUGE GALVANIZED FRAMES. DOORS AND FRAMES SHALL BE BONDERIZED AND PAINTED ONE COAT OF RUST INHIBITIVE PRIMER AND ONE FINISH COAT OF ENAMEL PAINT, COLOR TO BE SELECTED BY OWNER.
- B. DOOR HARDWARE:
  - 1. HANDLE: LINDSTROM STAINLESS STEEL, 8-1/2" X 2" OR EQUAL.
  - 2. HINGES: PB-31/NRP/26D 4 1/2" X 4 1/2" (CHROME-PLATED WITH NON-REMOVABLE HINGE PINS), 3 PER DOOR OR EQUAL.
  - 3. LOCK SET: PDQ INDUSTRIES KR116 - 32D (STAINLESS STEEL FINISH) OR EQUAL.
  - 4. SURFACE BOLT, UPPER: CAL-ROYAL 045901426D (SATIN CHROME FINISH) OR EQUAL.
  - 5. SURFACE BOLT, LOWER: CAL-ROYAL 045901426D (SATIN CHROME FINISH) OR EQUAL.
  - 6. ASTRAGAL: A4441/68R OR EQUAL.
  - 7. THRESHOLD: NATIONAL GUARD 897V60 RAISED INTERIOR, EXTRUDED ALUMINUM THRESHOLD WITH NEOPRENE SEAL OR EQUAL.
  - 8. DOOR HOLDER: GLYNN-JOHNSON 904H US32D (STAINLESS STEEL FINISH), OVERHEAD SLIDE TYPE SURFACE MOUNTED DOOR HOLDER OR EQUAL.
  - 9. Drip CAP: NATIONAL GUARD 15D72 OR EQUAL.
  - 10. DOOR STOP: IES 445B26D (INACTIVE LEAF ONLY) OR EQUAL.

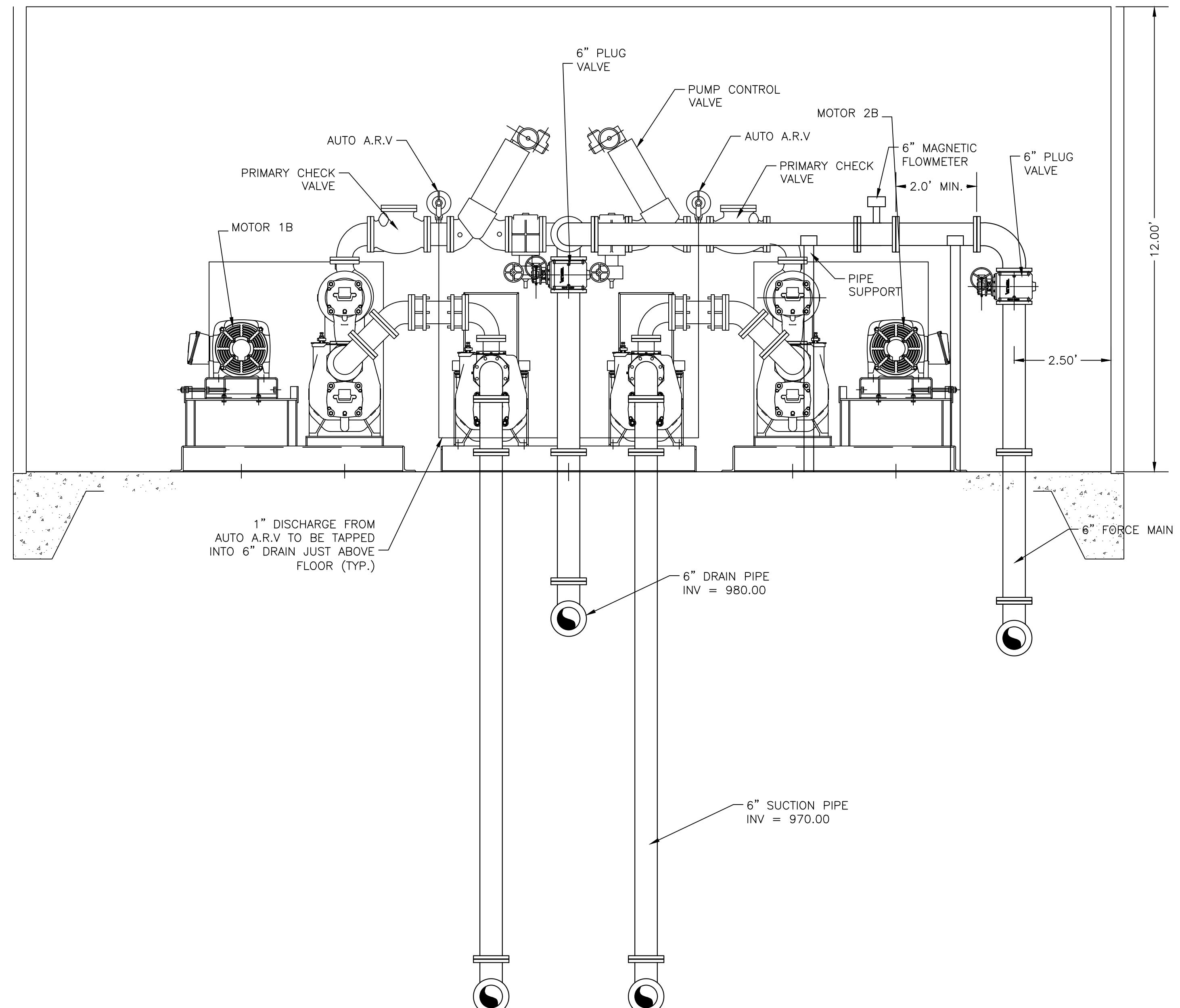
DRAWN BY CPB  
DESIGNED BY CPB  
CHECKED BY SMH  
DATE 4/14/2017  
SCALE AS NOTED  
REVISIONS:  
5/5/2017  
5/12/2017  
8/9/2017  
4/25/2018

SHEET NO.

**C6**

JOB NO. 04170002.00

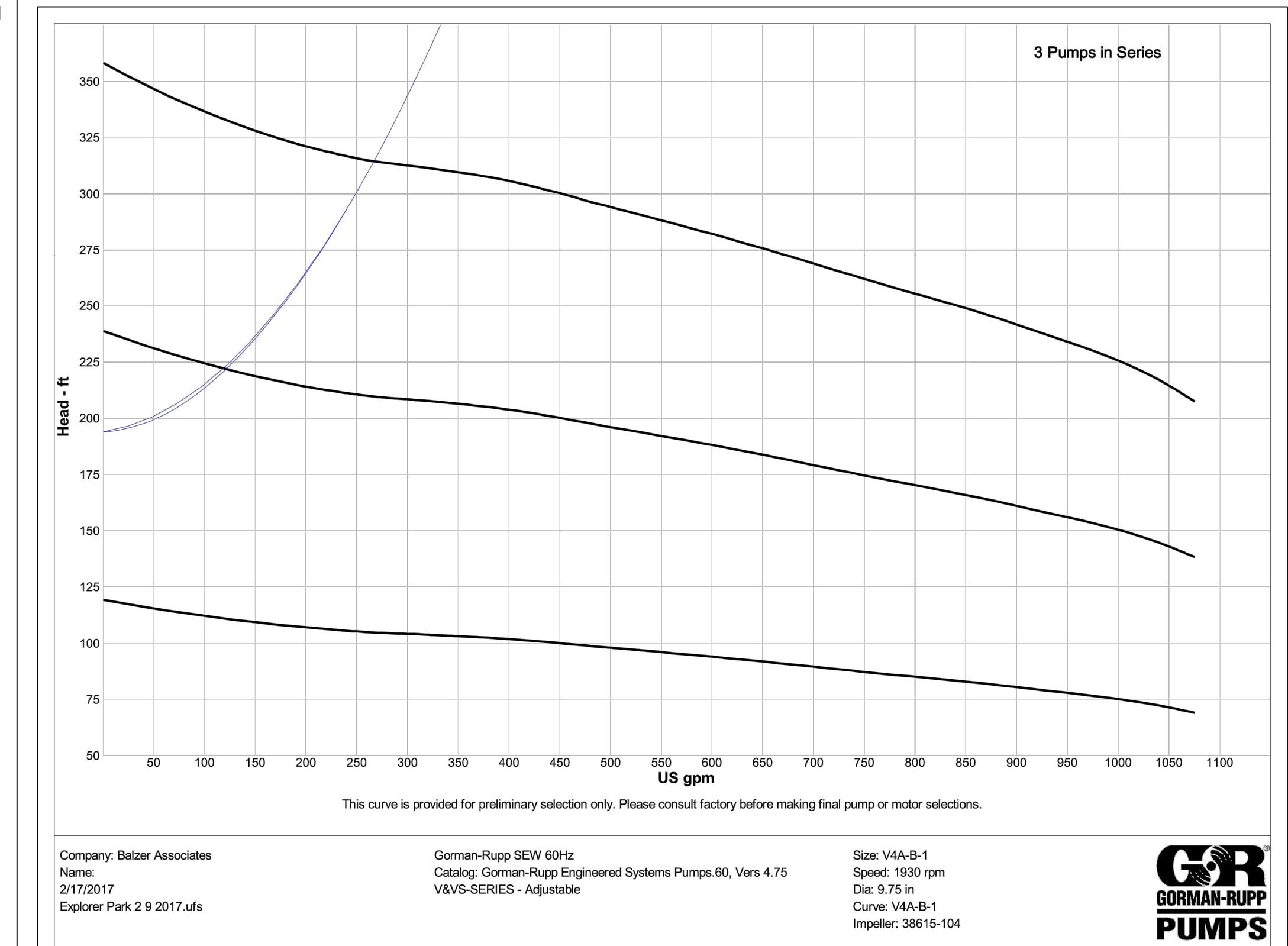
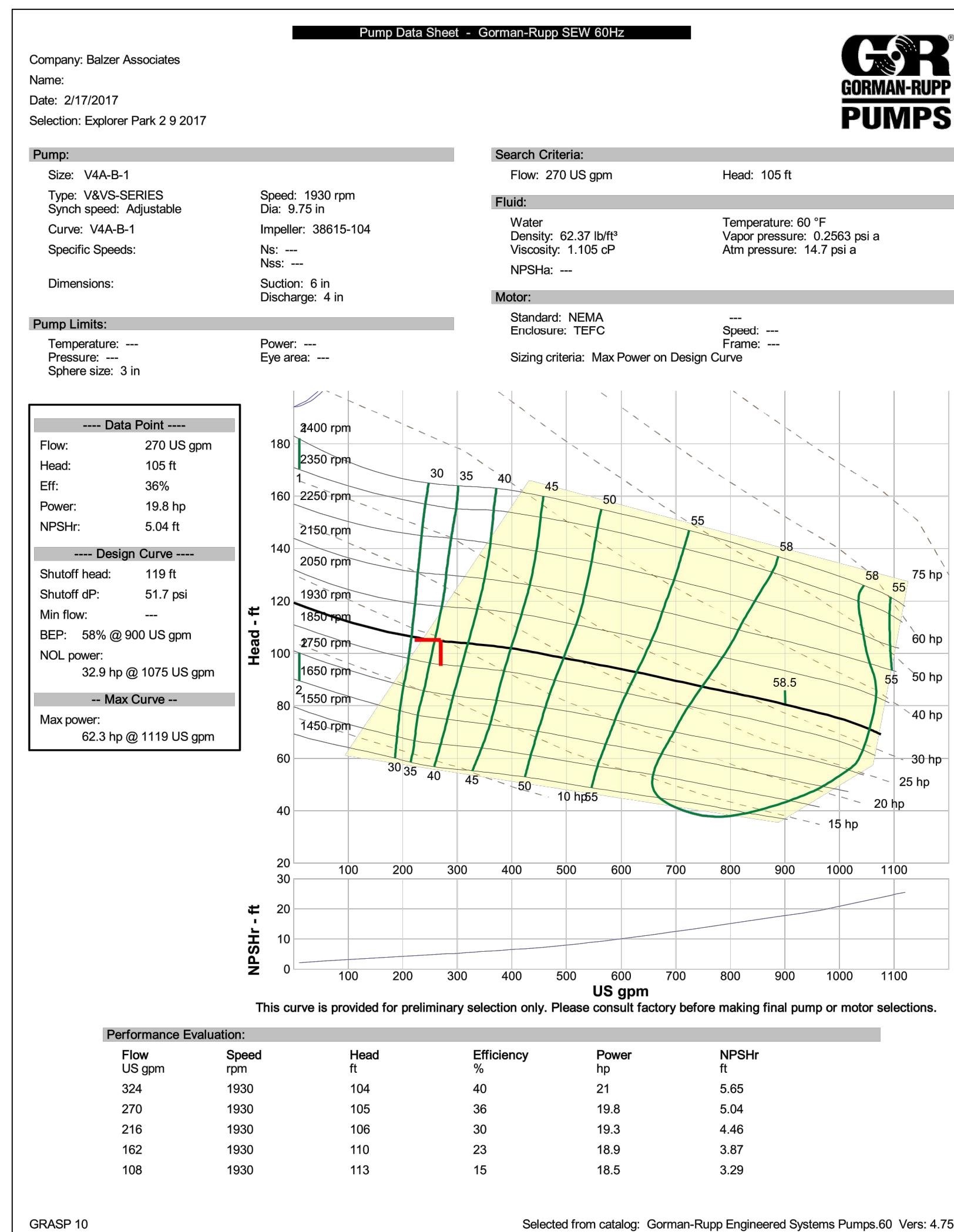






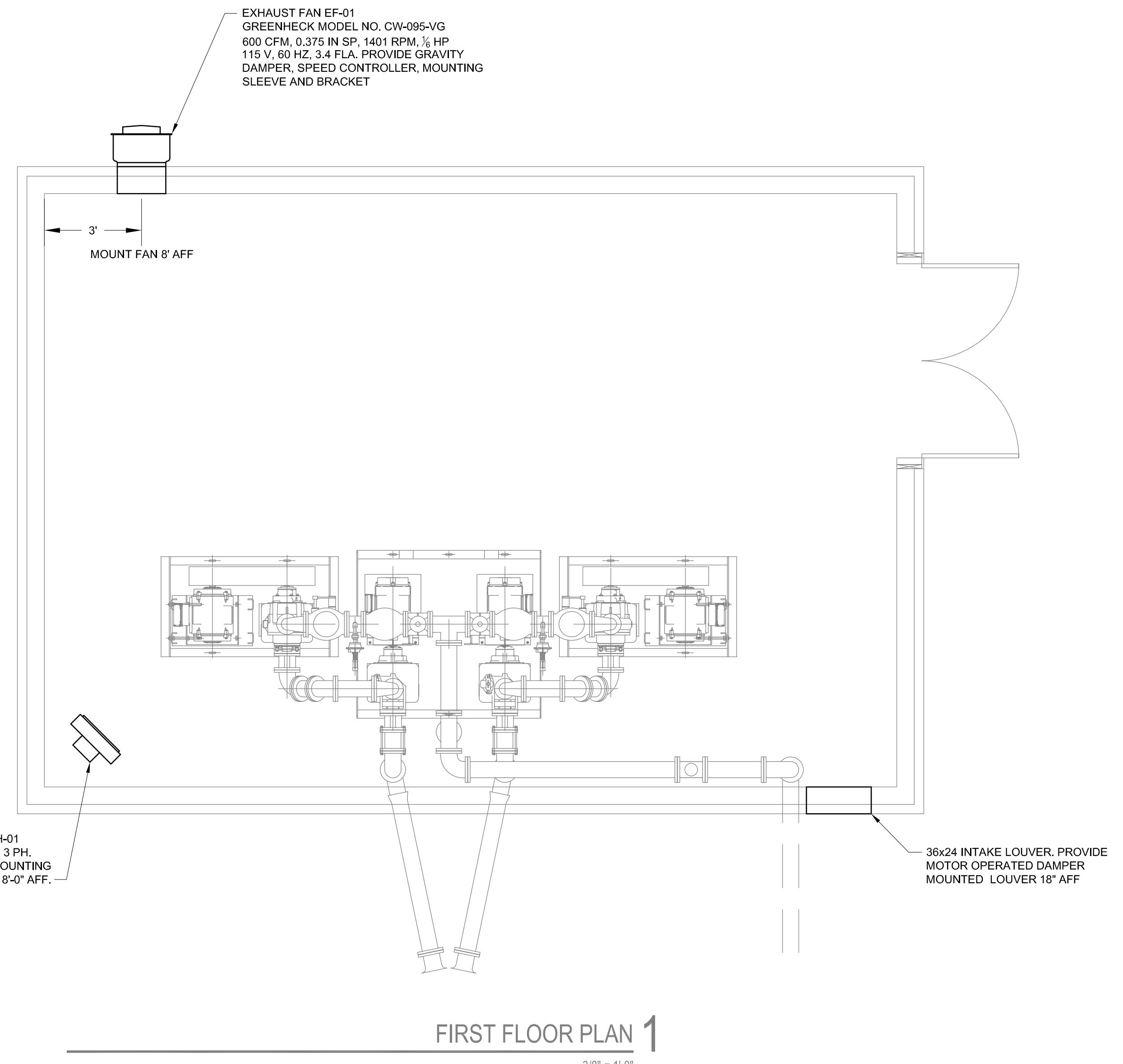
DAILY FLOW CALCULATIONS					
PROPOSED USE	AREA/ UNITS	FLOW BASIS	AVERAGE FLOW (GPD)	AVERAGE FLOW (GPM)	PEAK (AVG*4)
		GPD/AC	32500	22.6	
		<b>TOTAL</b>		<b>22.6</b>	<b>90.3</b>
					<b>9.0</b>

EXPLORE PARK PUMP STATION - PHASE I	
GROUND ELEV. AT PUMP STATION=	980 FT
WET WELL INVERT=	965 FT
INVERT @ TIE IN MH=	1087 FT
DISTANCE FROM PUMP TO MANIFOLD=	8100 FT
HIGH POINT IN FORCEMAIN=	1159 FT
GRAVITY INVERT	973 FT
STATIC HEAD=	194 FT
PEAK FLOW=	90.3 GPM
FM DIA (PUMP TO MANIFOLD)=	5.348 IN (HDPE)
FRICITION LOSS=	16.27 FT
$\theta$ =	130.00
TOTAL DYNAMIC HEAD=	210.27 FT
WET WELL INFORMATION	
DIAMETER	8 FEET
DEPTH	8 FEET
GALLON/FT VOLUME	376.0 GAL
VELOCITY	
	3.57 FT/SEC
PUMP RATE	
CYCLE TIME	250 GAL/MIN
	21.1 MIN
CONTROL LEVELS	
ALARM LEVEL	972.50 FT
TWO PUMPS ON	972.00 FT
ONE PUMP ON	971.50 FT
OFF-LEVEL	968 FT





## MECHANICAL PLAN



DRAWN BY \_\_\_\_\_ LSE  
DESIGNED BY \_\_\_\_\_ LSE  
CHECKED BY \_\_\_\_\_  
DATE 2017.07.10  
SCALE \_\_\_\_\_  
REVISIONS:

SHEET NO.

**M1.1**  
JOB NO. 17055







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<b>1.02 ADMINISTRATIVE REQUIREMENTS</b>	<b>2.05 FLEXIBLE METAL CONDUIT (FMC)</b>																				
A. Coordination:	A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.																				
1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.	1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.																				
2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.	2. Make penetrations perpendicular to surfaces unless otherwise indicated.																				
3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.	3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.																				
4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.	4. Conceal bends for conduit risers emerging above ground.																				
5. Notify Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.	5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.																				
B. Sequencing:	6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.																				
1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.	7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.																				
<b>1.03 SUBMITTALS</b>	8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.																				
A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.	9. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.																				
B. Shop Drawings:	10. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.																				
1. Include proposed locations of roof penetrations and proposed methods for sealing.	11. Boxes for Supporting Luminaires and Ceiling Fans: Listed suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.																				
C. Project Record Documents: Record actual routing for conduits installed underground and conduits 2 inch (53 mm) trade size and larger.	12. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes.																				
<b>1.04 QUALITY ASSURANCE</b>	13. Minimum Box Size, Unless Otherwise Indicated:																				
A. Conform to requirements of NFPA 70.	a. Wiring Devices: 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.																				
B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.	14. Wall Plates: Comply with Section 26 2726.																				
<b>1.05 DELIVERY, STORAGE, AND HANDLING</b>	<b>C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:</b>																				
A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.	1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.																				
<b>2.01 PRODUCTS</b>	2. NEMA 250 Environment Type, Unless Otherwise Indicated:																				
A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.	a. Indoor Clean, Dry Locations: Type 1, painted steel.																				
B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.	b. Outdoor Locations, Damp or Wet Locations and All Process Areas: Type 4X, stainless steel or fiberglass.																				
C. Underground:	3. Junction and Pull Boxes Larger Than 100 cubic inches:																				
1. Under Slab on Grade: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or rigid PVC conduit.	a. Provide hinged-cover enclosures unless otherwise indicated.																				
2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit.	b. Boxes 6 square feet and Larger: Provide sectionalized screw-cover or hinged-cover enclosures.																				
3. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.	c. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:																				
D. Embedded Within Concrete:	1. Where conduits cross structural joints intended for expansion, contraction, or deflection:																				
1. Within Slab on Grade: Not permitted.	2. Where conduits are subject to movement by settlement or frost.																				
2. Within Slab Above Ground: Not permitted.	N. Underground Boxes/Enclosures:																				
3. Within Concrete Walls Above Ground: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).	1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.																				
4. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).	2. Make penetrations perpendicular to surfaces unless otherwise indicated.																				
5. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).	3. Provide sleeves for penetrations as indicated or required to facilitate installation prior to starting work.																				
6. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).	<b>2.02 SUBMITTALS</b>																				
7. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).	A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.																				
8. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).	B. Shop Drawings: Provide schedule of items to be identified indicating proposed designations, materials, legends, and formats.																				
9. Locations subject to physical damage include, but are not limited to:	C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by producer testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.																				
a. Where exposed below 8 feet.	<b>2.03 FIELD QUALITY CONTROL</b>																				
K. Exposed, Exterior: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).	A. Description: Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.																				
L. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit.	B. Correct deficiencies and replace damaged or defective conduits.																				
M. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.	<b>3.01 EXAMINATION</b>																				
1. Maximum Length: 6 feet.	A. Verify that field measurements are as shown on drawings.																				
N. Connections to Vibrating Equipment:	B. Verify that mounting surfaces are ready to receive conduits.																				
1. Dry Locations: Use flexible metal conduit or liquidtight flexible metal conduit.	C. Verify that conditions are satisfactory for installation prior to starting work.																				
2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.	<b>3.02 FIELD QUALITY CONTROL</b>																				
3. Maximum Length: 3 feet unless otherwise indicated.	A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.																				
4. Vibrating equipment includes, but is not limited to:	B. Correct deficiencies and replace damaged or defective conduits.																				
a. Transformers.	<b>3.03 CLEANING</b>																				
b. Motors.	A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.																				
O. Connections to Process Instrumentation or Control Equipment:	<b>3.04 PROTECTION</b>																				
1. Dry Locations: Use liquidtight flexible metal conduit.	A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.																				
2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.	<b>3.05 PROTECTION</b>																				
3. Minimum Length: 18 inches unless otherwise indicated.	A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign																				



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PART 3 EXECUTION		SECTION 26 2726 WIRING DEVICES																		
3.01 EXAMINATION		F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.																		
A. Verify that field measurements are as shown on the drawings.		G. Do not use any receptacles as through feed devices. Branch circuit hot, neutral and ground shall be T-taped so that removal of the device will not interrupt service to devices downstream of it.																		
B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.		H. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box by bonding jumper.																		
C. Verify that mounting surfaces are ready to receive panelboards.		I. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.																		
D. Verify that conditions are satisfactory for installation prior to starting work.		J. Install wiring devices plumb and level with mounting hole held rigidly in place.																		
3.02 INSTALLATION		K. Install vertically mounted receptacles with grounding pole on bottom and horizontally mounted receptacles with grounding pole on right.																		
A. Perform work in accordance with NECA 1 (general workmanship).		L. Install wall plates with off position down.																		
B. Install products in accordance with manufacturer's instructions.		M. Install wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.																		
C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.		N. Verify that mounting surfaces are ready to receive enclosed safety switches.																		
D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.		O. Verify that conditions are satisfactory for installation prior to starting work.																		
E. Provide required supports in accordance with Section 26 0529.		3.03 FIELD QUALITY CONTROL																		
F. Install panelboards plumb.		A. Provide minimum two year manufacturer warranty covering repair or replacement due to defective materials or workmanship.																		
G. Install flush-mounted panelboards so that fits trim completely flush to wall with no gaps and rough opening completely covered.		B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.																		
H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.		C. Verify that mounting surfaces are ready to receive enclosed safety switches.																		
I. Mount floor-mounted power distribution panelboards on properly sized 3 inch high concrete pad constructed in accordance with Section 03 3000.		D. Verify that conditions are satisfactory for installation prior to starting work.																		
J. Mount floor-mounted power distribution panelboards on properly sized 3 inch high concrete pad constructed in accordance with Section 03300.		3.04 FIELD QUALITY ASSURANCE																		
K. Provide minimum of six space 1 inch trade size conductors of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor.		A. Conform to requirements of NFPA 70.																		
L. Provide grounding and bonding in accordance with Section 26 0526.		B. Products: Listed, classified, and labeled as suitable for the purpose intended.																		
M. Install all field-installed branch devices, components, and accessories.		C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.																		
N. Set field-adjustable circuit breaker tripping function settings as determined by overcurrent protective device coordination study performed according to Section 26 0573.		3.05 FIELD DEVICE APPLICATIONS																		
O. Set field-adjustable ground fault protection pickup and time delay settings as directed.		A. Provide wiring devices suitable for intended use and with ratings adequate for load served.																		
P. Provide filler plates to cover unused spaces in panelboards.		B. For single receptacles installed on an individual branch circuit, provide receptacle with amper rating not less than that of the branch circuit.																		
3.03 FIELD QUALITY CONTROL		C. Provide weather and corrosion resistant GFI receptacles with specified weatherproof covers for all receptacles installed outdoors or in damp or wet locations.																		
A. See Section 01 4000 - Quality Requirements, for additional requirements.		D. Unless noted otherwise, do not use combination switch/receptacle devices.																		
B. Inspect and test in accordance with NETA ATS, except Section 4.		3.06 ADJUSTING																		
C. Correct deficiencies and replace damaged or defective panelboards or associated components.		A. Adjust devices and wall plates to be flush and level.																		
3.04 ADJUSTING		3.06 CLEANING																		
A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.		A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.																		
B. Adjust alignment of panelboard fronts.		END OF SECTION 26 2726																		
C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directores accordingly. Maintain proper phasing for multi-wire branch circuits.		SECTION 26 2818 ENCLOSED SWITCHES																		
3.05 CLEANING		PART 1 GENERAL																		
A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.		1.01 ADMINISTRATIVE REQUIREMENTS																		
B. Repair scratched or marred exterior surfaces to match original factory finish.		A. Coordination:																		
END OF SECTION 26 2416		1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.																		
SECTION 26 2717 EQUIPMENT WIRING		2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.																		
PART 1 GENERAL		3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.																		
1.01 SECTION INCLUDES		4. Notify Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.																		
A. Electrical connections to equipment.		1.02 SUBMITTALS																		
1.02 RELATED REQUIREMENTS		A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.																		
1.03 REFERENCE STANDARDS		B. Shop Drawings: Indicate outline and support point dimensions, voltage and current ratings, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.																		
A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.		1. Include dimensioned plan and elevation views of enclosed switches and adjacent equipment with all required clearances indicated.																		
1.04 ADMINISTRATIVE REQUIREMENTS		2. Field Quality Control Test Reports.																		
A. Coordination:		3. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Indicate instructions for storage, handling, protection, examination, preparation, installation, and starting of product.																		
1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.		4. Project Record Documents: Record actual locations of enclosed switches.																		
2. Determine connection locations and requirements.		1.03 QUALITY ASSURANCE																		
B. Sequencing:		A. Conform to requirements of NFPA 70.																		
1. Install rough-in of electrical connections before installation of equipment is required.		B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.																		
2. Make electrical connections before required start-up of equipment.		1.04 DELIVERY, STORAGE, AND HANDLING																		
1.05 SUBMITTALS		A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product, including ratings, configurations, dimensions, finishes, weights, service condition requirements, and installed features. Include alternator starting capabilities, engine fuel consumption rates, and cooling, combustion air, and exhaust requirements.																		
A. Product Data: Provide wiring device manufacturer's catalog information showing dimensions, configurations, and construction.		1. Comply with federal (EPA), state, and local regulations applicable at the time of commissioning; include factory emissions certification with submittals.																		
B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Indicate instructions for storage, handling, protection, examination, preparation, and installation of product.		2. Do not make modifications affecting generator set factory emissions certification without approval of manufacturer and Engineer. Where such modifications are made, provide field emissions testing as necessary for certification.																		
1.06 QUALITY ASSURANCE		1. Sound Level Requirements:																		
A. Conform to requirements of NFPA 70.		1. Do not exceed 78 dBA when measured at 23 feet from generator set in free field (no sound barriers) while operating at full load; include manufacturer's sound data with submittals.																		
B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.		2. ENGINE AND ENGINE ACCESSORY EQUIPMENT																		
PART 2 PRODUCTS		A. Engine with adequate horsepower to achieve specified power output at rated speed, accounting for alternator efficiency and parasitic loads.																		
3.01 EXECUTION		B. Engine Fuel System - Diesel (Compression Ignition):																		
3.02 EXAMINATION		1. Fuel Source: Diesel, ASTM D975 No. 2-D or approved cold weather diesel blends.																		
A. Verify that field measurements are as shown on the drawings.		2. Fuel Storage: Sub-base fuel tank.																		
B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.		3. Engine Fuel Supply: Provide engine-driven, positive displacement fuel pump with replaceable fuel filter(s), water separator, check valve to secure prime, manual fuel priming pump, and relief/by-pass valve. Provide fuel cooler where recommended by manufacturer.																		
C. Verify that heat producing equipment using wire and cable with insulation suitable for temperatures encountered.		4. Engine Fuel Connections: Provide suitable, approved flexible fuel lines for coupling engine to fuel source.																		
D. Provide receptacle outlet to accommodate connection with attachment plug.		5. Sub-Base Fuel Tank:																		
E. Provide cord and cap where field-supplied attachment plug is required.		a. Provide sub-base mounted, double-wall fuel tank with secondary containment; listed and labeled as complying with UL 142.																		
F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.		b. Tank Capacity: Size for minimum of 48 hours of continuous engine generator operation at 100 percent rated load, but not larger than permissible by applicable codes.																		
G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.		c. Features:																		
H. Install terminal block jumpers to complete equipment wiring requirements.		1) Direct reading fuel level gage. 2) Normal atmospheric vent. 3) Emergency pressure relief vent. 4) Fuel fill opening with lockable cap. 5) Dedicated electrical conduit stub-up area. 6) Low fuel level switch. 7) Leak detection switch; located within secondary containment interstitial space for detection of primary tank fuel leak.																		
I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.		C. Engine Starting System:																		
END OF SECTION 26 2717		1. System Type: Electric, with DC solenoid-activated starting motor(s).																		
SECTION 26 2726 WIRING DEVICES		2. Battery(s):																		
PART 1 GENERAL		a. Battery Type: Lead-acid.																		
1.01 ADMINISTRATIVE REQUIREMENTS		b. Battery Capacity: Size according to manufacturer's recommendations for starting, starting and load acceptance requirements under worst case ambient temperature; capable of providing cranking through two complete periods of cranking limiter time-outs without recharging.																		
A. Coordination:		c. Provide battery rack, cables, and connectors suitable for the supplied battery(s); size battery cables according to manufacturer's recommendations for cable length to be installed.																		
1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.		3. Battery-Charging Alternator: Engine-driven, with integral solid-state voltage regulation.																		
2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.		4. Battery Charger:																		
3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.		a. Provide dual rate battery charger with automatic float and equalize charging modes and minimum ratings of 10 amps, suitable for maintaining the supplied battery(s) at full charge without manual intervention.																		
4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.		b. Capable of returning supplied battery(s) from fully discharged to fully charged condition within 24 hours, as required by NFPA 110 for Level 1 applications while carrying normal loads.																		
5. Notify Engineer of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.		c. Recognized as complying with UL 1236.																		
B. Sequencing:		d. Furnished with integral overcurrent protection; current limited to protect charger during engine cranking; reverse polarity protection.																		
1. Do not install wiring devices until final surface finishes and painting are complete.		e. Provide integral DC output ammeter and voltmeter with five percent accuracy.																		
1.02 SUBMITTALS		f. Provide alarm output contacts as necessary for alarm indications.																		
A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.		4. Battery Charger:																		
B. Project Record Documents: Record actual installed locations of wiring devices.		a. Provide dual rate battery charger with automatic float and equalize charging modes and minimum ratings of 10 amps, suitable for maintaining the supplied battery(s) at full charge without manual intervention.																		
1.03 QUALITY ASSURANCE		b. Capable of returning supplied battery(s) from fully discharged to fully charged condition within 24 hours, as required by NFPA 110 for Level 1 applications while carrying normal loads.																		
A. Conform to requirements of NFPA 70.		c. Recognized as complying with UL 1236.																		
B. Products: Listed, classified, and labeled as suitable for the purpose intended.		d. Furnished with integral overcurrent protection; current limited to protect charger during engine cranking; reverse polarity protection.																		
C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.		e. Provide integral DC output ammeter and voltmeter with five percent accuracy.																		
3.04 FIELD QUALITY CONTROL		f. Provide alarm output contacts as necessary for alarm indications.																		
A. See Section 01 4000 - Quality Requirements, for additional requirements.		4. Engine Speed Control System (Governor):																		
B. Inspect and test in accordance with NETA ATS, except Section 4.		1. Single Engine Generator Sets (Not Operated in Parallel): Provide electronic isochronous governor for controlling engine speed/alternator frequency.																		
C. Correct deficiencies and replace damaged or defective panelboards or associated components.		2. Frequency Regulation, Electronic Isochronous Governors: No change in frequency from no load to full load; plus/minus 0.25 percent at steady state.																		
3.05 FIELD DEVICE APPLICATIONS		E. Engine Lubrication System:																		
A. Provide wiring devices suitable for intended use and with ratings adequate for load served.		1. System Type: Full pressure, with engine-driven, positive displacement lubrication oil pump, replaceable full-flow oil filter(s), and dip-stick for oil level indication. Provide oil cooler where recommended by manufacturer.																		
B. For single receptacles installed on an individual branch circuit, provide receptacle with amper rating not less than that of the branch circuit.		F. Engine Cooling System:																		
C. Provide weather and corrosion resistant GFI receptacles with specified weatherproof covers for all receptacles installed outdoors or in damp or wet locations.		1. System Type: Closed-loop, liquid-cooled, with unit-mounted radiator/fan and engine-driven coolant pump; suitable for providing adequate cooling while operating at full load under worst case ambient temperature.																		
D. Unless noted otherwise, do not use combination switch/receptacle devices.		2. Fan Guard: Provide suitable guard to protect personnel from accidental contact with fan.																		
3.06 ADJUSTING		3. Coolant Heater: Provide thermostatically controlled coolant heater to improve starting under cold ambient conditions; size according to manufacturer's recommendations for achieving starting and load acceptance requirements under worst case ambient temperature.																		
A. Adjust devices and wall plates to be flush and level.		G. Engine Air Intake and Exhaust System:																		
3.06 CLEANING		1. Air Intake Filtration: Provide engine-mounted, replaceable, dry element filter.																		
A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.		2. Engine Exhaust Connection: Provide suitable, approved flexible connector for coupling engine to exhaust system.																		
END OF SECTION 26 2726		3. Exhaust Silencer: Provide critical grade or better exhaust silencer with sound attenuation not less than basis of design; select according to manufacturer's recommendations to meet sound performance requirements, where specified.																		
SECTION 26 2818 ENCLOSED SWITCHES		4. ALTERNATOR (GENERATOR)																		
PART 1 GENERAL		A. Alternator: 4-pole, 1800 rpm (60 Hz output) revolving field, synchronous generator complying with NEMA MG 1; connected to engine with flexible coupling; voltage output configuration as indicated, with reconnectable leads for 3 phase alternators.																		
1.01 ADMINISTRATIVE REQUIREMENTS		B. Exciter:																		
A. Coordination:		1. Exciter Type: Brushless; provide permanent magnet generator (PMG) excitation system; self-excited (shunt) systems are not permitted.																		
1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.		2. PMG Excitation Short-Circuit Current Support: Capable of sustaining 300 percent of rated output current for 10 seconds.																		
2. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.		3. Voltage Regulation (with PMG excitation): Plus/minus 0.5 percent for any constant load from no load to full load.																		
3. Repair scratched or marred exterior surfaces to match original factory finish.		C. Temperature Rise: Comply with UL 2200.																		
END OF SECTION 26 2818		D. Insulation System: NEMA MG 1, Class II; suitable for alternator temperature rise.																		
SECTION 26 3213 ENGINE GENERATORS		E. Enclosure: NEMA MG 1, drip-proof.																		
PART 1 GENERAL		F. Total Harmonic Distortion: Not greater than five percent.																		
1.01 ADMINISTRATIVE REQUIREMENTS		A. Generator Set General Requirements:																		
A. Coordination:		1. Prototype tested in accordance with NFPA 110 for Level 1 systems.																		
1. Coordinate compatibility of generator sets to be installed with work provided under other sections or by others.		2. Factory-assembled, with components mounted on suitable base.																		
2. Transfer Switches: See Section 26 3600.		3. List and label engine generator assembly as complying with UL 2200.																		
3. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment or other potential obstructions within the spaces dedicated for engine generator system.		4. Power Factor: Unless otherwise indicated, specified power ratings are at 0.8 power factor for three phase voltages and 1.0 power factor for single phase voltages.																		
4. Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.		5. Provide suitable guards to protect personnel from accidental contact with rotating parts, hot piping, and other potential sources of injury.																		
5. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.		6. Main Line Circuit Breakers: Provide factory-installed line side connections with suitable tags for load side connections.																		
6. Notify Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.		F. Service Conditions: Provide engine generator system and associated components suitable for operation under the service conditions at the installed location.																		
1.02 SUBMITTALS		G. Starting and Load Acceptance Requirements:																		
A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.		1. Cranking Method: Cycle cranking complying with NFPA 110 (15 second crank period, followed by 15 second rest period, with cranking limiter time-out after 3 cycles), unless otherwise required.																		
B. Shop Drawings: Indicate dimensioned plan views and sections indicating locations of system components, required clearances, and field connection locations. Include system interconnection schematic diagrams showing all factory and field connections.		2. Cranking Limiter Time-Out: If generator set fails to start after specified cranking period, indicate overcrank alarm condition and lock-out generator set from further cranking until manually reset.																		
C. Fuel Storage Tank Calculations: Indicate maximum running time for generator set configuration provided.		3. Start Time: Capable of starting and achieving conditions necessary for load acceptance within 10 seconds (NFPA 110, Type 10).																		
D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use																				

