

Heritage Shores Circle Pump Station

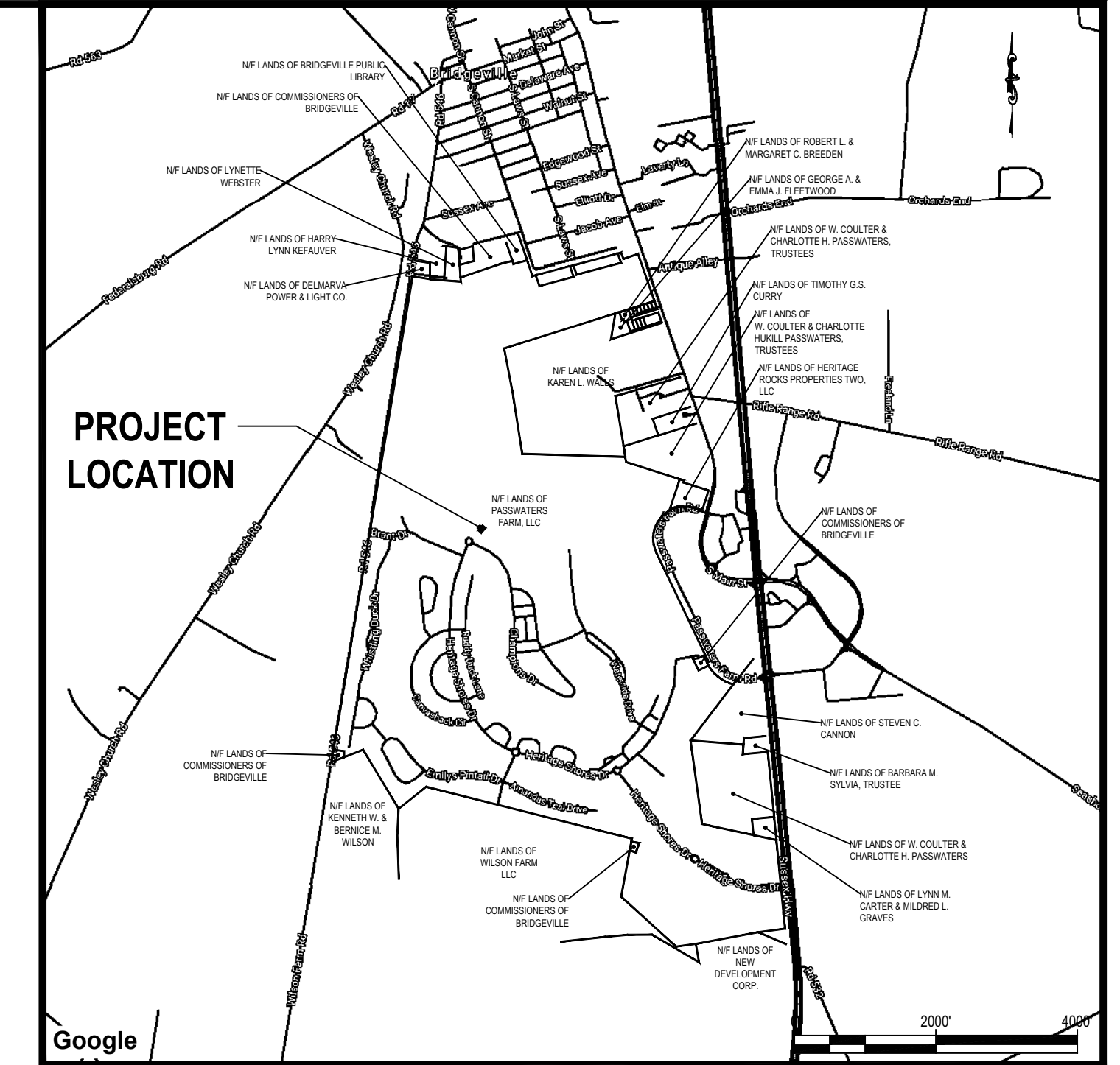
Site Information

Owner & Applicant: Passwaters Farm, LLC
 3201 Jermantown Rd, Ste. 150
 Fairfax, VA 22030
 phone: (703) 270 - 1400

Tax Map/Parcel: 131-14.00-44.00

Engineer:

RAUCH inc.
 106 N. Harrison St.
 Easton, MD 21601
 phone: (410) 770 - 9081 | fax: (410) 770 - 3667
 email: design@raucheng.com | website: www.raucheng.com



LOCATION MAP

VICINITY MAP

GENERAL NOTES

- THE EXISTING UTILITIES SHOWN WERE TAKEN FROM THE BEST AVAILABLE RECORDS. THE CONTRACTOR SHALL VERIFY THEIR EXACT LOCATION PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE INCURRED TO SUCH UTILITIES SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
- THE CONTRACTOR SHALL NOTIFY THE FOLLOWING TWO (2) WEEKS PRIOR TO THE START OF CONSTRUCTION AND SHALL COORDINATE CONSTRUCTION WITH THE UTILITY COMPANIES INVOLVED:
 - MISS UTILITY 410-712-0056
 - RAUCH inc. 410-770-9081
 - SUSSEX CONSERVATION DISTRICT 302-856-3990
 - TOWN OF BRIDGEVILLE 302-337-7135
 - SUSSEX COUNTY ENGINEERING 302-855-7370
- THE CONTRACTOR SHALL PROVIDE ALL EQUIPMENT, LABOR, AND MATERIALS FOR ANY MISCELLANEOUS OR TEST PIT EXCAVATIONS REQUIRED BY THE ENGINEER.
- ALL CONSTRUCTION SHALL BE MARKED FOR TRAFFIC AND PEDESTRIAN SAFETY.
- THE CONTRACTOR ASSUMES ALL RESPONSIBILITIES FOR ANY DEVIATIONS FROM THESE PLANS, UNLESS SAID DEVIATION IS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL RECEIVE WRITTEN PERMISSION FROM THE ENGINEER IF A DEVIATION OF THE PLAN IS NECESSARY.
- ALL DISTURBED AREAS SHALL BE SMOOTHLY GRADED TO PROVIDE POSITIVE DRAINAGE IN THE DIRECTION OF FLOW ARROWS SHOWN HEREIN AND STABILIZED WITH TOPSOIL, SEED, AND MULCH. IF SETTLEMENT OCCURS, TOPSOIL, SEEDING AND MULCHING SHALL BE REPEATED UNTIL SETTLEMENT SUBSIDES (SEE EROSION AND SEDIMENT CONTROL SPECIFICATIONS).
- ANY EXCESS EXCAVATED MATERIAL PLACED OUTSIDE OF THOSE AREAS DESIGNATED ON THIS PLAN SHALL MEET APPROVAL OF SUSSEX CONSERVATION DISTRICT AND ENGINEER.
- ANY EXISTING SURVEY MONUMENTATION THAT IS DISTURBED DURING CONSTRUCTION SHALL BE REPLACED BY A REGISTERED SURVEYOR AT THE CONTRACTOR'S EXPENSE.
- ALL FILL AREAS WITHIN LIMITS OF ROADWAY CONSTRUCTION AND OTHER AREAS AS DESIGNATED ON THESE PLANS SHALL BE COMPACTED TO 95% MODIFIED PROCTOR DENSITY AND LAID AND COMPACTED IN 6" LIFTS
- TRENCHES SHALL NOT REMAIN OPEN OVERNIGHT, IF IT IS NECESSARY FOR TRENCHES TO REMAIN OPEN, STEEL PLATES, CAPABLE OF BEARING TRAFFIC, SHALL BE USED TO COMPLETELY COVER THE TRENCH.
- ALL FIRE LANES, FIRE HYDRANTS, AND FIRE DEPARTMENT CONNECTIONS SHALL BE MARKED IN ACCORDANCE WITH THE DELAWARE STATE FIRE PREVENTION REGULATIONS.
- WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER. AT CROSSINGS ON FULL LENGTH OF WATER PIPE SHALL BE LOCATED SO BOTH JOINTS WILL BE AS FAR FROM THE SEWER AS POSSIBLE. SPECIAL STRUCTURAL SUPPORT FOR THE WATER AND SEWER PIPES MAY BE REQUIRED
- THERE SHALL BE AT LEAST A 10 FOOT HORIZONTAL SEPARATION BETWEEN WATER MAINS AND SANITARY SEWER FORCE MAINS. THERE WILL BE AN 18 INCH VERTICAL SEPARATION AT CROSSINGS
- MINIMUM DEPTH OF WATER MAIN SHALL BE 3.5 FEET AS MEASURED FROM TOP OF PIPE TO FINISHED GRADE. ANY PIPE NOT MEETING THESE REQUIREMENTS SHALL BE ENCASED IN CONCRETE
- A MINIMUM OF 3 FEET COVER IS REQUIRED FOR ALL SEWER MAINS.
- CONTRACTOR SHALL MANDREL TEST ALL SEWERS.
- MANHOLE INSERTS SHALL BE INSTALLED ON ALL SEWER MANHOLES IN SUMP

LEGEND

24.81	SPOT ELEVATION
--- 25 ---	EXISTING CONTOUR
--- 25 ---	PROPOSED CONTOUR
---	PROPERTY LINE
---	EASEMENTS
---	LIMITS OF DISTURBANCE
☆	LIGHT POLE
—○—	SANITARY SEWER SERVICE LATERAL & CLEANOUT
—○—	WATER SERVICE LATERAL & METER VAULT
—○—	WATER VALVE & FIRE HYDRANT
—○—	STORM DRAIN PIPE & MANHOLE
—○—	STORM DRAIN PIPE & INLET
—○—	SANITARY SEWER MAIN & MANHOLE
—	WATER MAIN

SHEET INDEX

CIVIL ENGINEERING DRAWINGS

PS1-101	TITLE SHEET
PS1-201	DRAINAGE AREA & SITE PLAN
PS1-301	SITE PLAN & PROFILE
PS1-402	PUMP STATION, WETWELL AND SLAB
PS1-403	PUMP CALCULATIONS, CURVES AND HATCHES
PS1-404	CONSTRUCTION DETAILS
PS1-501	ELECTRICAL SITE PLAN
PS1-601	ELECTRICAL SINGLE LINE & CABINET
PS1-701	VENTILATION, DETAILS & SCHEDULES
PS1-801 → PS1-804	SEDIMENT & EROSION CONTROL

ABBREVIATION LIST

FP	FLOODPLAIN	PVC	POLYVINYL CHLORIDE PIPE
DIP	DUCTILE IRON PIPE	R	REDUCER
FM	FORCE MAIN	SD	STORM DRAIN
HB	HORIZONTAL BEND	SS	SEWER
HDPE	HIGH DENSITY POLYETHYLENE PIPE	V	VALVE
MH	MANHOLE	VB	VERTICAL BEND
PC	POINT OF CURVATURE	VAC	VACUUM SEWER
PT	POINT OF TANGENCY	W	WATER

Date of Current Survey: January 2021

Sussex County Official

Approved By: _____ Date: _____

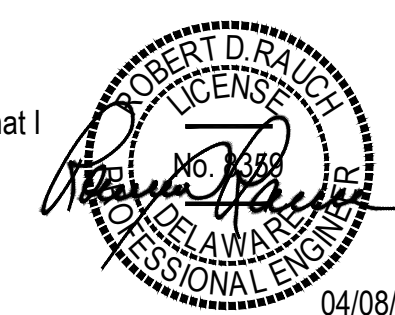
Agreement # _____



Main Office: 106 N Harrison St - Easton, MD 21601
 Web: www.rauch-inc.com | Email: design@raucheng.com
 Phone: 410.770.9081 | Fax: 410.770.3667

Professional Certification

I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Delaware.
 License No. 8359
 Expiration Date: June 30, 2022



Revisions

INITIAL SUBMISSION - 01/21/22	
FIRST REVISION - 04/08/22	

OWNER'S/DEVELOPER'S CERTIFICATION

I/We hereby certify that all construction including and not limited drainage, grading, stormwater management, roads, and water & sewer will be done pursuant to this plan, all local, state and federal codes and requirements, Town of Bridgeville Construction Standards and Specifications for Water, Sewer & Streets, and any other requirements imposed by the Town of Bridgeville. I/We hereby authorize a right-of-entry to any Town of Bridgeville, local, state of federal personnel for the purpose of inspection evaluation, or observation of any construction activity related to the project.

Signed _____ Date 04/08/22
 Title VP OF LAND DEVELOPMENT

ENGINEER'S CERTIFICATION STATEMENT

I hereby certify that I am a registered Professional Engineer in the State of Delaware. This plan has been prepared to meet or exceed the requirements set forth by the Town of Bridgeville Construction Standards and Specifications for Water, Sewer & Streets, and other State Design documents.

Signed _____ Date 04/08/22
 Delaware Registered Professional Engineer
 License Number 8359

SITE CHARACTERISTICS

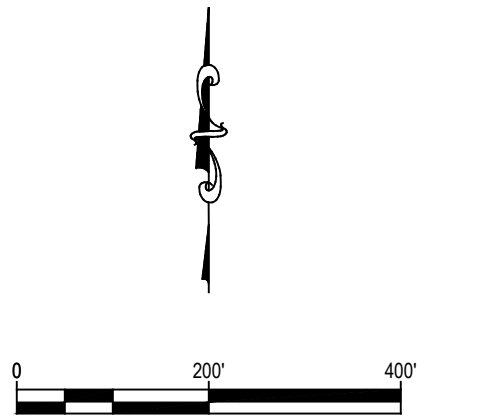
Total Site Area:	736.30	AC
Disturbed Area:	0.34	AC
Fill Quantity:	668	CY
Cut Quantity:	75	CY
Net Fill:	593	CY

HORIZ. CONTROL: Delaware State Grid NAD-83
 VERT. CONTROL: NAVD 1988

STREET LOCATION: INTERSECTION OF US ROUTE 13 & HERITAGE SHORES DRIVE

Heritage Shores Circle Pump Station

Bridgeville, Delaware	04/08/22
First Election District - Sussex County	Scale: As Shown
Title Sheet	PS1-101



FUTURE DEVELOPMENT

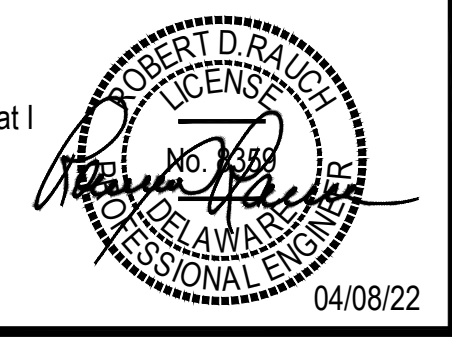
FUTURE DEVELOPMENT

FUTURE DEVELOPMENT

TIER II Pump Station
 CUMULATIVE
 DRAINAGE AREA
 176 LOTS - 44,000GPD

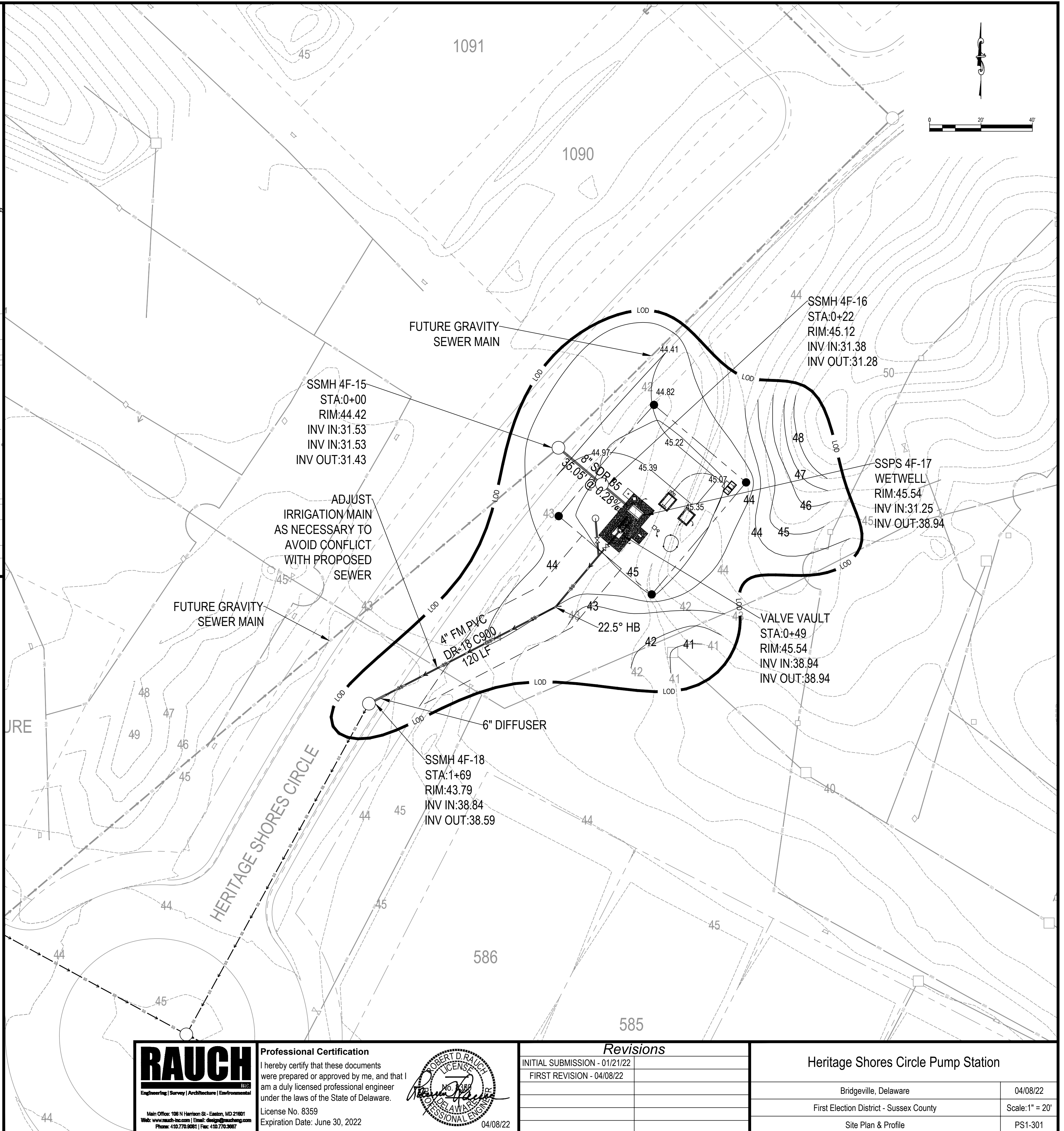
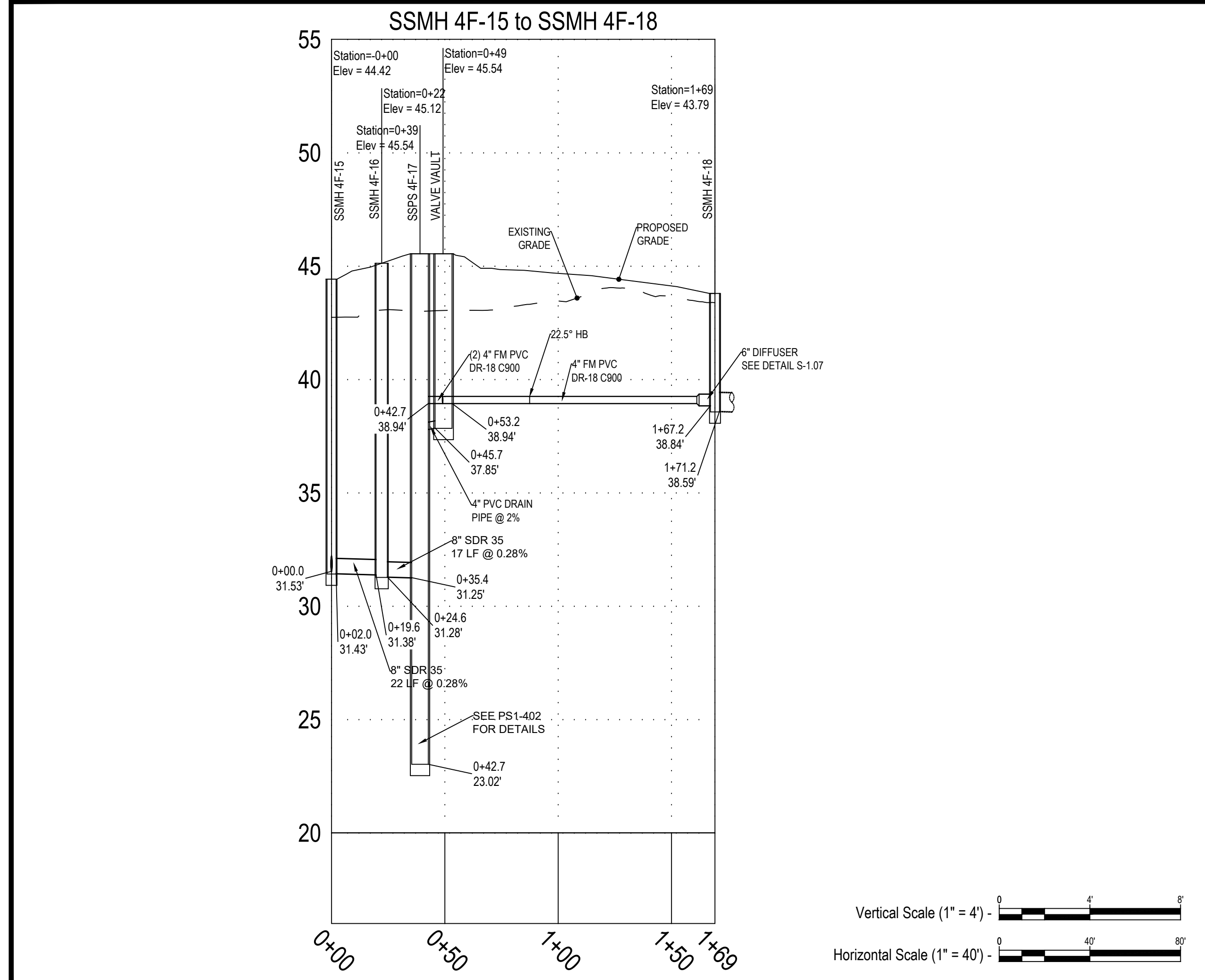
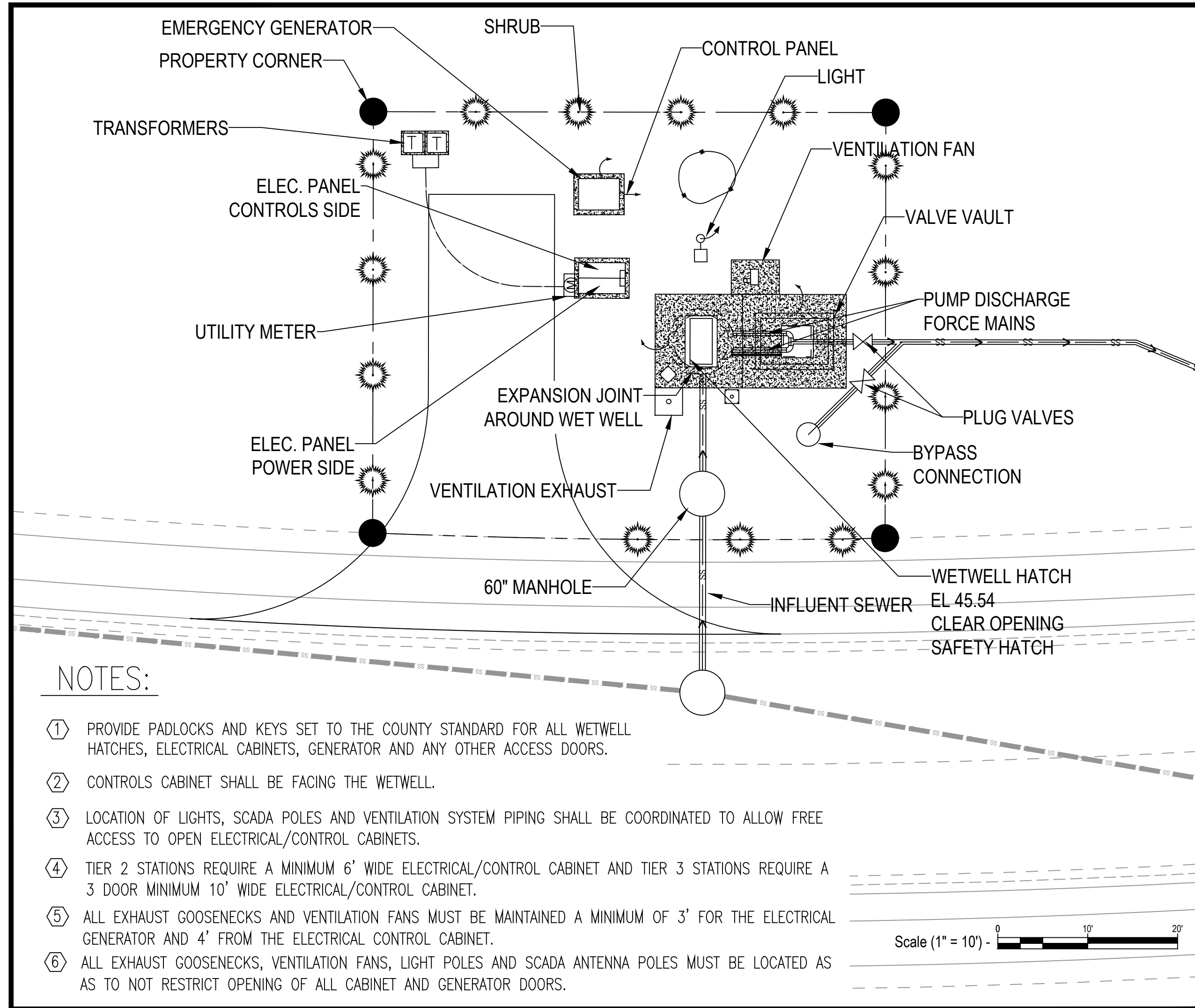
RAUCH
 Engineering | Survey | Architecture | Environmental
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 Web: www.rauch-hcc.com | Email: design@rauchhcc.com
 Phone: +1.410.770.9091 | Fax: +1.410.770.9097

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Revisions	
INITIAL SUBMISSION - 01/21/22	
FIRST REVISION - 04/08/22	

Heritage Shores Circle Pump Station	
Bridgeville, Delaware	04/08/22
First Election District - Sussex County	Scale: 1" = 200'
Drainage Area Plan	PS1-201



RAUCH
Engineering | Survey | Architecture | Environmental

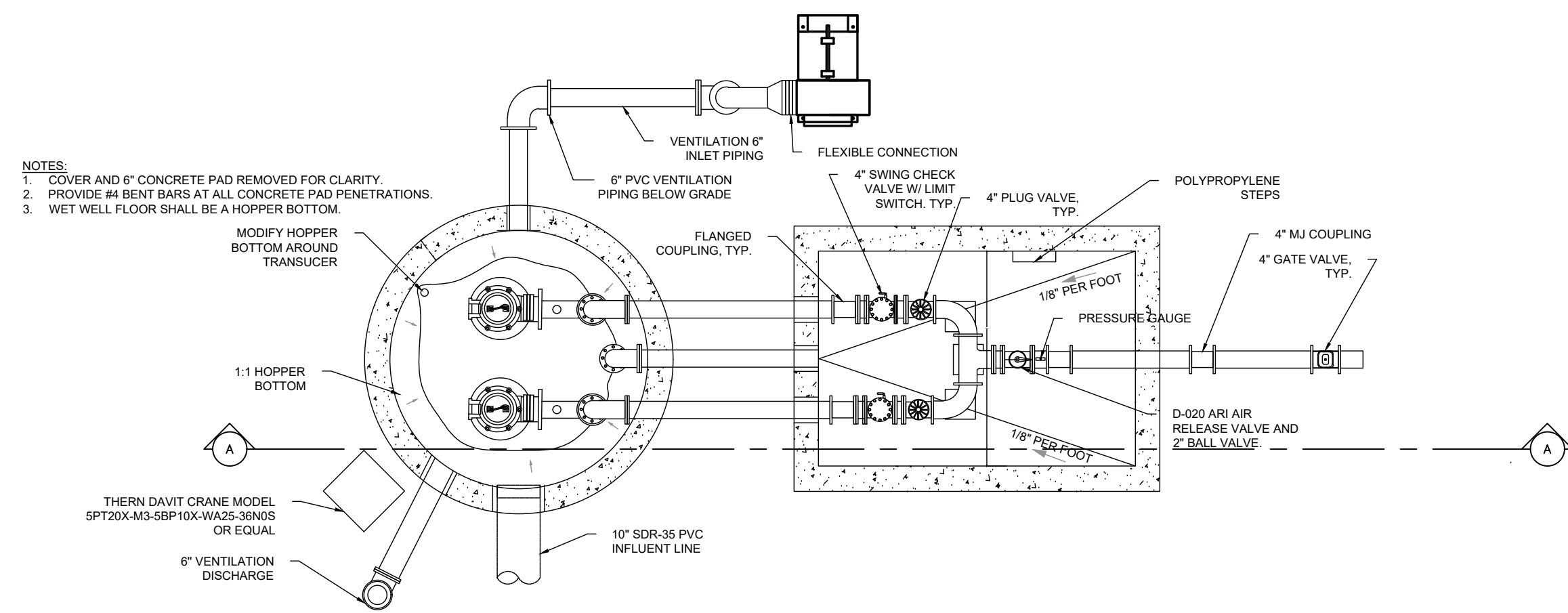
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License No. 8359
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ROBERT D. RAUCH
LICENSED PROFESSIONAL ENGINEER
NO. 8359
DELAWARE
PROFESSIONAL ENGINEER

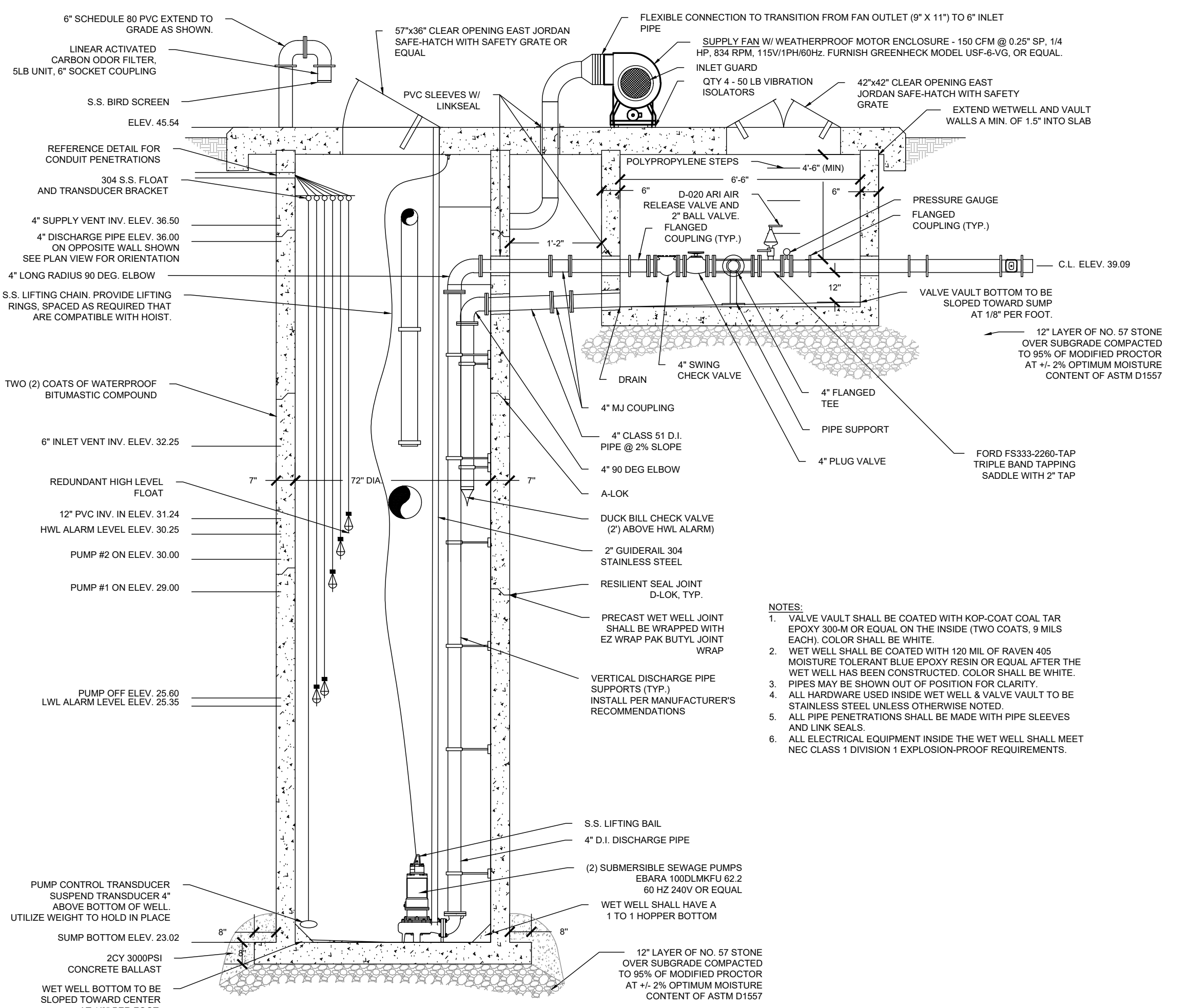
Revisions	
INITIAL SUBMISSION - 01/21/22	
FIRST REVISION - 04/08/22	

Heritage Shores Circle Pump Station	
Bridgeville, Delaware	04/08/22
First Election District - Sussex County	Scale: 1" = 20'
Site Plan & Profile	PS1-301



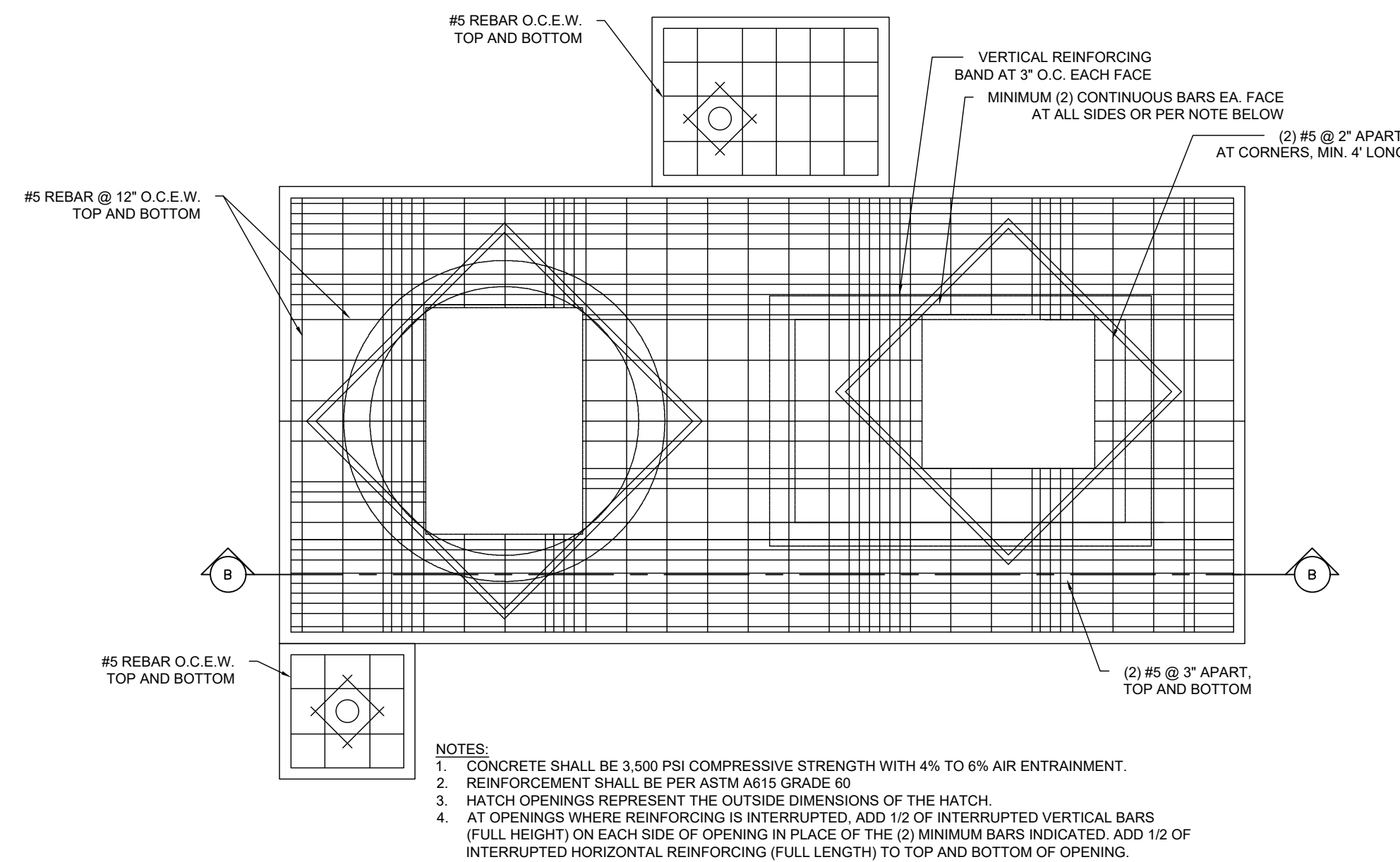
1 PUMP STATION PLAN VIEW

3/8" = 10"



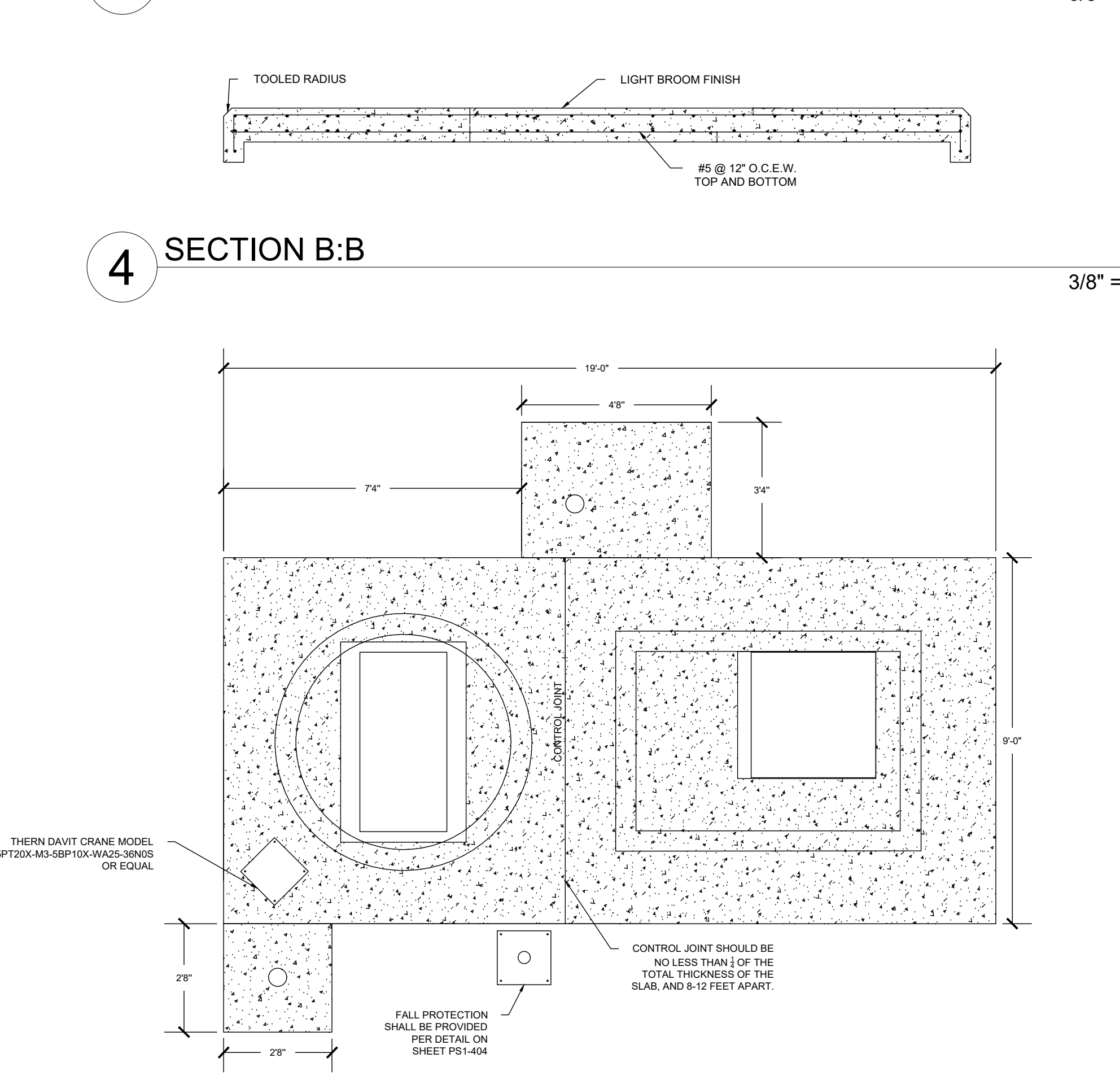
2 SECTION A:A - WETWELL AND VALVE VAULT

3/8" = 10"



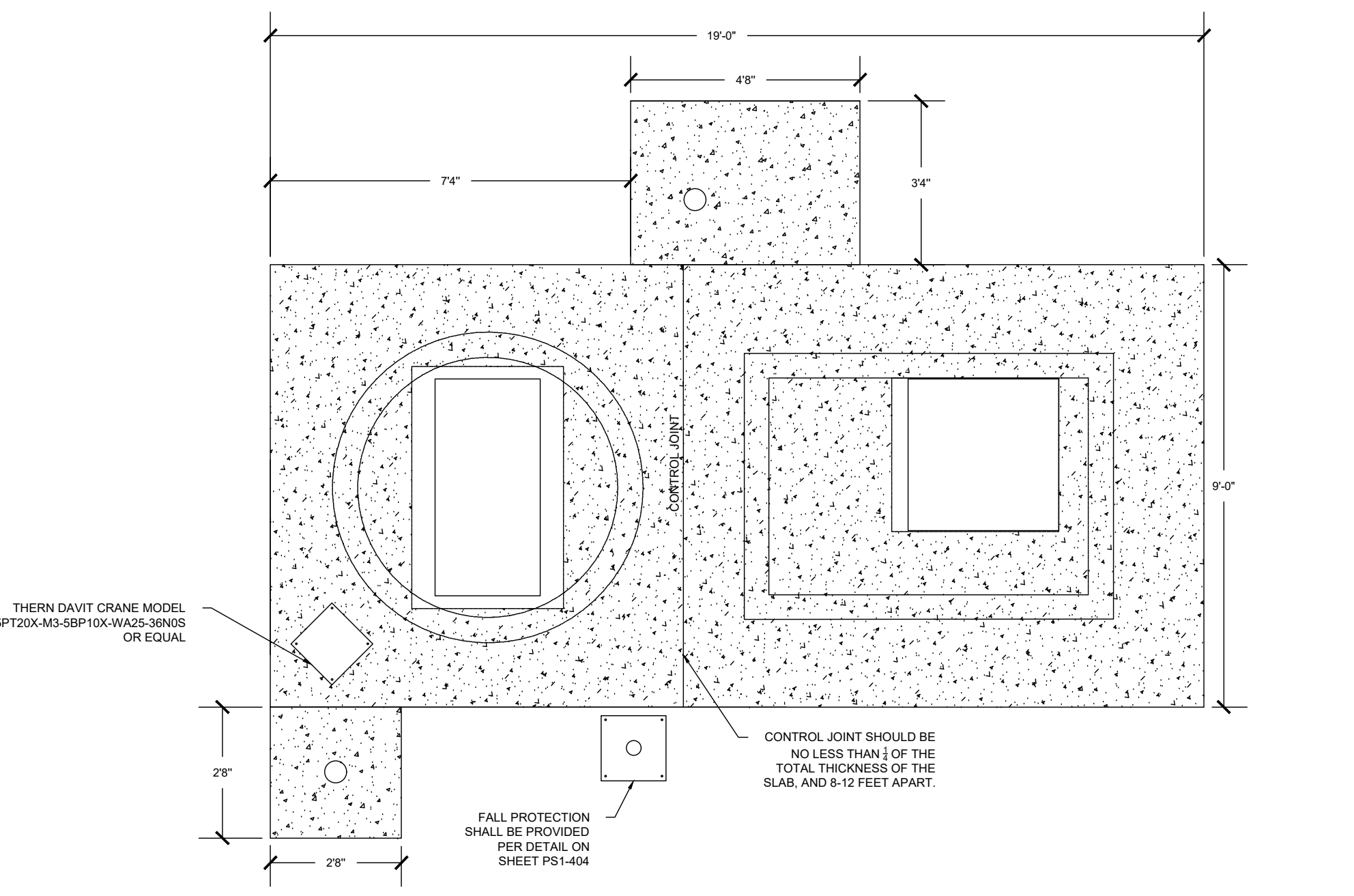
3 SLAB REINFORCEMENT PLAN VIEW

3/8" = 10"



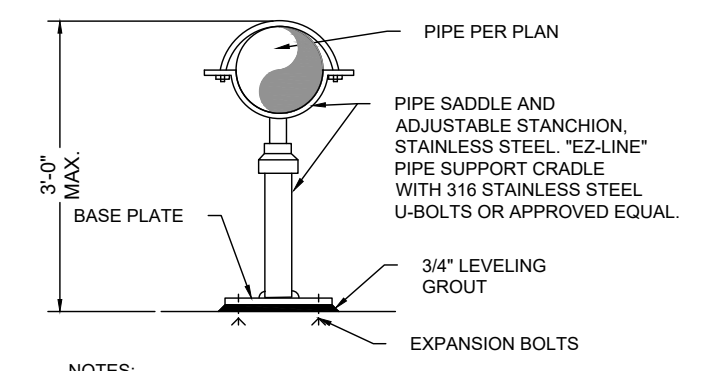
4 SECTION B:B

3/8" = 10"



5 TOP SLAB PLAN VIEW

3/8" = 10"



6 PIPE SUPPORT DETAILS

3/8" = 10"

2 SECTION A:A - WETWELL AND VALVE VAULT

3/8" = 10"

5 TOP SLAB PLAN VIEW

3/8" = 10"

<p>Engineering Survey Architecture Environmental</p> <p>Main Office: 108 N. Harrison St., Essex, MD 21091 Web: www.rauch-inc.com Email: design@rauch.com Phone: 410.770.9291 Fax: 410.770.3667</p>	<p>Professional Certification</p> <p>I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Delaware.</p> <p>License No. 8359 Expiration Date: June 30, 2022</p>	<p>Revisions</p> <table border="1"> <tr> <td>INITIAL SUBMISSION</td> <td>04/04/22</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	INITIAL SUBMISSION	04/04/22							<p>Heritage Shores Circle Pump Station</p> <table border="1"> <tr> <td>Bridgeville, Delaware</td> <td>04/04/22</td> </tr> <tr> <td>First Election District - Sussex County</td> <td>Scale: N.T.S.</td> </tr> <tr> <td>Pump Station, Wetwell and Slab</td> <td>PS1-402</td> </tr> </table>	Bridgeville, Delaware	04/04/22	First Election District - Sussex County	Scale: N.T.S.	Pump Station, Wetwell and Slab	PS1-402
	INITIAL SUBMISSION	04/04/22															
Bridgeville, Delaware	04/04/22																
First Election District - Sussex County	Scale: N.T.S.																
Pump Station, Wetwell and Slab	PS1-402																

1. DESIGN FLOW	Value	Units
Equivalent Dwelling Units (EDUs)	176	EDUs
Flow per EDU (Given by Regulatory Agency)	250	gpd
Peaking Factor (Given by Regulatory Agency)	2.31	
Average Daily Flow (ADF)	44,000	gpd

2. FORCE MAIN NOMINAL PIPE SIZING	Value	Units
Peak Hourly Flow	4242	gph
Convert to gpm	71	gpm
Increase for Pump Down (10%)	78	gpm
Convert to cfs	0.173	cfs
Minimum Velocity	2.5	fps
Maximum Velocity	5	fps
Cross-Sectional Area	0.069	sf
Diameter	0.297	ft
Maximum Diameter (convert to inches)	3.565	in
Cross-Sectional Area	0.035	sf
Diameter	0.210	ft
Minimum Diameter (convert to inches)	2.521	in
Nominal Pipe Size:	4 in	

3. PUMP SIZING	Value	Units
Pipe Material	PVC C-900	
Pipe Dimension Ratio (DR)	DR-18	
Inner Pipe Diameter	4.23	in
Wall Thickness	0.267	in
Cross-Sectional Area	0.098	sf
Minimum Velocity	2.5	fps
Minimum Pump Rate (convert to cfs)	0.244	cfs
Convert to gpm	109.50	gpm
Maximum Velocity	5	fps
Maximum Pump Rate (convert to cfs)	0.488	cfs
Convert to gpm	219.01	gpm
Recommended Pumping Range	110-219 gpm	
Design Pumping Rate	219 gpm	

4. SYSTEM HEAD	Value	Units
Pumps Off Elevation	25.60	ft (elev)
Discharge Elevation	39.06	ft (elev)
Static Head	13.46	ft
Length of Forcemain (4" PVC)	135	ft
other:		ft
Hazen-Williams Coefficient (C-Factor)	150	
Pump Rate (One Pump in Operation)	219	gpm
Minor Losses (Equivalent Pipe Lengths) (4" PVC)	139.3	ft
Maximum Friction Head	5.22	ft
Velocity Head	0.39	ft
Total Dynamic Head (TDH)	20 feet	

5. PUMP SELECTION	Value	Units
Design Pumping Rate	219	gpm
Total Dynamic Head (TDH)	20	ft
Pump Manufacturer & Model	Ebara 100DLKFU62.2 (or equal)	

6. FORCE MAIN VELOCITY	Value	Units
Design Pump Rate	219	gpm
Cross-Sectional Area	0.098	sf
Design Force Main Velocity	5.00 fps	

7. WET WELL SIZING	Value	Units
Peak Inflow	71	gpm
Design Pumping Rate	219	gpm
Effective Drawdown	148	gpm
Wet Well Shape	Cylindrical	
Inside Dimension of Wet Well	6	ft
Pump Starts per Hour	4.0	starts
Wet Well Volume per Vertical Foot	211.51	gal
Active Volume	718.15	gal
Active Depth	3.40	ft
Drawdown Time	4.84	min
Top of Slab	45.54	ft (elev)
Influent Pipe Invert	31.24	ft (elev)
High Level Alarm	30.25	ft (elev)
Lag Pump On	30.00	ft (elev)
Lead Pump On	29.00	ft (elev)
Pumps Off	25.60	ft (elev)
Low Level Alarm	25.35	ft (elev)
Transducer	23.35	ft (elev)
Submergence	2.58	ft
Wet Well Sump	23.02	ft (elev)
Wet Well Depth	22.52 ft	

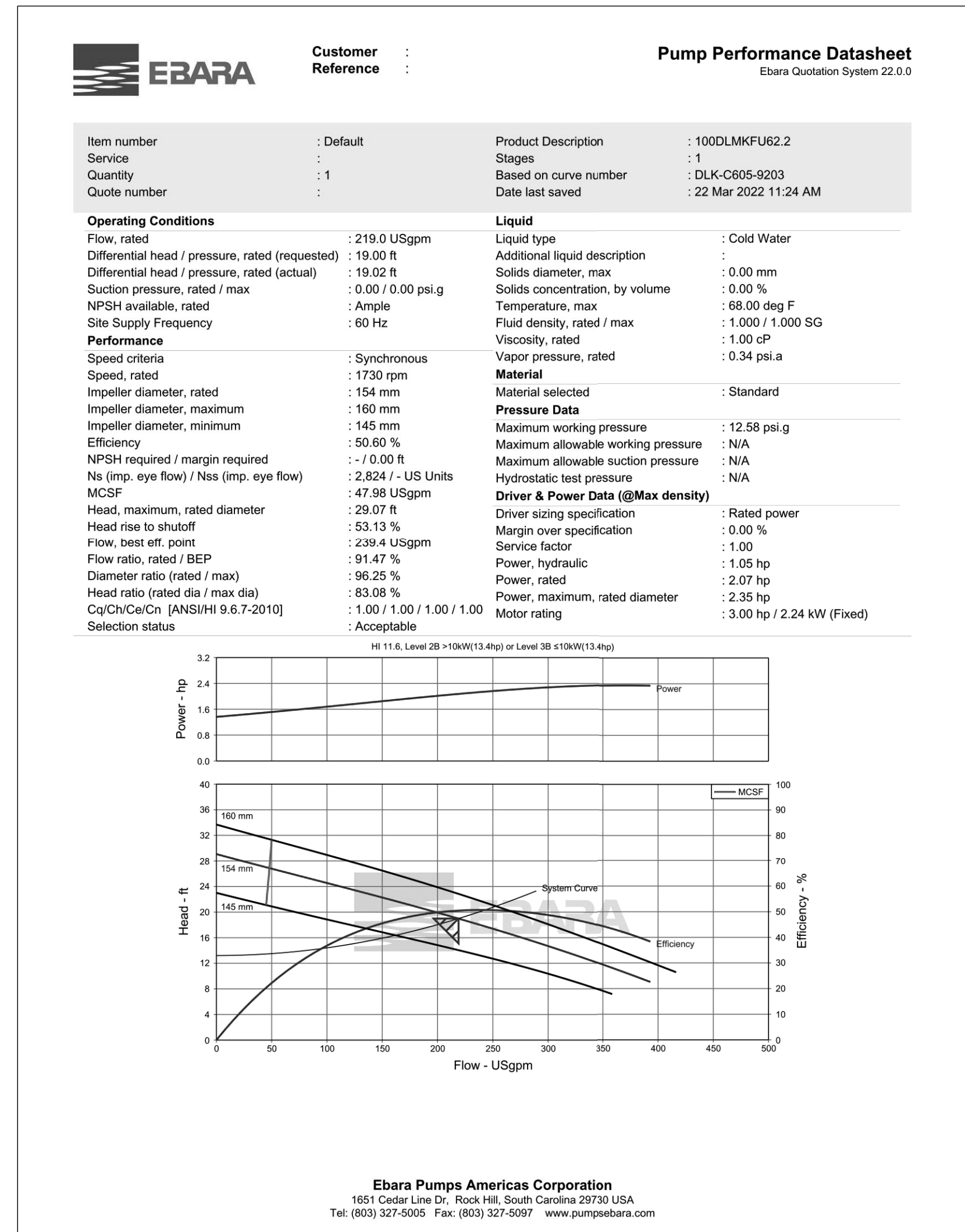
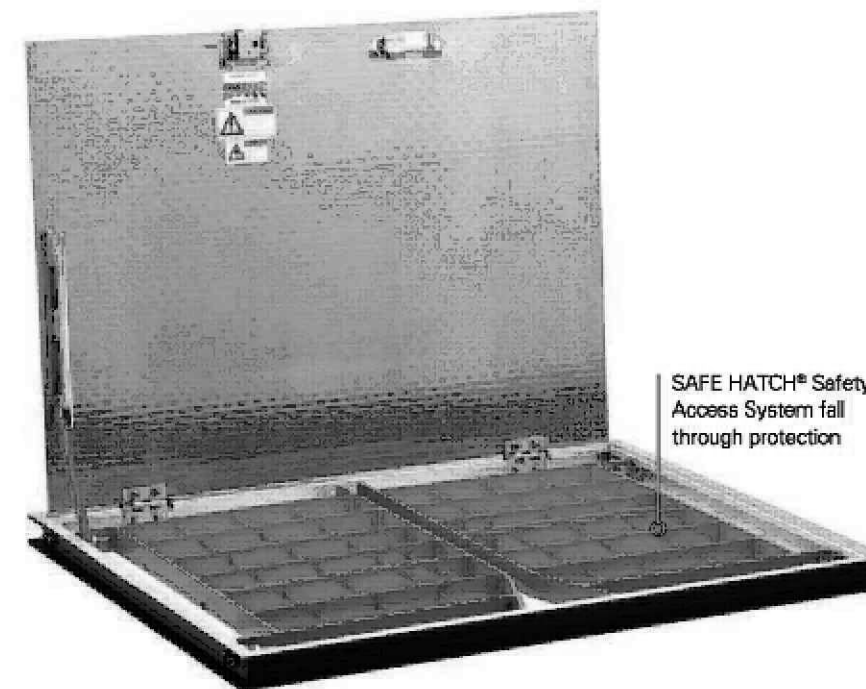
9. WET WELL BUOYANCY	Value	Units
Inner Dimension of Wet Well	6	ft
Wall Thickness of Wet Well	7	in
Outer Diameter of Wet Well	7.17	ft
Depth of Wet Well (to Top Of Base)	22.52	ft
Exposed Slab	0.25	ft
Depth of Wet Well in Soil	22.27	ft
Volume of Water Displaced by the Wet Well	898.30	cf
Weight of Water	62.4	lb/cf
Buoyant Force (Weight of Water Displaced)	56,054	lb
Factor of Safety	1.5	
Counteractive Weight Required	84,081	lb
Effective Weight of Concrete	87.6	lb/cf
Weight of Concrete in Wet Well Walls	23,799	lb
Proposed Diameter of Round Base	10.0	ft
Volume of Saturated Soil over Extended Base	851	cf
Effective Weight of Saturated Soil (Loose Sand)	48	lb/cf
Weight of Saturated Soil Over Extended Base	40,493	lb
Depth of Concrete Base	12	in
Volume of Concrete Base	79	cf
Weight of Concrete in Base	6,880	lb
Top Slab Width (only calculate square)	24	ft
Slab Area	576	sf
Top Slab Thickness	10	in
Volume of Concrete in Top Slab	480	cf
Weight of Top Slab	42,048	lb/cf
Required Weight of Concrete Ballast (29,139) lb		
Volume of Concrete Ballast	0.00 cy	

ANGLE FRAME, PEDESTRIAN RATED WITH SAFE HATCH® SAFETY ACCESS SYSTEM

- Non-traffic, pedestrian rated
- Safety orange aluminum safety grate system for fall through protection and controlled confined space entry
- Heavy duty stainless steel hinges
- Exterior of frame coated with black primer
- Stainless steel slam lock with removable T-handle and threaded stainless steel plug
- Stainless steel hardware
- Aluminum lift handle
- Extruded aluminum frame
- 1/4" aluminum diamond plate cover

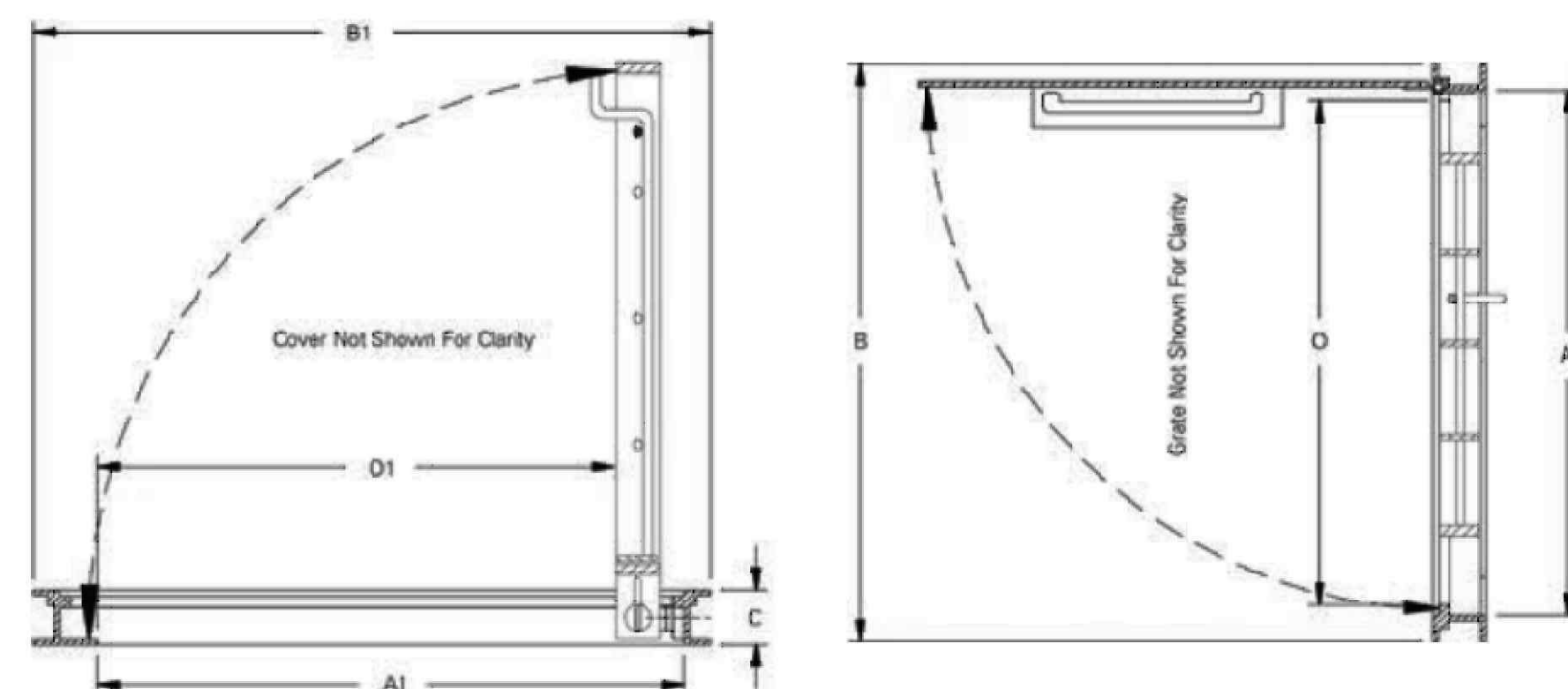
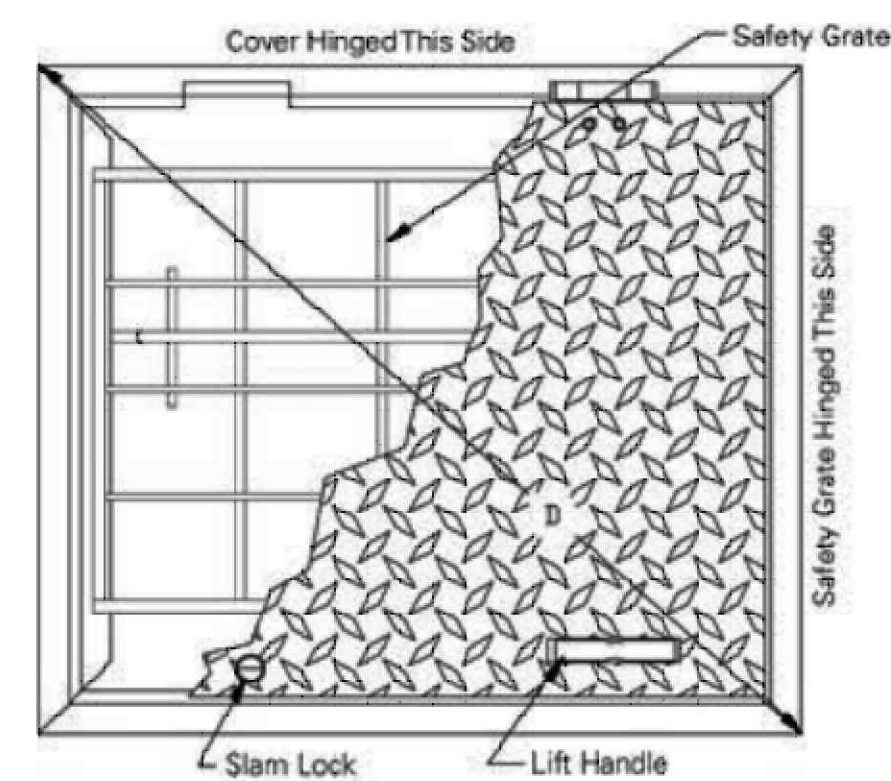
See aluminum hatch options on pages 8 and 9 for additional options.

No vehicle traffic allowed.

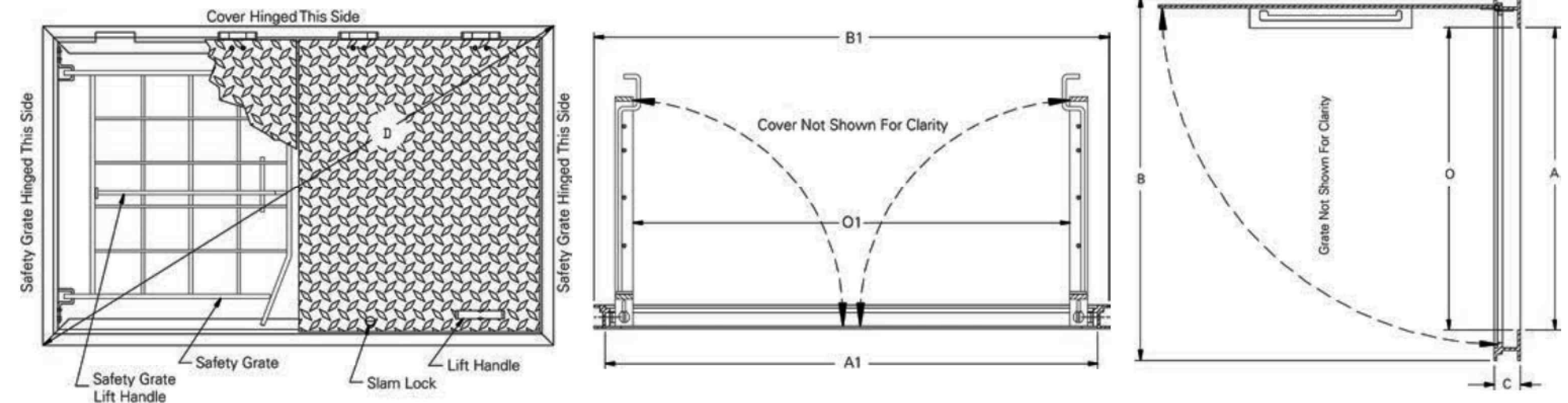


1 PUMP CURVE

Single Grate, Single Cover Style



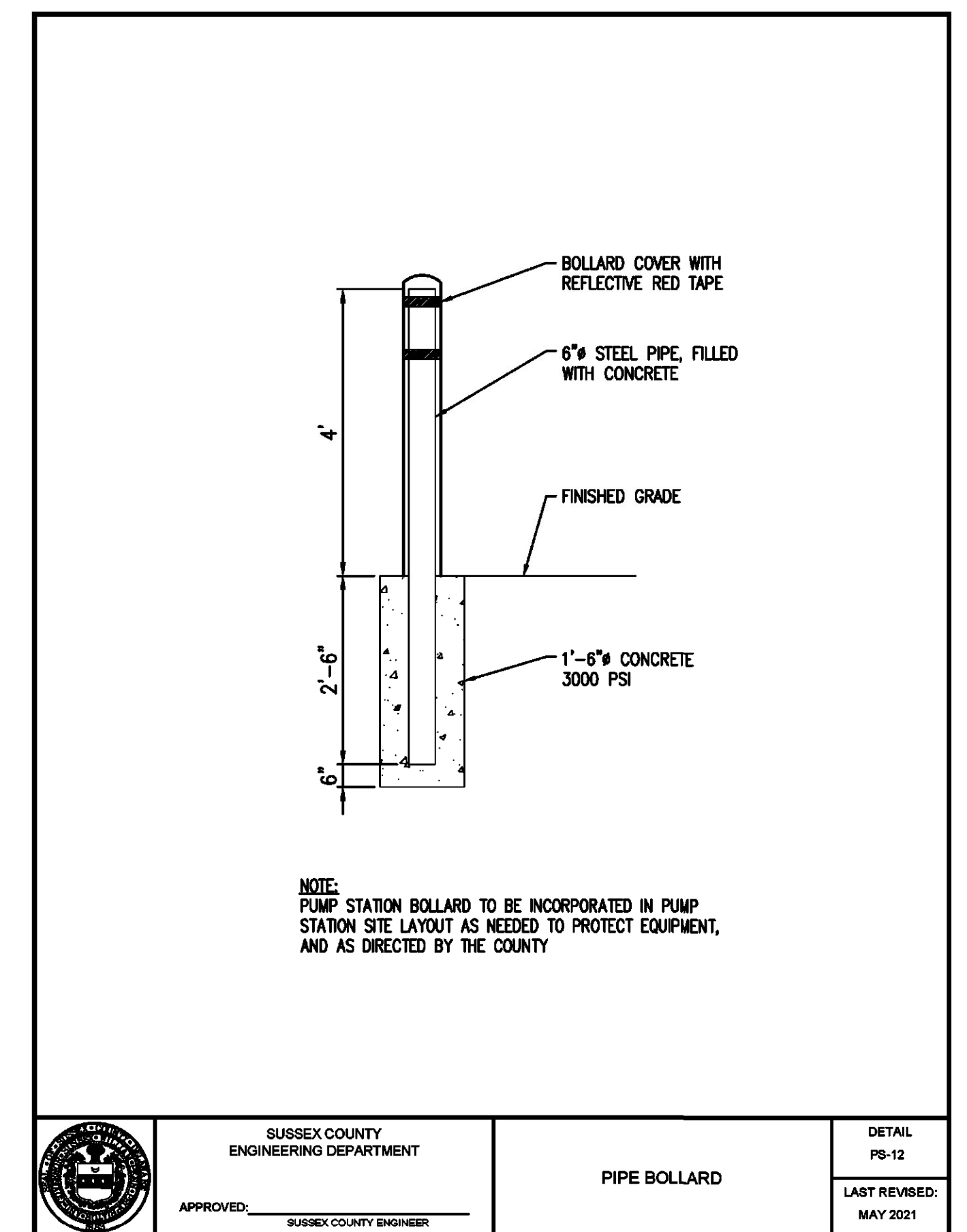
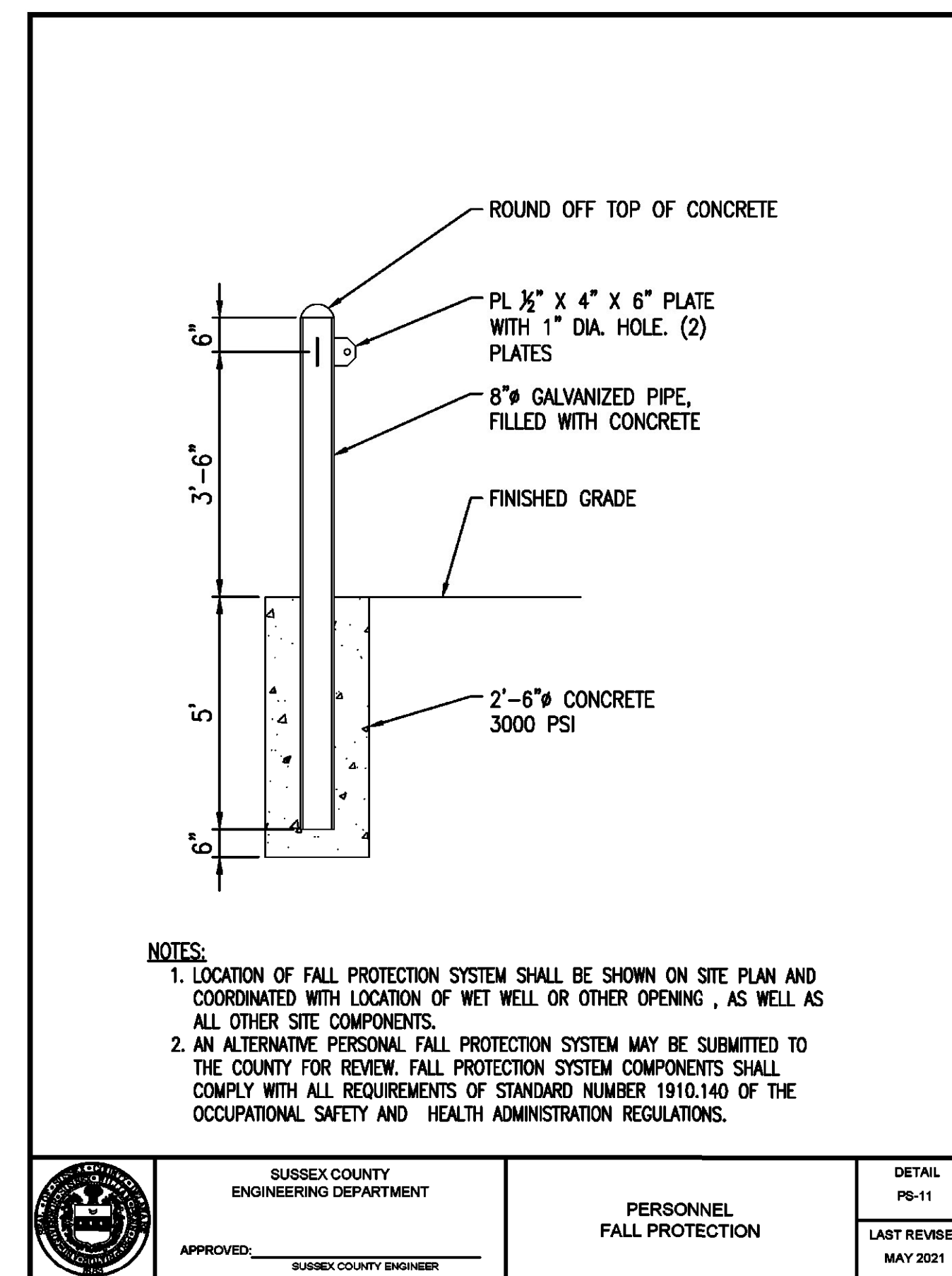
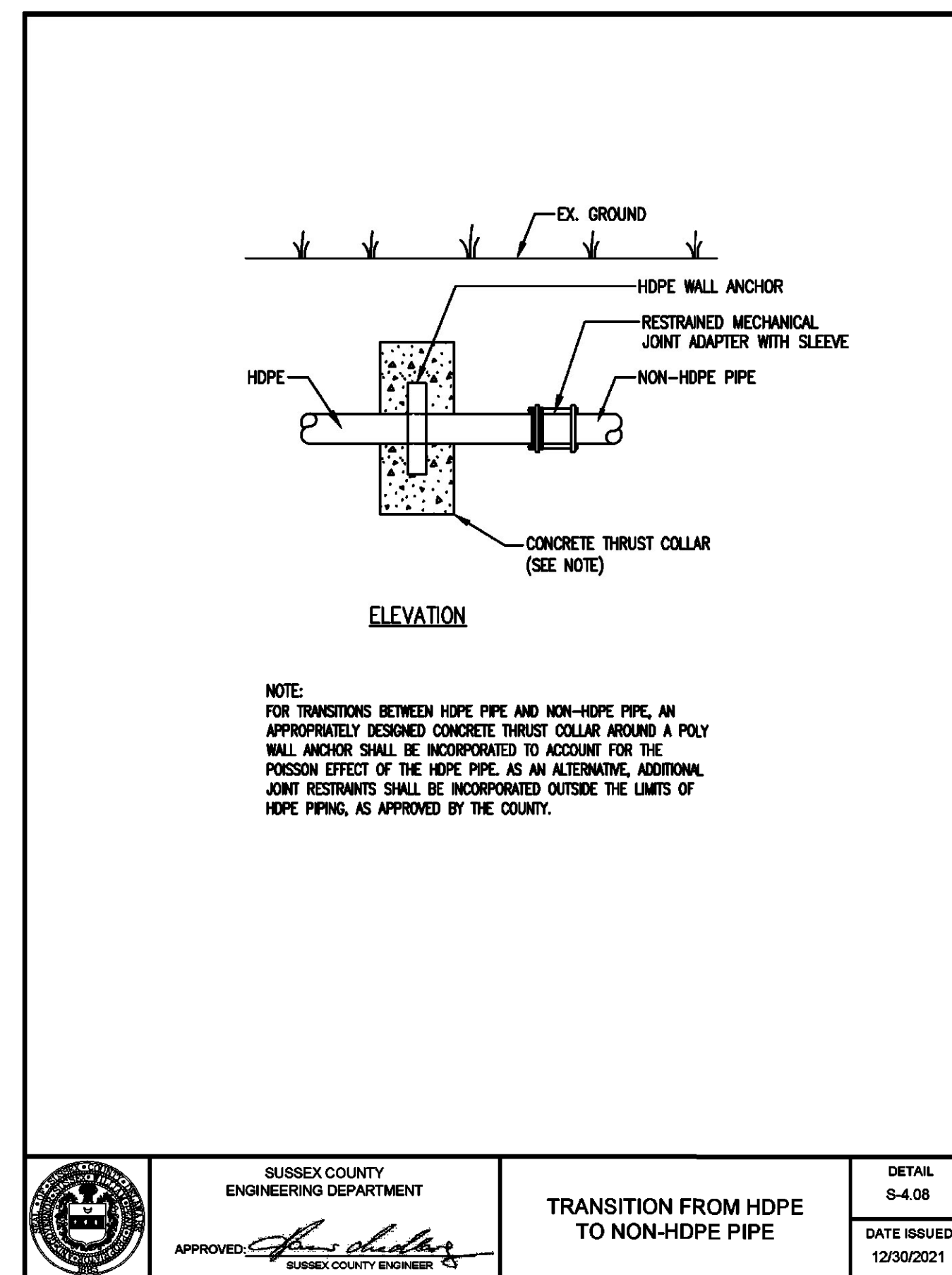
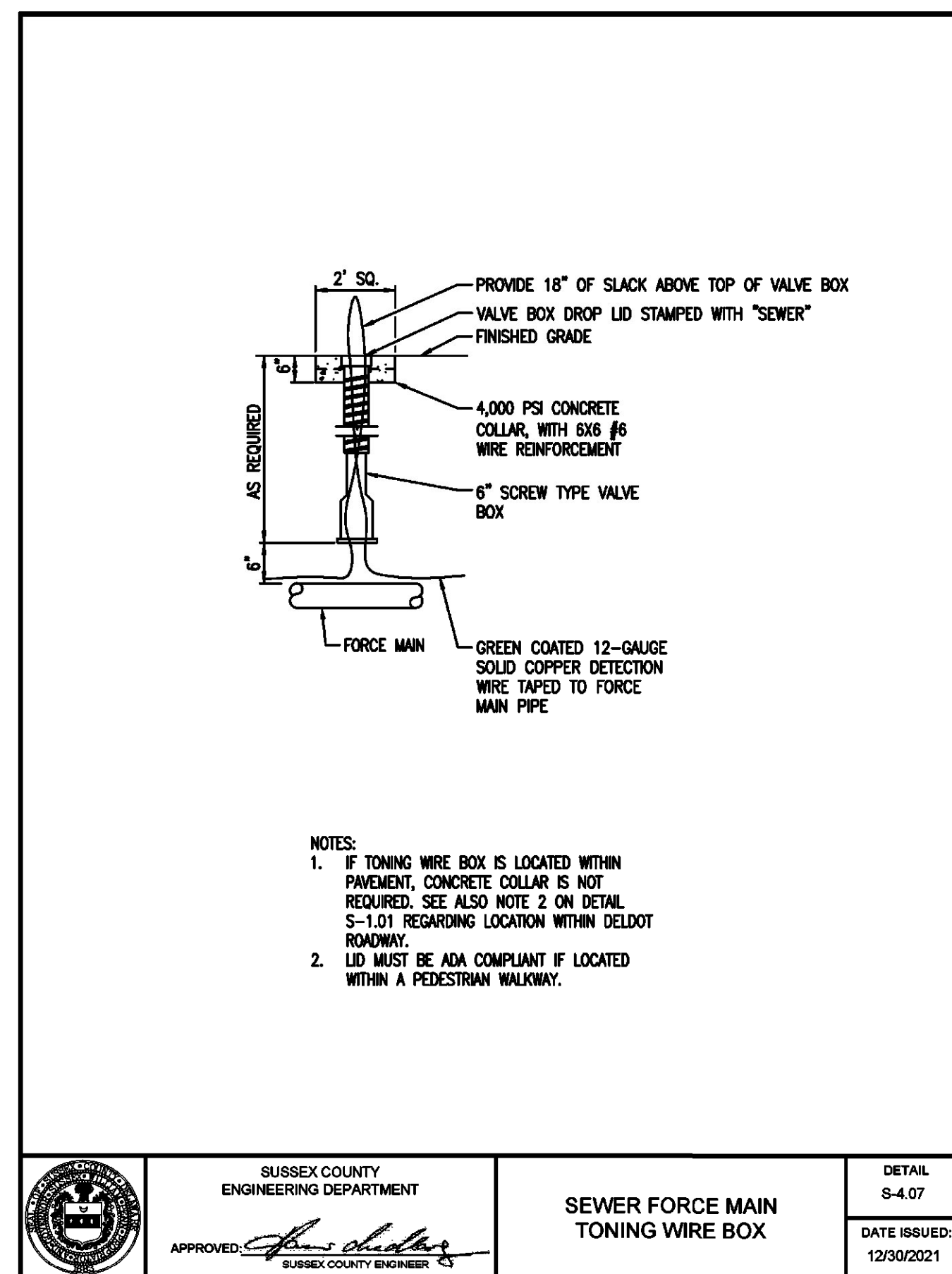
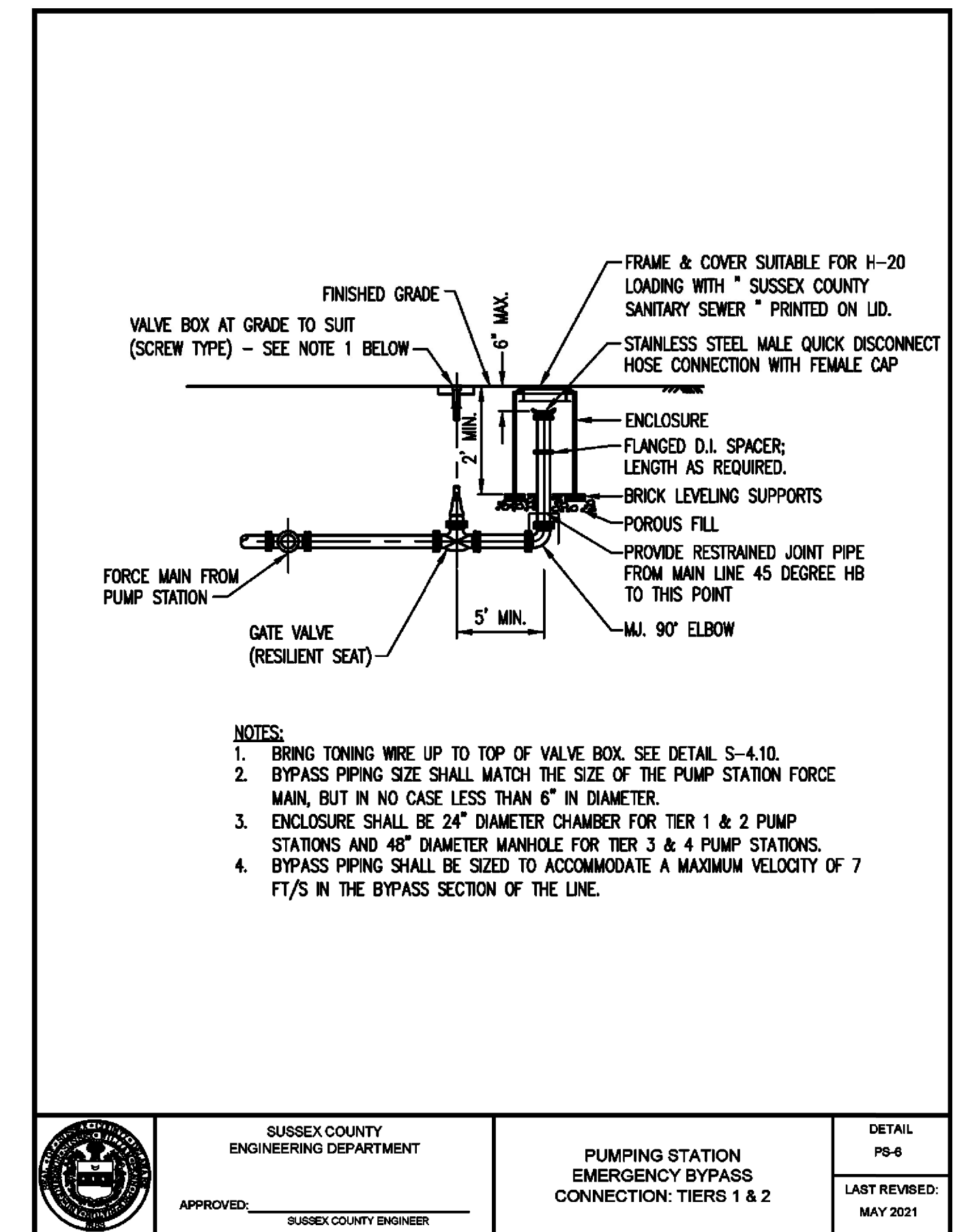
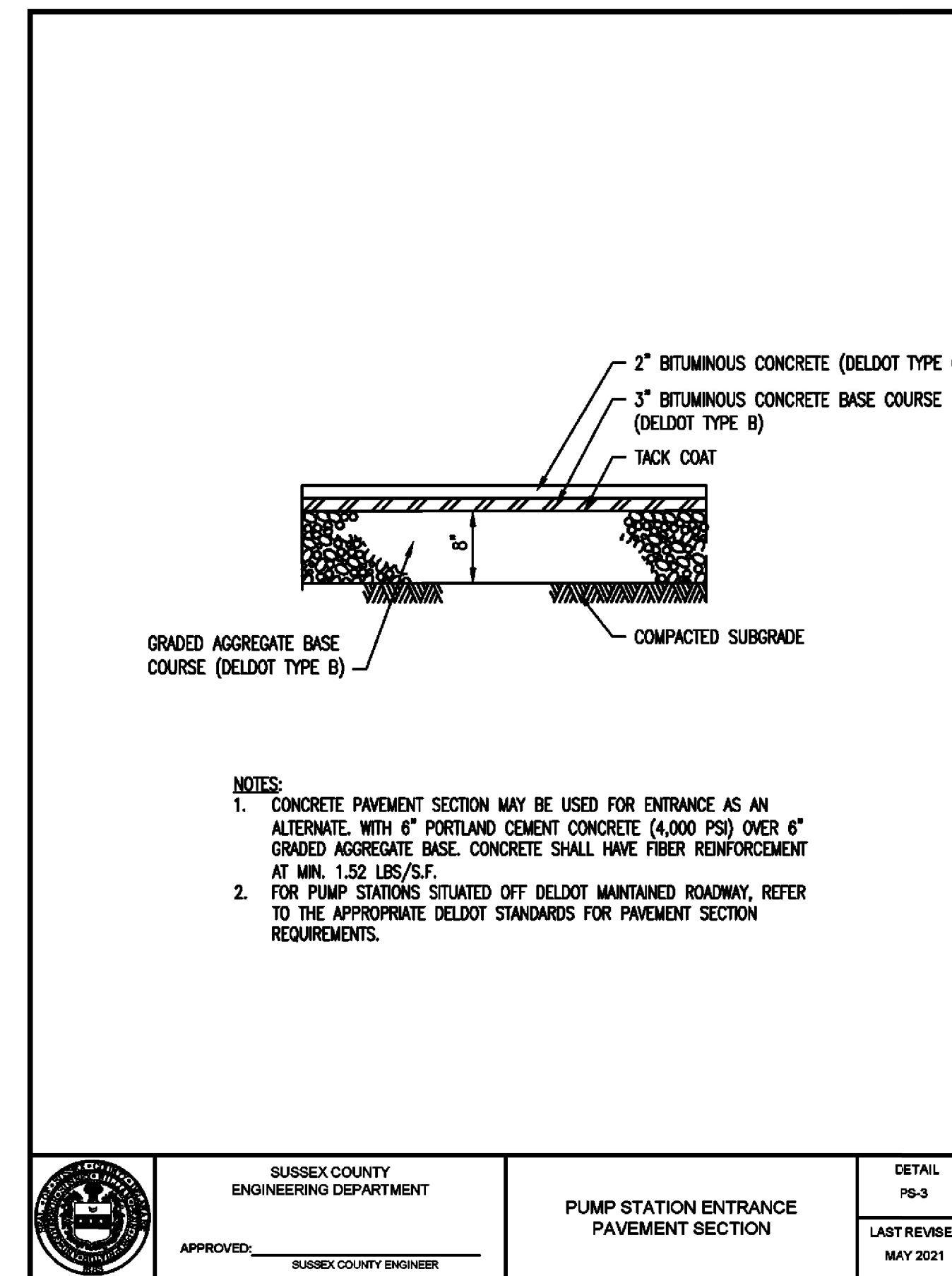
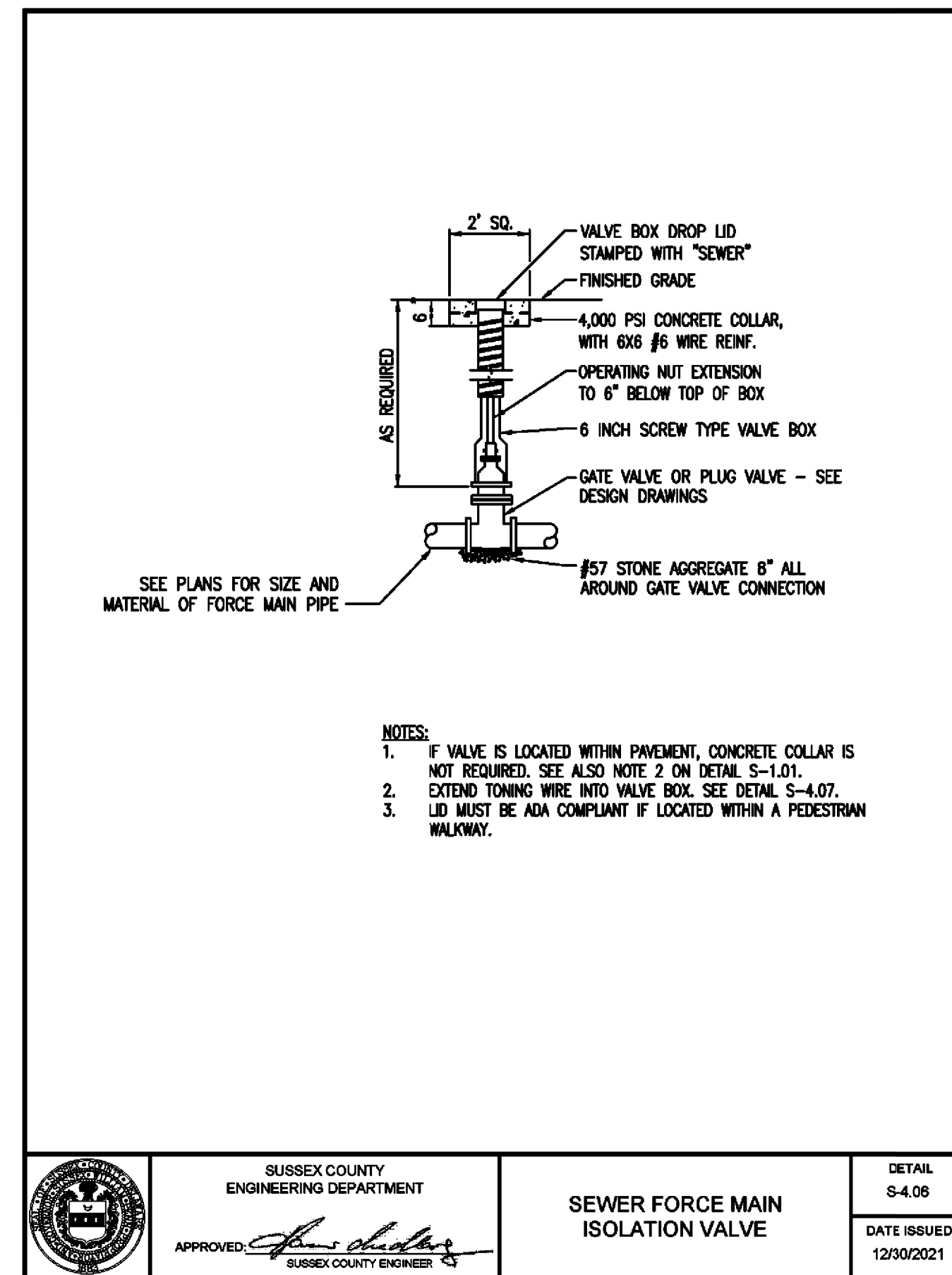
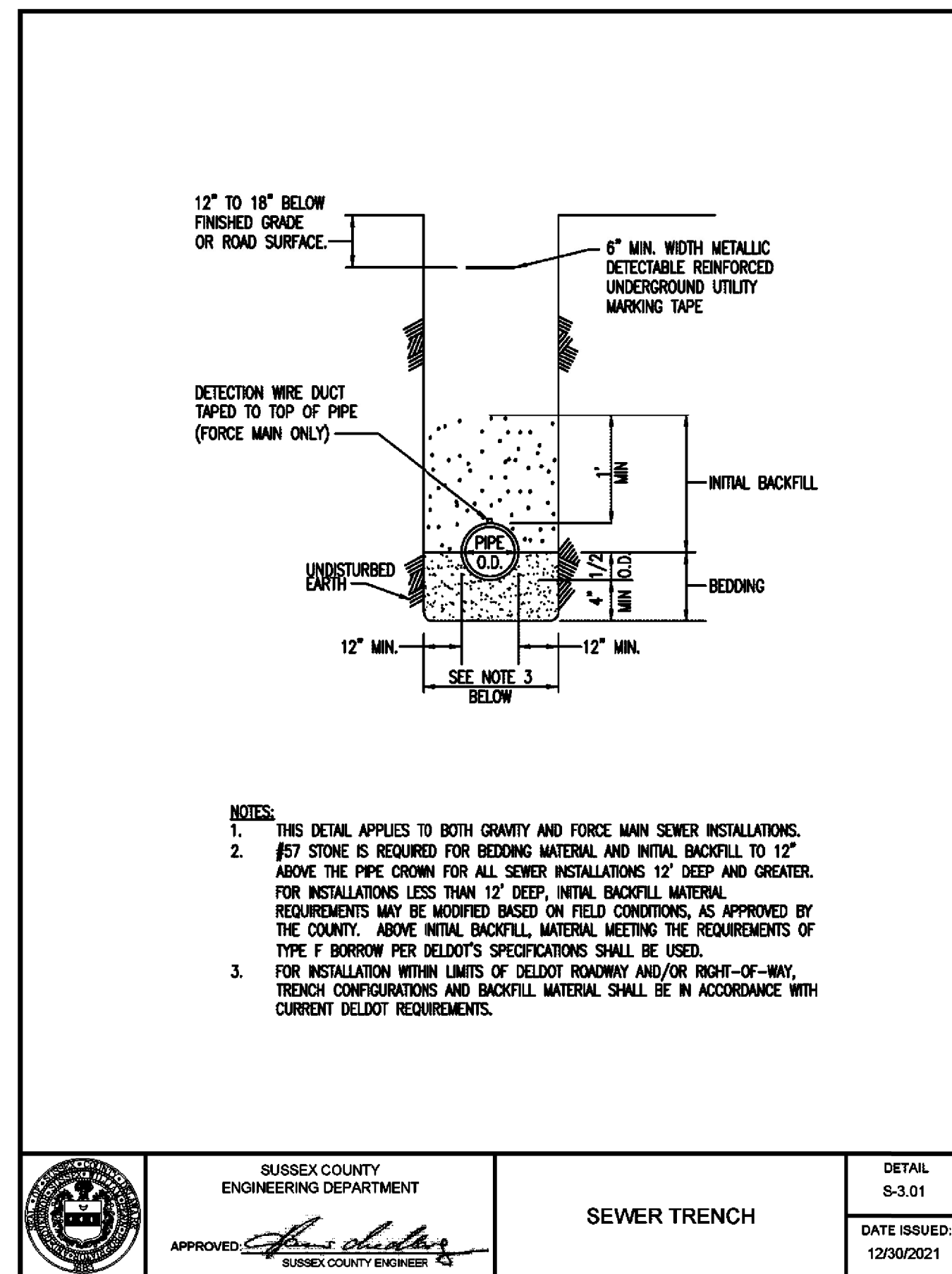
Double Grate, Double Cover Style



Professional Certification
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License No. 8359
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Revisions	
INITIAL SUBMISSION	04/04/22

Heritage Shores Circle Pump Station	
Bridgeville, Delaware	04/04/22
First Election District - Sussex County	Scale: N.T.S.
Pump Calculations, Curves and Hatches	PS1-403



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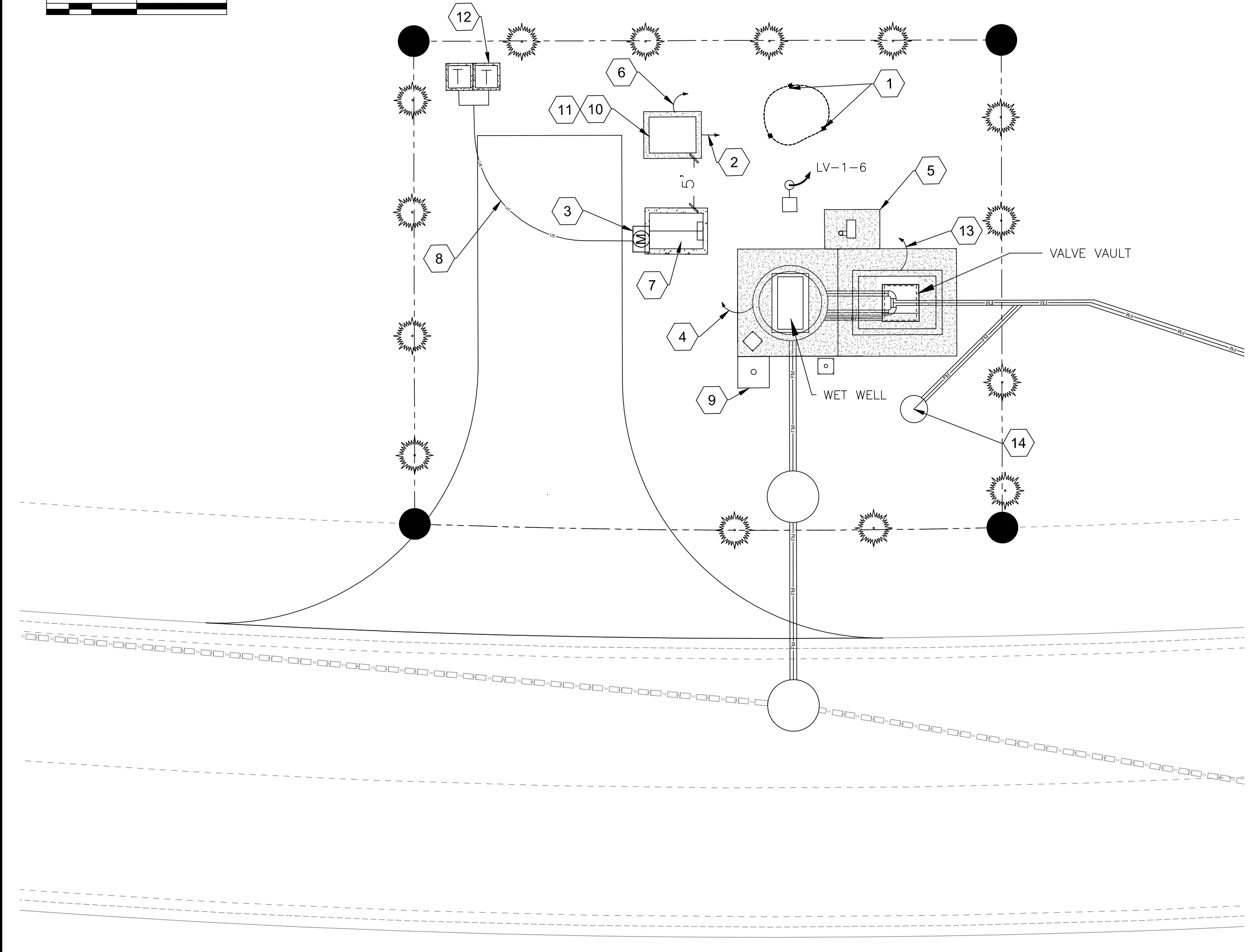
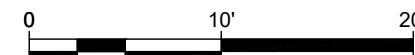
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Revisions	
INITIAL SUBMISSION	04/04/22

Heritage Shores Circle Pump Station	
Bridgeville, Delaware	04/04/22
First Election District - Sussex County	Scale: N.T.S.
Construction Details	PS1-404



1 ELECTRICAL SITE PLAN

1" = 10'

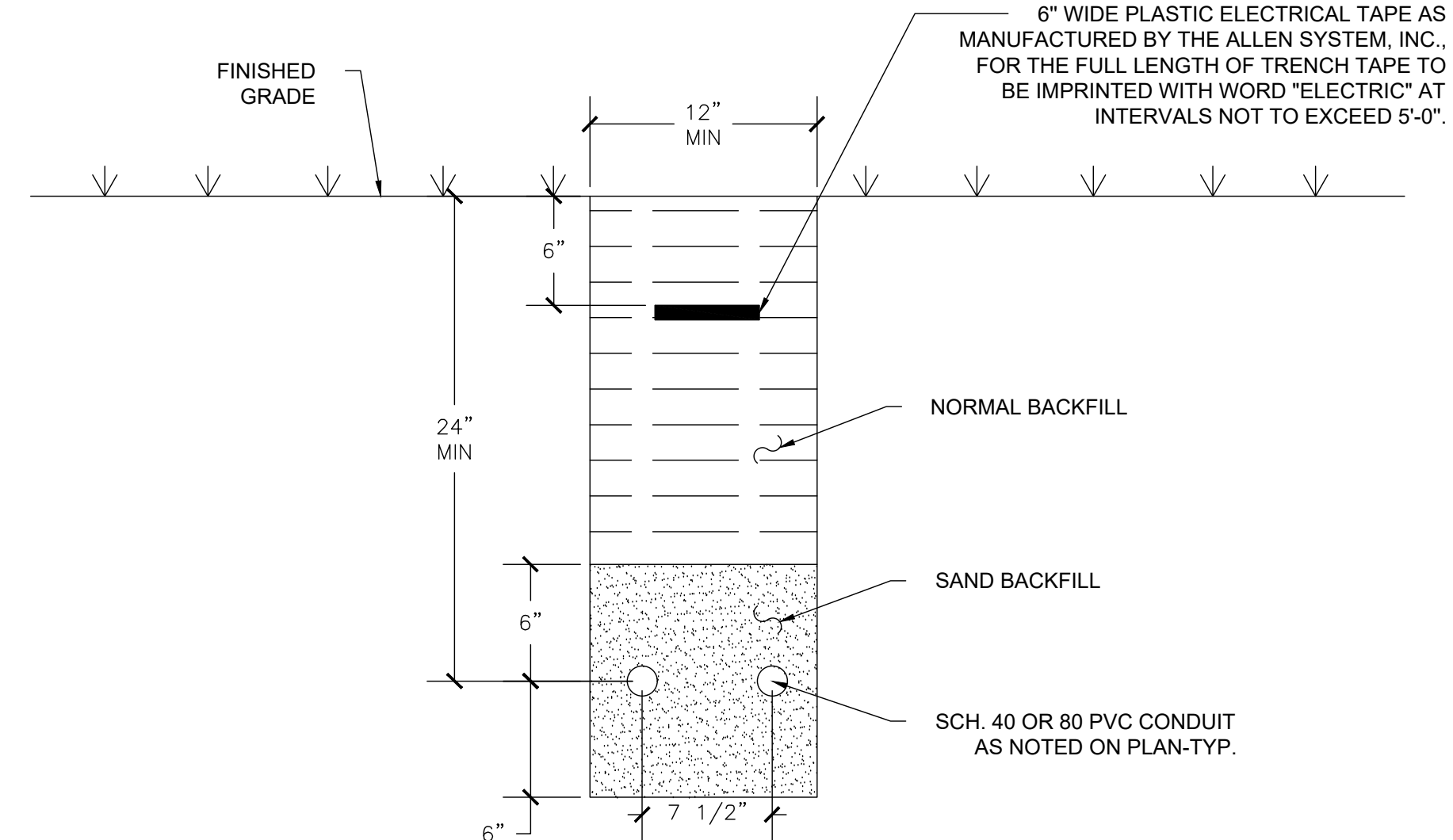
SYMBOLS:

- POLE MOUNTED LED LUMINAIRE - SEE DETAIL, THIS SHEET.
- PUMP FLOAT - # DENOTES FLOAT QTY
- RECEPTACLE - 20A, 125V. - GFI DUPLEX, WEATHER PROTECTED
- JUNCTION BOX
- PRESSURE TRANSDUCER
- CONDUIT - EXPOSED
- CONDUIT - IN OR UNDER FLOOR SLAB OR UNDERGROUND.
- HOMERUN TO PANEL - NO. OF ARROWS INDICATES NO. OF CIRCUITS AND NO. OF CROSSLINES INDICATES NO. OF #12 CONDUCTORS.
- DENOTES REFERENCE TO SHEET NOTE.
- NEMA 1 ENCLOSED CIRCUIT BREAKER
- VENTILATION FAN - MODEL AS NOTED ON SHEET
- PUMP - MODEL AS NOTED ON SHEET
- THERMAL MANUAL MOTOR STARTER
- AUTOMATIC TRANSFER SWITCH - NEMA 4X
- PUMP CONTROL PANEL
- SURGE PROTECTION DEVICE
- TRANSIENT VOLTAGE SURGE SUPPRESSOR
- SERVICE METER
- FLOW METER, FLOW RECEIVER

ABBREVIATIONS:

- | | | | |
|--------|--------------------------------------------------------------------------------|--------|------------------------------------------|
| A. | AMP OR AMPERES | OIT | OPERATORS INTERFACE TERMINAL |
| A.F.F. | ABOVE FINISHED FLOOR | P. | POLE OR POLES |
| BRKR. | BREAKER | PCP | PUMP CONTROL PANEL |
| C. | CONDUIT | PLC | PROGRAMMABLE LOGIC CONTROLLER |
| CTD. | COATED | PVC | POLYVINYL CHLORIDE |
| CFM | CUBIC FEET/MINUTE | PHASE | PHASE |
| DP | DELMARVA POWER | RPM | REVOLUTIONS PER MINUTE |
| DIA. | DIAMETER | SCADA | SUPERVISORY CONTROL AND DATA ACQUISITION |
| ELEV. | ELEVATION | SCH. | SCHEDULE |
| G.F.I. | GROUND FAULT INTERRUPTER | S.P. | STATIC PRESSURE |
| GND. | GROUND | TYP. | TYPICAL |
| GRS. | GALVANIZED RIGID STEEL | UG. | UNDERGROUND |
| H.O.A. | HAND OFF AUTOMATIC | UPS | UNINTERRUPTIBLE POWER SUPPLY |
| HP | HORSEPOWER | V. | VOLT OR VOLTS |
| HZ | HERTZ | WP. | WEATHERPROOF |
| J.B. | JUNCTION BOX | WW. | WET WELL |
| K.V.A. | KILOVOLT AMPERES | RTU | REMOTE TELEMETRY UNIT |
| KW. | KILOWATTS | S.E.C. | SERVICE EQUIPMENT CABINET |
| LED | LIGHT EMITTING DIODE | | |
| M.H. | MOUNTING HEIGHT - TO CENTER OF DEVICE OR EQUIPMENT UNLESS OTHERWISE INDICATED. | | |

2 #12 & 1 #12 GND. - 3/4" C. UNLESS OTHERWISE NOTED.



2 TYPICAL UNDERGROUND CONDUIT INSTALLATION DETAIL

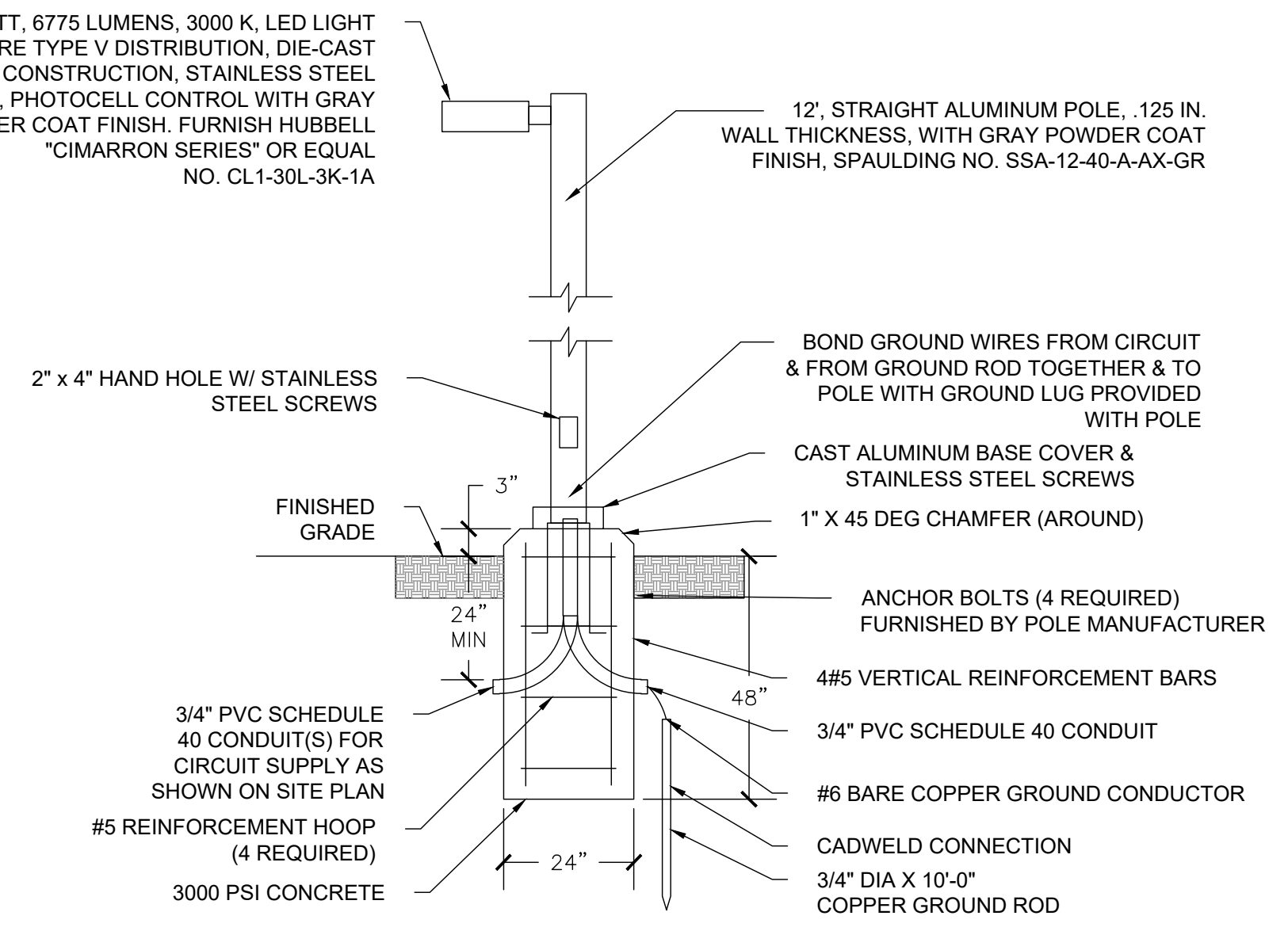
NOTES:

- TRENCH DETAIL IS APPLICABLE TO PUMP STATION SITES ONLY.
- TRENCH WIDTH SHALL BE OUTSIDE DIAMETER OF CONDUIT PLUS 6 INCHES ON EITHER SIDE.
- FOR MULTIPLE CONDUIT CONFIGURATIONS, PROVIDE 3" SEPARATION BETWEEN CONDUITS.

SHEET NOTES:

- GROUND GRID CONSISTING OF THREE (3) DRIVEN GROUND RODS (3/4" DIA X 10'0" LONG, ONE PIECE COPPER CLAD STEEL) INTERCONNECTED WITH #10 BARE COPPER CONDUCTOR. ALL UG. CONNECTIONS SHALL BE EXOTHERMIC WELDED.
- DIRECTION OF ENGINE EXHAUST & RADIATOR DISCHARGE.
- SERVICE METER - MOUNT ON EXTERIOR OF SERVICE EQUIPMENT CABINET UTILIZING VERTICAL ALUMINUM CHANNEL SUPPORTS (MINIMUM 1-1/2" SQUARE X 12 GAUGE) SECURED WITH STAINLESS STEEL THRU-BOLT ASSEMBLIES.
- PUMP MOTOR & LEVEL SENSING CONDUITS TO SERVICE EQUIPMENT CABINET - SEE SINGLE LINE DIAGRAM, SHEET PS1-601.
- WET WELL VENTILATION FAN - SEE SINGLE LINE DIAGRAM, SHEET PS2-601; SEE INSTALLATION DETAIL, SHEET PS1-701.
- GENERATOR SUPPLY, CONTROL, ALARM & AUXILIARY POWER CIRCUITS TO SERVICE EQUIPMENT CABINET - SEE SINGLE LINE DIAGRAM, SHEET PS1-601.
- ELECTRICAL AND CONTROL CABINET. SEE DETAIL / ELEVATION, SHEET PS1-601.
- 4" C. (SCHEDULE 80 PVC) TURNOUT FOR INCOMING 240/120V., 3PH, 4 WIRE DELMARVA POWER SERVICE CONDUCTORS.
- VENTILATION EXHAUST PIPE - SEE DETAIL, SHEET PS1-701.
- PAD MOUNTED & ENCLOSED DIESEL ENGINE DRIVEN GENERATOR SET - SEE SINGLE LINE DIAGRAM, SHEET PS1-601.
- SEE CONCRETE PAD DETAIL, SHEET PS1-701.
- ELECTRICAL SERVICE TRANSFORMER PROPOSED LOCATION. EXACT LOCATION SHALL BE DETERMINED BY THE POWER COMPANY. PROVIDE CONCRETE PAD & TRANSFORMER GROUNDING CONNECTION AS DIRECTED BY THE POWER COMPANY.
- FLOW METER SIGNAL CONDUITS - SEE SIGNAL LINE DIAGRAM, SHEET PS1-601.
- BYPASS CONNECTION. SEE DETAIL ON SHEET PS1-404

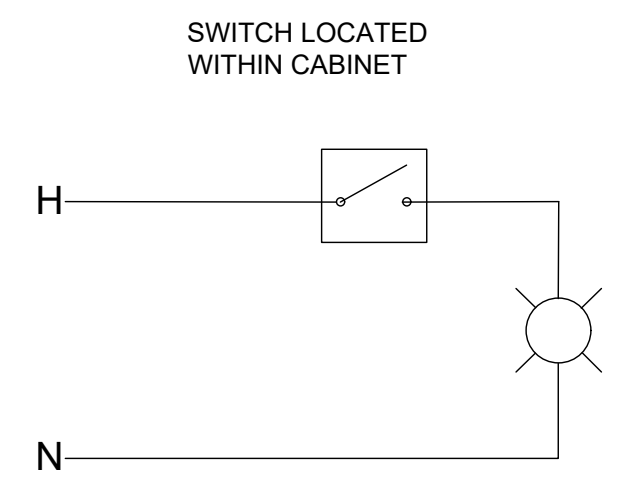
70 WATT, 6775 LUMENS, 3000 K, LED LIGHT FIXTURE TYPE V DISTRIBUTION, DIE-CAST ALUMINUM CONSTRUCTION, STAINLESS STEEL HARDWARE, PHOTOCELL CONTROL WITH GRAY POWDER COAT FINISH. FURNISH HUBBELL "CIMARRON SERIES" OR EQUAL NO. CL1-30L-3K-1A



3 SITE LIGHT FIXTURE AND POLE/FOUNDATION DETAIL

NOTES:

- POLE SHALL BE ALUMINUM ROUND TAPERED, BLACK FINISH, 12' HEIGHT, 3" PIPE FITTER, WITH ANCHOR BOLTED BASE.
- LIGHT TO BE LOCATED TO PROVIDE DIRECT ILLUMINANCE OF WET WELL AREA.
- LIGHT FIXTURE TO BE RATED TO PROVIDE A MIN OF 10,000 LUMENS AT 5,000 K.
- ORIENTATION OF HINGE SHALL BE COORDINATED WITH LOCATION OF OTHER ABOVE GROUND FEATURES WITHIN PUMP STATION SITE.

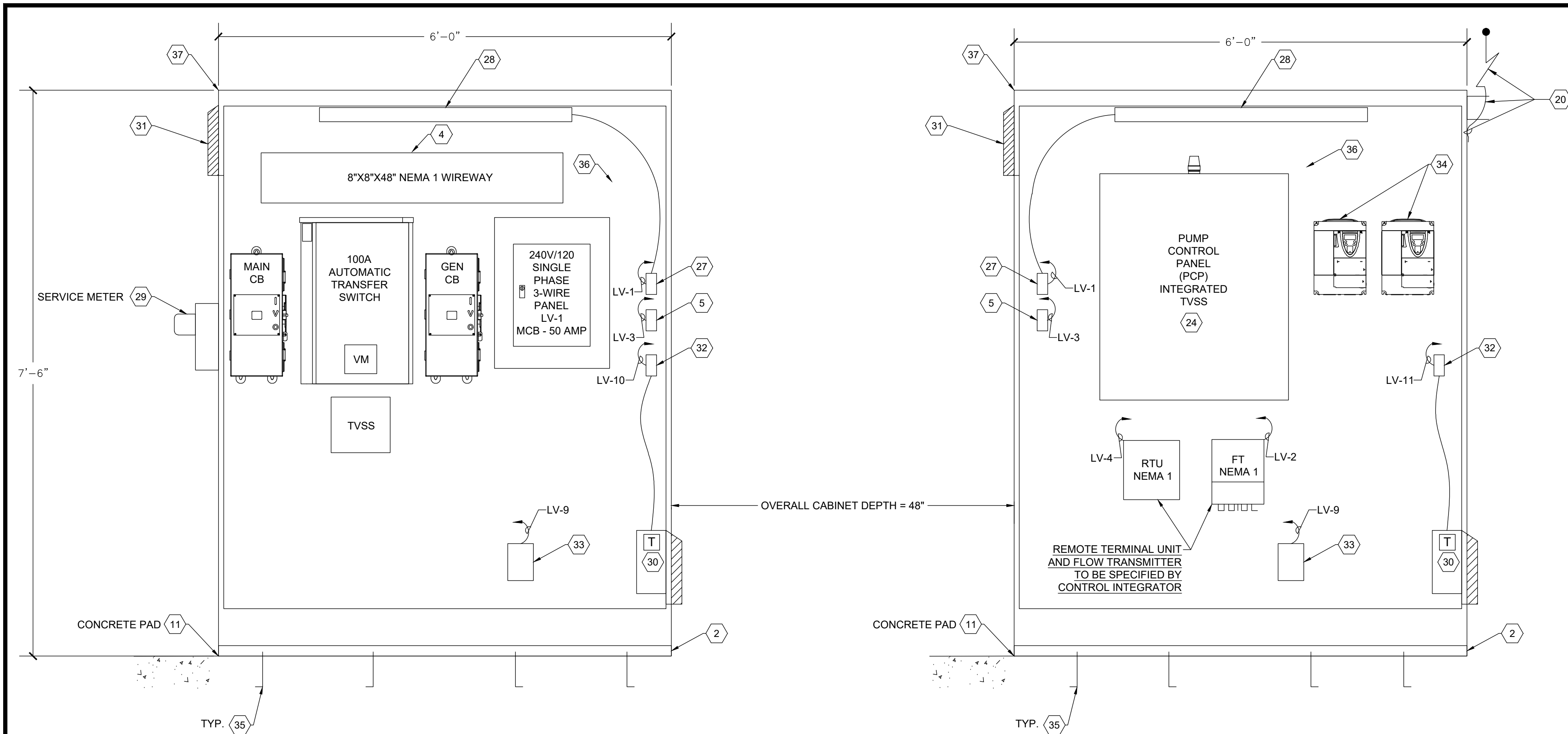


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License No. 8359
Expiration Date: June 30, 2022

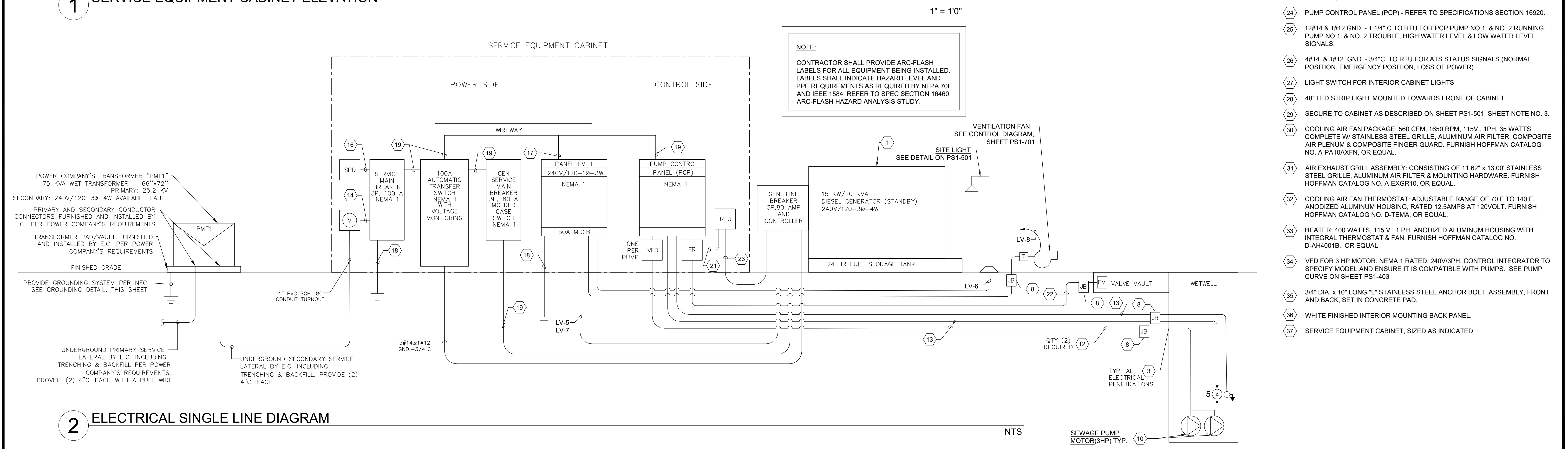


Revisions	
INITIAL SUBMISSION	04/04/22

Heritage Shores Circle Pump Station	
Bridgeville, Delaware	04/04/22
First Election District - Sussex County	Scale: N.T.S.
Electrical Site Plan	PS1-501



1 SERVICE EQUIPMENT CABINET ELEVATION



2 ELECTRICAL SINGLE LINE DIAGRAM

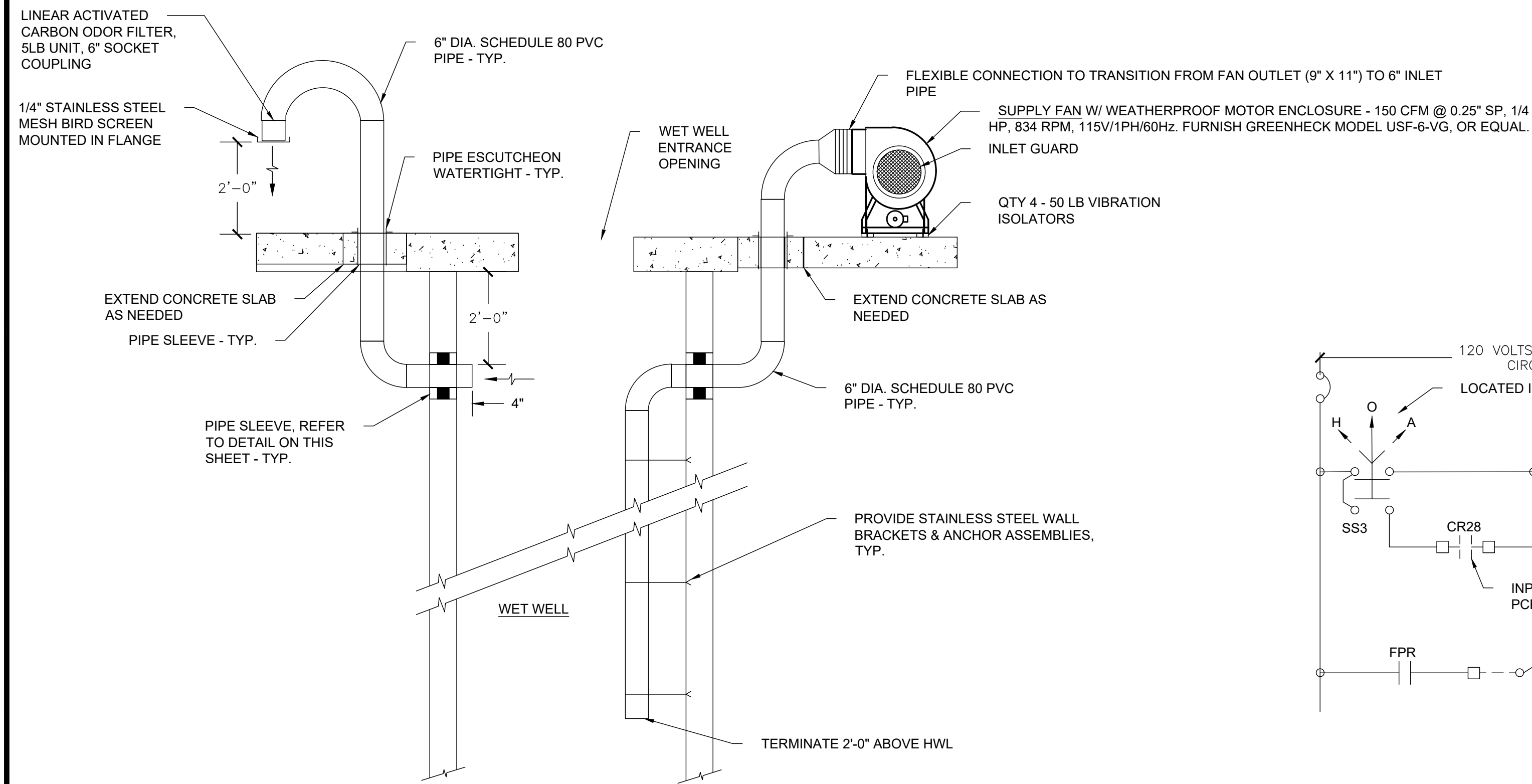
- SHEET NOTES:**
- 15 KW/20 KVA DIESEL GENERATOR (STANDBY), 240V/120-3PH-4W, 24 HR FUEL STORAGE, GENERATOR BREAKER TO BE PROVIDED BY GENERATOR MFG.
 - 1 1/2" x 3" STAINLESS STEEL BASE CHANNELS, FULL LENGTH FRONT AND BACK. PROVIDE FINISH TO MATCH CABINET.
 - TERMINATE CONDUIT 4" INSIDE WET WELL. PROVIDE INSULATED TYPE BUSHING & STAINLESS STEEL CABLE STRAIN RELIEF GRIP.
 - WIREWAY NEMA 4X ENCLOSURE
 - DUPLEX G.F.I. RECEPTACLE
 - 1 1/2" x 3" STAINLESS STEEL BASE CHANNELS, FULL LENGTH FRONT AND BACK. PROVIDE FINISH TO MATCH CABINET.
 - UTILITY ELECTRICAL METER WITH INTEGRATED SURGE PROTECTION DEVICE
 - IN GRADE EXPLOSION PROOF JUNCTION BOX. REFER TO DETAIL SHEET PS1-701.
 - ALARM LIGHT PROVIDED WITH PCP
 - WITH INTEGRAL CABLE(S) COMPLETE TO JB.
 - CONCRETE PAD - ELECTRICAL CONTRACTOR TO COORDINATE STUB-OUT LOCATIONS WITH CIVIL CONTRACTOR PRIOR TO POURING SLAB
 - 3#10 & 1#10 GND. + 4#14 - 1" C. TO PCP FOR PUMP POWER AND CONTROL
 - 3C #18 SHIELDED CABLE IN 3/4" C. TO PCP FOR LEVEL SENSING
 - 4 #4 - 1-1/4" C.
 - SEE PANEL SCHEDULE, SHEET PS1-701 FOR BRANCH BREAKER SIZES & USAGE.
 - 4 #6 & 1 #8 GND. - 1-1/2" C.
 - 3 #6 & 1 #8 GND. - 1" C.
 - 1 #4 - 3/4" C TO GROUND GRID.
 - 4 #4 & 1 #8 GND. - 1 1/4" C.
 - CELLULAR ANTENNA BRACKET MOUNTED TO S.E.C. (STAINLESS STEEL BRACKET THRU BOLT SECURED TO S.E.C. W/ STAINLESS HARDWARE) WITH ANTENNA CABLE TO RTU.
 - 2/C #18 SHIELDED CABLE IN 3/4" C. TO RTU FOR FLOW SIGNAL.
 - ELECTRODE CABLE IN 3/4" C. & COIL CURRENT CABLE IN 3/4" C. TO FLOW RECEIVER. CABLES WILL BE SUPPLIED BY THE FLOW METER MANUFACTURER.
 - 8#14 & 1#12 GND.-3/4" C. TO RTU FOR GENERATOR RUNNING, GENERATOR TROUBLE, FUEL TANK LEVEL LOW & FUEL TANK LEAK SIGNALS.
 - PUMP CONTROL PANEL (PCP) - REFER TO SPECIFICATIONS SECTION 16920.
 - 12#14 & 1#12 GND. - 1 1/4" C TO RTU FOR PCP PUMP NO. 1. & NO. 2 RUNNING, PUMP NO 1. & NO. 2 TROUBLE, HIGH WATER LEVEL & LOW WATER LEVEL SIGNALS.
 - 4#14 & 1#12 GND. - 3/4" C. TO RTU FOR ATS STATUS SIGNALS (NORMAL POSITION, EMERGENCY POSITION, LOSS OF POWER).
 - LIGHT SWITCH FOR INTERIOR CABINET LIGHTS
 - 48" LED STRIP LIGHT MOUNTED TOWARDS FRONT OF CABINET
 - SECURE TO CABINET AS DESCRIBED ON SHEET PS1-501, SHEET NOTE NO. 3.
 - COOLING AIR FAN PACKAGE: 560 CFM, 1650 RPM, 115V., 1PH, 35 WATTS COMPLETE W/ STAINLESS STEEL GRILLE, ALUMINUM AIR FILTER, COMPOSITE AIR FLENUM & COMPOSITE FINGER GUARD. FURNISH HOFFMAN CATALOG NO. A-PA10AXFN, OR EQUAL.
 - AIR EXHAUST GRILL ASSEMBLY: CONSISTING OF 11 62" x 13.00" STAINLESS STEEL GRILLE, ALUMINUM AIR FILTER & MOUNTING HARDWARE. FURNISH HOFFMAN CATALOG NO. A-EXGR10, OR EQUAL.
 - COOLING AIR FAN THERMOSTAT: ADJUSTABLE RANGE OF 70 F TO 140 F. ANODIZED ALUMINUM HOUSING, RATED 12.5AMPS AT 120VOLT. FURNISH HOFFMAN CATALOG NO. D-TEMA, OR EQUAL.
 - HEATER: 400 WATTS, 115 V., 1 PH. ANODIZED ALUMINUM HOUSING WITH INTEGRAL THERMOSTAT & FAN. FURNISH HOFFMAN CATALOG NO. D-AH4001B, OR EQUAL
 - VFD FOR 3 HP MOTOR, NEMA 1 RATED, 240V/3PH. CONTROL INTEGRATOR TO SPECIFY MODEL AND ENSURE IT IS COMPATIBLE WITH PUMPS. SEE PUMP CURVE ON SHEET PS1-403
 - 3/4" DIA. x 10" LONG "L" STAINLESS STEEL ANCHOR BOLT. ASSEMBLY, FRONT AND BACK, SET IN CONCRETE PAD.
 - WHITE FINISHED INTERIOR MOUNTING BACK PANEL.
 - SERVICE EQUIPMENT CABINET, SIZED AS INDICATED.

<p>Professional Certification I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Delaware. License No. 8359 Expiration Date: June 30, 2022</p>	<p>Revisions</p> <table border="1"> <tr> <td>INITIAL SUBMISSION</td> <td>04/04/22</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>		INITIAL SUBMISSION	04/04/22							<p>Heritage Shores Circle Pump Station</p> <table border="1"> <tr> <td>Bridgeville, Delaware</td> <td>04/04/22</td> </tr> <tr> <td>First Election District - Sussex County</td> <td>Scale:N.T.S.</td> </tr> <tr> <td>Electrical Single Line & Cabinet</td> <td>PS1-601</td> </tr> </table>	Bridgeville, Delaware	04/04/22	First Election District - Sussex County	Scale:N.T.S.	Electrical Single Line & Cabinet	PS1-601
	INITIAL SUBMISSION	04/04/22															
Bridgeville, Delaware	04/04/22																
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Electrical Single Line & Cabinet	PS1-601																
<p>Main Office: 108 N. Veterans St., Exton, MD 21921 Web: www.rauch-inc.com Email: design@raucheng.com Phone: 410.770.9091 Fax: 410.770.9087</p>																	

HERITAGE SHORES PS1		Supply Air		127 Minimum CFM	
3/25/2022					
SF-1					
Description	Area (sqft) (Az)	WET WELL DEPTH	Air Change Required	Supply Air Design (Vpz)	
PS1 - WETWELL	28.27	22.52	12	127	
	28			127	

1 VENTILATION REQUIREMENT FOR WETWELL FAN

NTS



PANEL LV-1									
VOLTAGE (L-N): 120					ENCLOSURE TYPE: NEMA 4X				
VOLTAGE (L-L): 240					MOUNTING: SURFACE				
PHASES, WIRES: 1 φ, 3 W					AIC RATING: 10000				
MINIMUM BUS CAPACITY (A): 20 A					NOTES: - - - -				
MAIN O.C. DEVICE (A): 50 A									
CKT NO	DESCRIPTION	TRIP AMPS	POLE	PHASE LOADS (VA)		POLE	TRIP AMPS	DESCRIPTION	CKT NO
				A	B				
1	SERVICE EQUIPMENT CABINET LIGHTING	20	1	20	24	1	20	FLOW METERING SYSTEM	2
3	RECEPTACLES	20	1		360	120	1	REMOTE TERMINAL UNIT	4
5	GENERATOR BLOCK HEATER	30	1	2000	70		1	SITE LIGHT	6
7	GENERATOR BATTERY CHARGER	20	1		600	186	1	WETWELL SUPPLY FAN	8
9	SERVICE EQUIPMENT CABINET HEATER	20	1	800	1500		1	SERVICE EQUIPMENT CABINET FAN AND THERMOSTAT: POWER	10
11	SERVICE EQUIPMENT CABINET FAN AND THERMOSTAT: CONTROL	20	1			1500	0	SPARE	12
13	SPARE	20	1	0	0		1	SPARE	14
15	SPARE	20	1			0	0	SPARE	16
				CONNECTED LOAD PHASE TOTALS (VA)					
				4414		2766			
				CONNECTED LOAD (KVA)	DEMAND FACTOR	DEMAND LOAD (KVA)	DEMAND LOAD SPARE CAPACITY		7.2 KVA
				Receptacles (0 - 10 KVA)	0.4	1.00	SPARE CAPACITY		4.8 KVA
				Cooling and Heating	3.8	1.00	SPARE CAPACITY		20.1 AMPS
				Equipment	3.0	1.00	SPARE CAPACITY		40%
				Lighting	0.0	1.25			
TOTAL:				7.2		7.2			
LOAD (AMPS):				29.9		29.9			

2 DETAIL-WET WELL SUPPLY FAN INSTALLATION

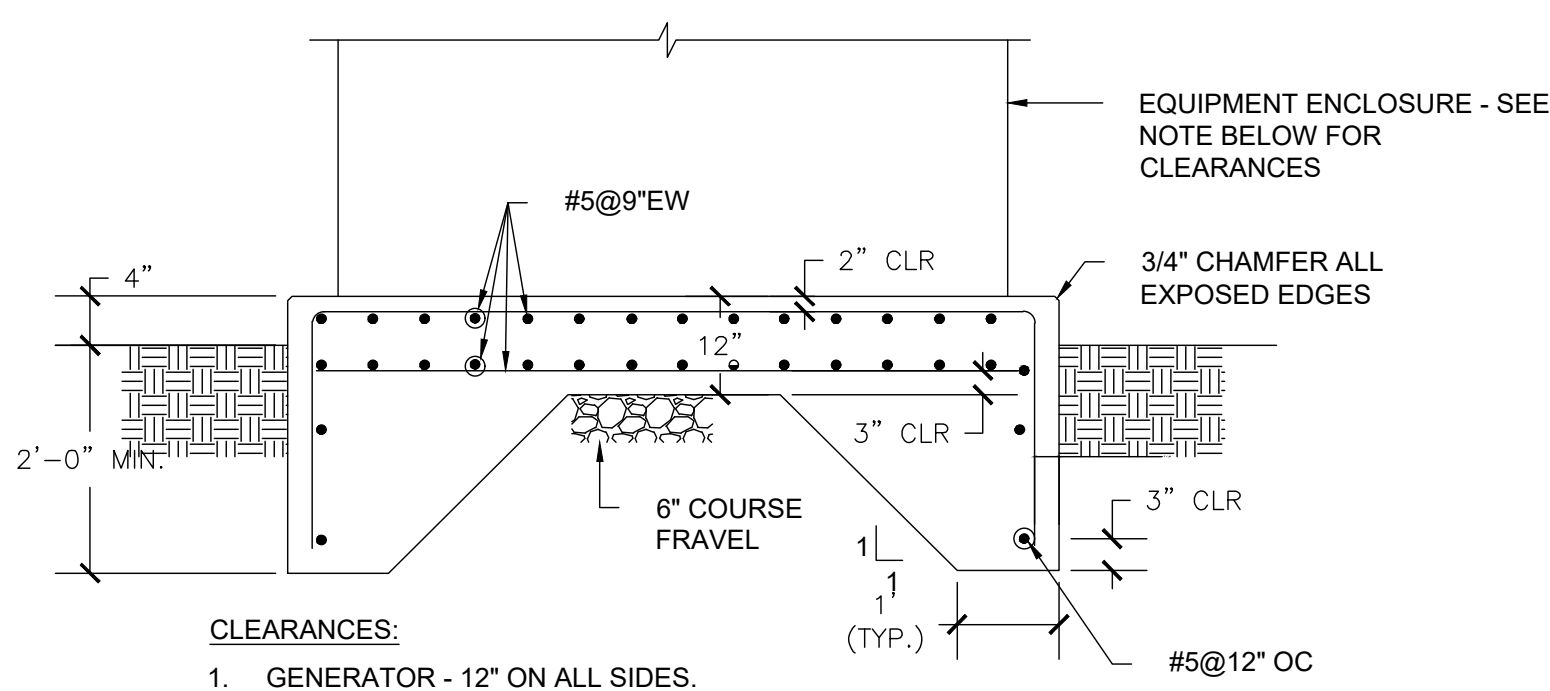
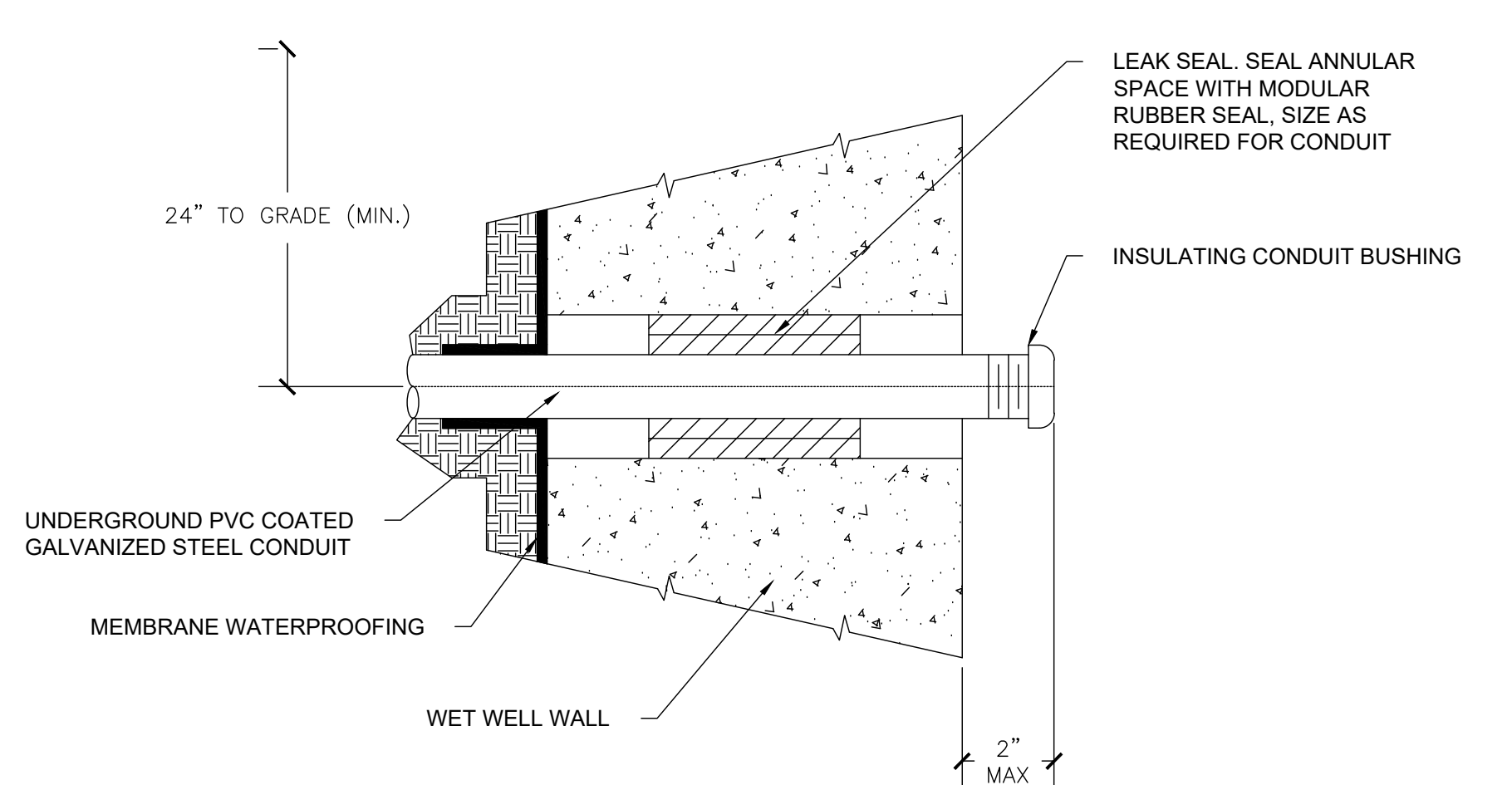
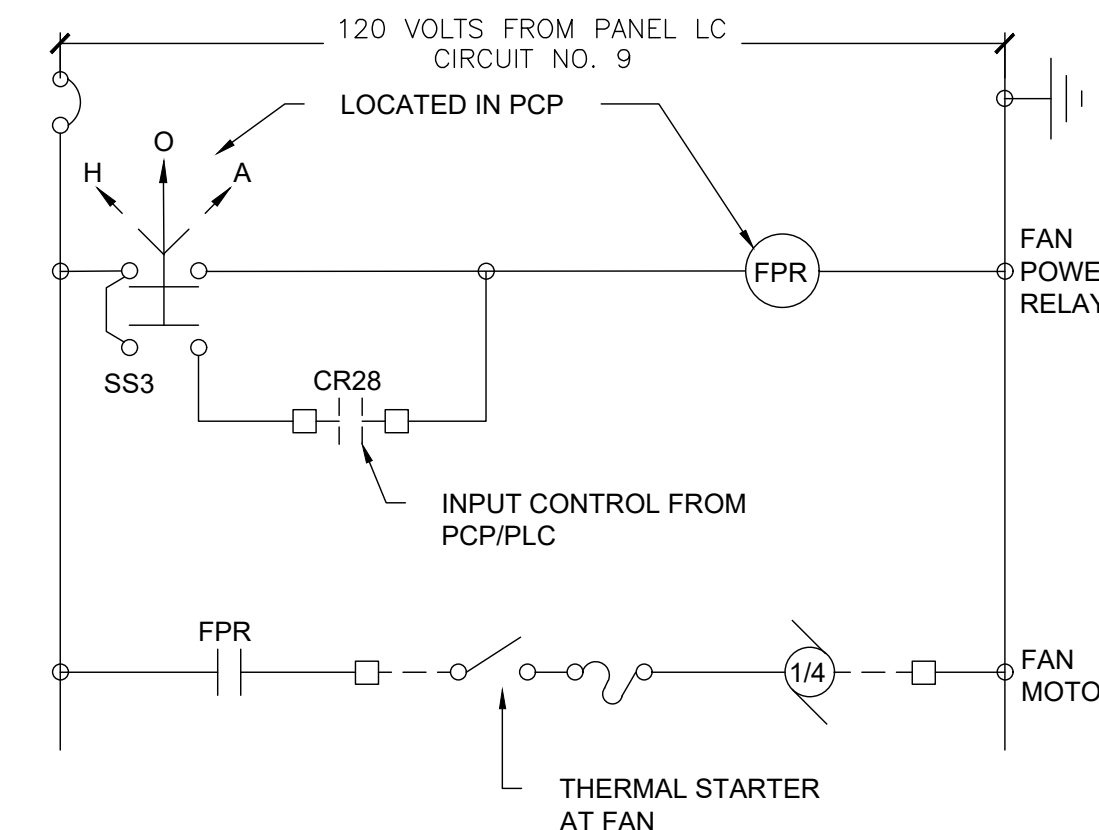
NTS

3 DETAIL - SUPPLY FAN CONTROL DIAGRAM

NTS

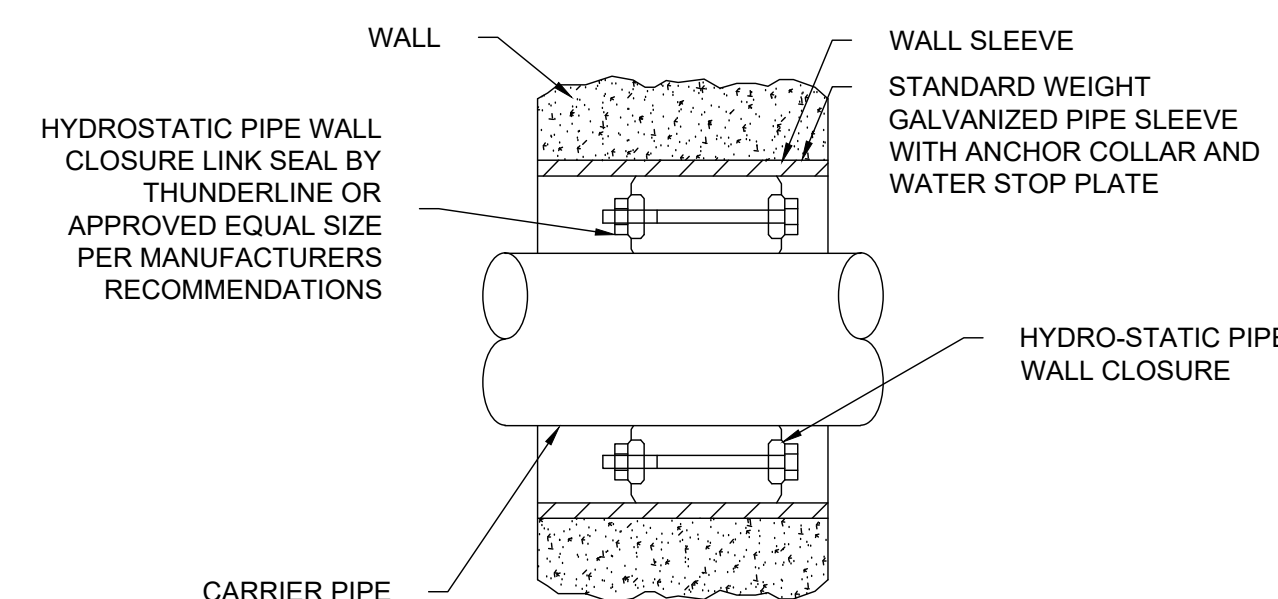
4 TYPICAL WET WELL ELECTRICAL HUB CONDUIT ENTRY DETAIL

NTS



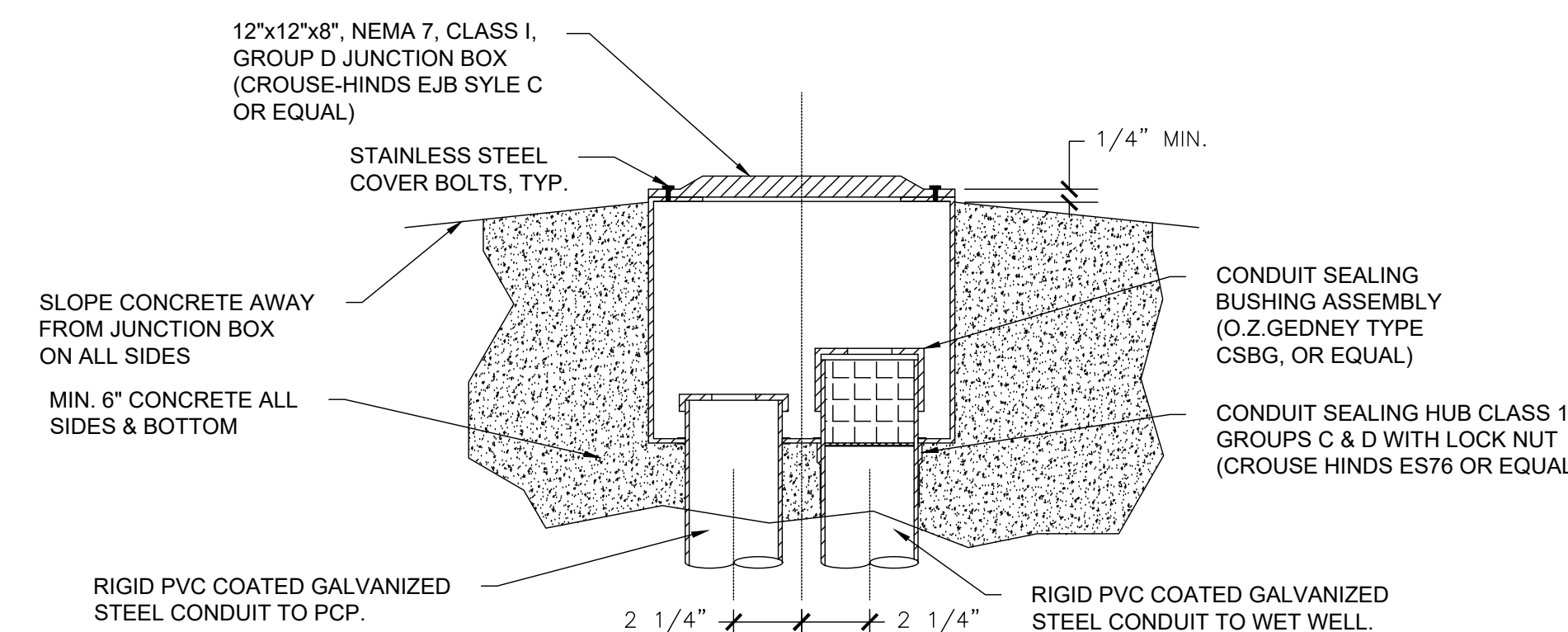
5 DETAIL - TYPICAL GENERATOR CONCRETE PAD

NTS



6 DETAIL - TYPICAL PIPE SLEEVE THRU WALL

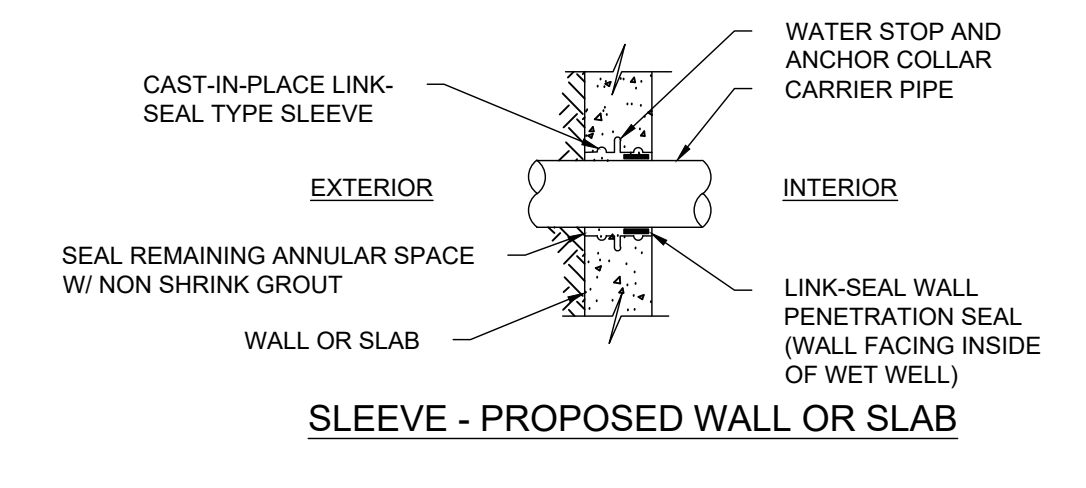
NTS



7 DETAIL - EXPLOSION PROOF IN GRADE JUNCTION BOX

NTS

- NOTES:
- INSTALL BOXES MINIMUM 3' FROM WET WELL.
 - THREE BOXES REQUIRED - ONE FOR LEVEL SENSING DEVICE CABLES & ONE EACH FOR PUMP MOTOR CABLES.



8 WALL SLEEVE DETAIL

NTS



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Revisions	
INITIAL SUBMISSION	04/04/22

Heritage Shores Circle Pump Station	
Bridgeville, Delaware	04/04/22
First Election District - Sussex County	Scale: N.T.S.
Ventilation, Details & Schedules	PS1-701


Heritage Shores Circle Pump Station Sediment & Erosion Control Plan

NOTES

- The Sussex Conservation District must be notified in writing five (5) days prior to commencing with construction to schedule a pre-construction meeting. Failure to do so constitutes a violation of the approved Sediment and Stormwater Management Plan.
- Review and approval of the Sediment and Stormwater Management Plan shall not relieve the contractor from his or her responsibilities for compliance with the requirements of the Sediment and Stormwater Regulations, nor shall it relieve the contractor from errors or omissions in the approved plan.
- If the approved plan needs to be modified, additional sediment and stormwater control measures may be required as deemed necessary by the Sussex Conservation District.
- The Sussex Conservation District reserves the right to enter private property for purposes of periodic site inspection.
- Following soil disturbance or redistribution, permanent or temporary stabilization shall be completed within 14 calendar days as to the surface of all perimeter sediment controls, topsoil stockpiles, and all other disturbed or graded areas on the proposed site.
- All erosion and sediment control practices shall comply with the Delaware Erosion and Sediment Control Handbook 1989 or latest edition.
- Approved plans remain valid for 3 years from the date of approval.
- As-built surveys and drawings are to be submitted to the District within 60-days of stormwater management facility completion.
- Approval of a Sediment and Stormwater Plan does not grant or imply a right to discharge stormwater runoff. The owner/developer is responsible for acquiring any and all agreements, easements, etc., necessary to comply with State drainage and other applicable laws.
- Sediment accumulation in the 0% grade pipes connecting the proposed ponds shall be cleaned when the sediment interferes with the normal operation of the pipe. The pipes shall be cleaned with high pressure hoses. Sediment control silt fences at the entrance of the discharge pipe shall be maintained during the pipe cleaning process.
- SCD inspector has to approve any pumping operation discharge location and means prior to start of activity.

Passwaters Farm LLC shall be responsible for maintenance and repair of all sediment control and stormwater management practices during construction.


Passwaters Farm LLC certifies that DNREC or a delegated inspection agency shall have access to the site for the completion of on-site inspections.

 04/08/22
Date

Bridgeville Villas, LLC

OWNERS CERTIFICATE

"I, the undersigned, certify that all land clearing, construction and development shall be done pursuant to the approved plan and that responsible personnel involved in the land disturbance will have a Certification of Training at a Departmental sponsored or approved training program for the control of erosion and sediment control before initiation of the project."


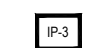
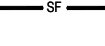


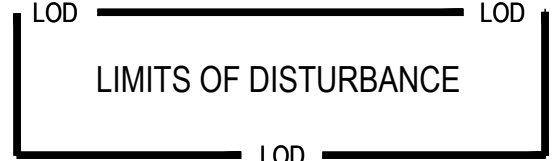
 04/08/22
Date

Bridgeville Villas, LLC
3201 Jermantown Road, Suite 150
Fairfax, Virginia 22030
Phone (703) 270-1400
Fax (703) 270-1401

SEQUENCE OF CONSTRUCTION

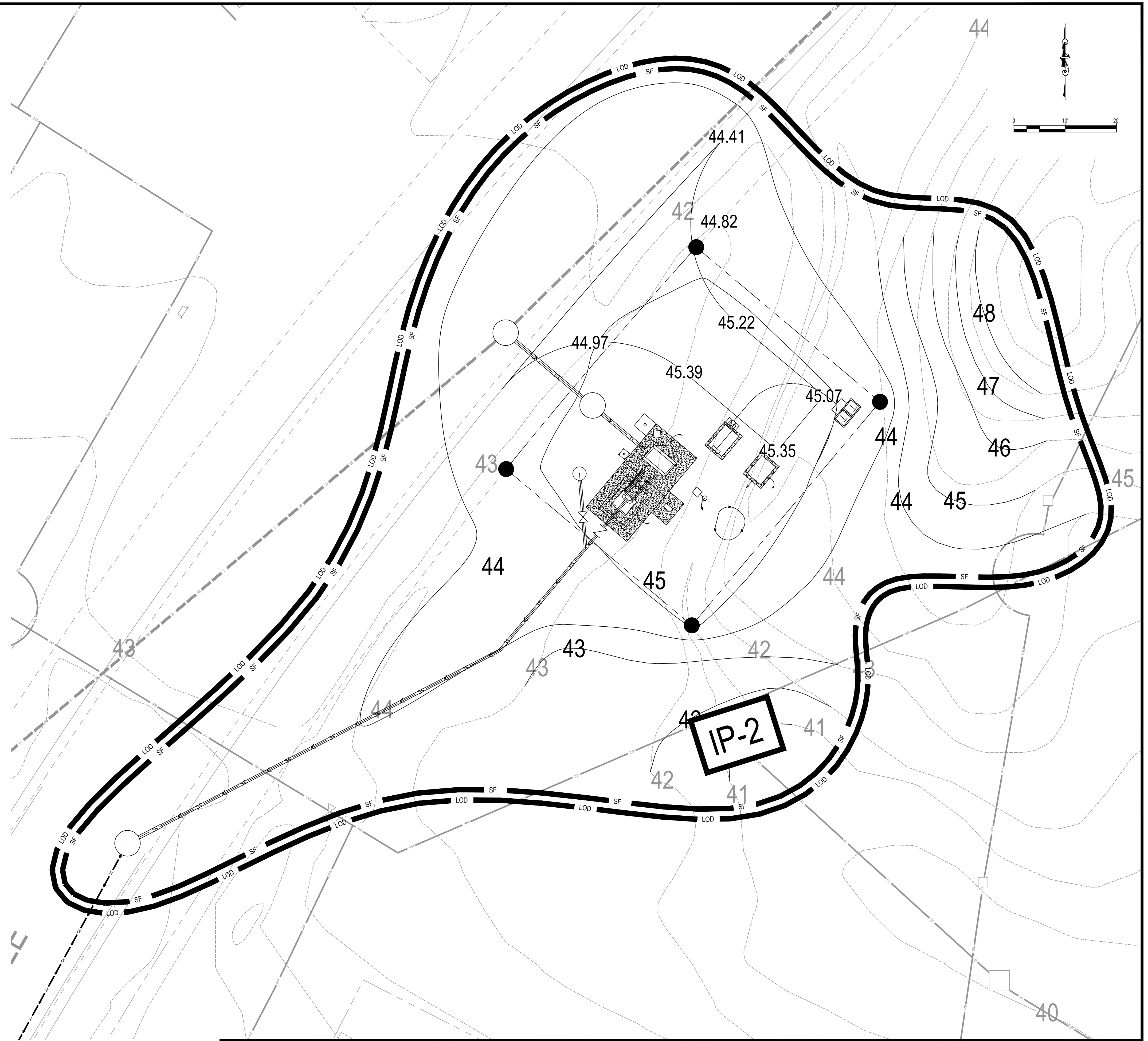
- The Sussex Conservation District is to be contacted at 302-856-7219 for a pre-construction meeting a minimum of two weeks prior to commencement of construction. A CCR is required for this project and shall attend the pre-construction meeting.
- District Inspector is to approve the method and location of any dewatering activity. Dewatering permits may be required by DNREC and should be verified with the Water Supply Section at 302-739-9944.
- Repair or replace any damaged perimeter controls established in previous phases of construction.
- Stakeout location of Sediment Control Devices
- Install Stabilized Construction Entrance
- Install Silt Fence and all perimeter controls. The SCD shall be notified for a perimeter site inspection prior to the contractor proceeding with construction activity.
- Concurrent Grading Activities (No more than 20 Acres may be disturbed at one time)
 - Strip and stockpile topsoil within LOD
 - Grade to design subgrade
 - Install gravity sewer and pump station
 - Backfill and compact SS trench with select material at specified lifts and compaction to design subgrade
 - Install Driveway
 - Reapply Topsoil
 - Apply Permanent Stabilization

SEC LEGEND

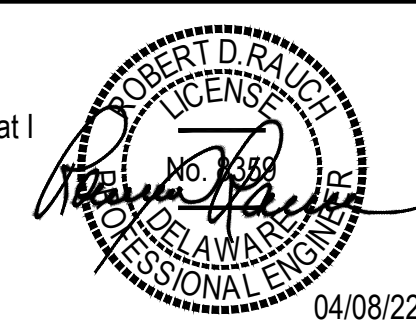
-  AT GRADE INLET PROTECTION
-  GUTTER BUDDY CURB INLET PROTECTION
-  SILT FENCE
-  STABILIZED CONSTRUCTION ENTRANCE
-  ROCK OUTLET / INLET PROTECTION
-  LIMITS OF DISTURBANCE

SITE CHARACTERISTICS

Total Site Area:	736.30	AC
Disturbed Area:	0.34	AC
Fill Quantity:	668	CY
Cut Quantity:	75	CY
Net Fill:	593	CY



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Revisions	
INITIAL SUBMISSION - 01/21/22	
FIRST REVISION - 04/08/22	

Heritage Shores Circle Pump Station	
Bridgeville, Delaware	04/08/22
First Election District - Sussex County	Scale: 1" = 10'
Site Plan	PS1-801

Standard Detail & Specifications
Silt Fence

Section

Plan

Source: Adapted from MD Stds. & Specs. for ESC
Symbol: **SF**
Detail No. **DE-ESC-3.1.2.1** Sheet 1 of 2

Effective February 2019

Standard Detail & Specifications
Silt Fence

Construction Detail

Method for joining continuous sections

Construction Notes:

- Geosynthetic fabric to be fastened securely to fence posts with wire ties or staples.
- When two sections of filter cloth adjoin each other they shall be overlapped by six inches and folded.
- Maintenance shall be performed as needed and material removed when "bulges" develop in the silt fence.

Materials:

- Stakes: Steel (either T or U) or 2" x 2" hardwood
- Geosynthetic Fabric: Type GD-1
- Reinforcing strip: Wooden lath or plastic strip

Source: Adapted from MD Stds. & Specs. for ESC
Symbol: **SF**
Detail No. **DE-ESC-3.1.2.1** Sheet 2 of 2

Effective February 2019

Standard Detail & Specifications
Super Silt Fence

Perspective

Section

Source: Adapted from MD Stds. & Specs. for ESC
Symbol: **SSF**
Detail No. **DE-ESC-3.1.2.3** Sheet 1 of 2

Effective February 2019

Standard Detail & Specifications
Super Silt Fence

Construction Notes:

- The poles do not need to be set in concrete.
- Chain link fence shall be fastened securely to the fence posts with wire ties or staples.
- Geotextile fabric shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.
- Geotextile fabric shall be embedded a minimum of 8" into the ground.
- When two sections of geotextile fabric adjoin each other, they shall be overlapped by 6' and folded.
- Maintenance shall be performed as needed and silt buildups removed when "bulges" develop in the silt fence.

Materials:

- Fencing: Fencing shall be 42 inches in height and constructed in accordance with the latest Delaware Department of Transportation (Del-DOT) Specifications for Chain Link Fencing Section 727. The Del-DOT specification for a 6 foot fence shall be used, substituting 42 inch fabric and 6 foot length posts.
- Geosynthetic Fabric: Type GD-1

Source: Adapted from MD Stds. & Specs. for ESC
Symbol: **SSF**
Detail No. **DE-ESC-3.1.2.3** Sheet 2 of 2

Effective February 2019

Standard Detail & Specifications
Inlet Protection - Type 2

Bag Detail

Perspective

Source: Adapted from ACF Products, Inc.
Symbol: **IP-2**
Detail No. **DE-ESC-3.1.5.2** Sheet 1 of 2

Effective February 2019

Standard Detail & Specifications
Inlet Protection - Type 2

Notes:

- This practice shall only be used in situations in which Inlet Protection - Type 1 cannot be used due to site constraints. These include, but are not limited to partially completed parking areas, streets, roads, etc.
- It may be necessary to transition from Type 1 to Type 2 Inlet Protection as construction proceeds.
- For areas where there is a concern for oil run-off or spills, insert shall meet one of the above specifications with an oil-absorbent pillow or shall be made completely from an oil-absorbent material with a woven pillow.

Materials:

The geotextile Inlet Insert shall meet or exceed the specifications of Type GD-II geotextile in accordance with Appendix A-3 of the Delaware Erosion & Sediment Control Handbook.

Source: Adapted from ACF Products, Inc.
Symbol: **IP-2**
Detail No. **DE-ESC-3.1.5.2** Sheet 2 of 2

Effective February 2019

Standard Detail & Specifications
Geotextile Dewatering Bag

Plan

Profile

Source: Adapted from ACF Products, Inc.
Symbol: **GB**
Detail No. **DE-ESC-3.2.1.2** Sheet 1 of 2

Effective February 2019

Standard Detail & Specifications
Geotextile Dewatering Bag

Construction Notes:

- The dewatering bag should be placed so the incoming water flows into and through the bag, and then flow off the site without creating more erosion. The neck should be tied off tightly to stop the water from flowing out of the bag without going through the walls. The dewatering bag should be placed on a gravel bed to allow water to flow in all directions.
- The dewatering bag is considered full and should be disposed when it is impractical for the bag to filter the sediment out at a reasonable flow rate. At this point, it should be replaced with a new bag.
- Disposal may be accomplished as directed by the construction reviewer. If the site allows, the bag may be buried on site and seeded, visible fabric removed and seeded or removed from site to a proper disposal area.

Materials:

- The geotextile fabric shall be a Type GD-IV.
- The dewatering bag shall be sewn with a double needle machine using high strength thread. All structural seams will be sewn with high strength, double stitched "J" type. Seam strength test will have the following minimum average roll values:

Type	TEST METHOD	TEST RESULT
Heavy duty	ASTM D-4884	100 lb / in

- The dewatering bag shall have an opening large enough to accommodate a four (4) inch discharge hose with attached strap to tie off the hose to prevent the pumped water from escaping from the bag without being filtered.

Source: Adapted from ACF Products, Inc.
Symbol: **GB**
Detail No. **DE-ESC-3.2.1.2** Sheet 2 of 2

Effective February 2019

Standard Detail & Specifications									
Vegetative Stabilization									
TEMPORARY SEEDING BY RATES, DEPTHS AND DATES									
Mix #	Species ^a	Seeding Rate	Optimum Seeding Dates ¹						Planting Depth ²
			Coastal Plain		Piedmont		All		
Certified Seed	lb/Ac ¹	lb/1000 sq.ft.	2/1-4/30	8/15-8/14	9/15-10/31	1/15-7/31	8/1-10/31	10/21-2/1	
1	Berley	125	4	O	A	O	O	A	1-2 inches 2-3" sandy soils
2	Oats	125	4	O	A	A	O	A	1-2 inches 2-3" sandy soils
3	Rye	125	4	O	A	O	O	A	1-2 inches 2-3" sandy soils
4	Perennial Ryegrass	125	4	O	A	O	O	A	0.5 inches 1-2" sandy soils
5	Annual Ryegrass	125	4	O	A	O	O	A	0.5 inches 1-2" sandy soils
6	Winter Wheat	125	4	O	A	O	O	A	1-2 inches 2-3" sandy soils
7	Foxtail Millet	30 PLS	0.7						0.5 inches 1-2" sandy soils
8	Pean Millet	20 PLS	0.5						1-2" sandy soils

1. Winter seeding requires 3 tons per acre of straw mulch for proper stabilization.
 2. May be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
 3. Applicable on slopes 5:1 or less.
 4. Fifty pounds per acre of Annual Lespedeza may be added to 1/2 the seeding rate of any of the above species.
 5. Use varieties currently recommended for Delaware. Contact a County Extension Office for information.
 6. Warm season grasses such as Millet or Weeping Lovegrass may be used between 5/1 and 9/1 if desired. Seed at 3-5 lbs. per acre. Good on low fertility and acid areas. Seed after frost through summer at a depth of 0.5".

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		DE-ESC-3.4.3 Sheet 1 of 4

Effective February 2019

Standard Detail & Specifications									
Vegetative Stabilization									
PERMANENT SEEDING AND SEEDING DATES									
Mix No.	Certified Seed ^a	Seeding Rate ¹	Optimum Seeding Dates ²						Remarks
			Coastal Plain		Piedmont		All		
lb/Ac	lb/1000 sq.ft.	2/1-4/30	8/15-8/14	9/15-10/31	1/15-7/31	8/1-10/31	10/21-2/1		
1	Well Drained Soils	160	3.2	A	O	A	O	A	Good erosion control mix. Tolerant of low fertility soils. Lowgrass very difficult to mow; eliminates only to bed weather.
2	Creeping Red Fescue or Perennial Ryegrass ^b	30	0.69	A	O	A	O	A	Good erosion control mix. Tolerant of low fertility soils. Good wildlife cover and food.
3	Tall Fescue (Turk-type) or Strong Creeping Red Fescue or Perennial Ryegrass	50	1.15	O	A	O	O	A	Good erosion control mix. Tall Fescue for droughty conditions. Creeping Red Fescue for heavy shade. Flatgrass to suppress woody vegetation.
4	Strong Creeping Red Fescue, Kentucky Bluegrass, Perennial Ryegrass or Redtop	100	2.3	O	A	O	O	A	Schedule mowings only. Canada Bluegrass more drought tolerant. Use Redtop for increased drought tolerance.
5	Plus White Clover ^c	3	0.07						Use appropriate mowing schedule.
6	Switchgrass ^d or Cocksfoot Ryegrass, Big Bluestem, Little Bluestem, Indigo Grass	10	0.23						Native warm-season mixture. Tolerant of low fertility soils. Drought tolerant. Poor shade tolerance. N fertilizer discouraged - needs managed for strip for red-tiled surface.
7	Tall Fescue (Turk-type) (Band of 2 cultivars)	180	3.5	O	A	O	O	A	Three cultivars of Kentucky Bluegrass. Traffic tolerant.
8	Big Bluestem ^e , Indigo Grass ^f , Little Bluestem ^g , Creeping Red Fescue plus one of: Partridge Pea Barn Clover Wild Indigo Shady Tick/Trifolium	10	0.23	O	A	O	O	A	All species are native. Indigo Grass and Bluestem have fluffy seeds. Plant with a specialized native seed drill. Creeping Red Fescue will provide erosion protection while the warm season grasses get established.

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		DE-ESC-3.4.3 Sheet 2 of 4

Effective February 2019

Standard Detail & Specifications									
Vegetative Stabilization									
PERMANENT SEEDING AND SEEDING DATES (cont.)									
Mix No.	Certified Seed ^a	Seeding Rate ¹	Optimum Seeding Dates ²						Remarks
			Coastal Plain		Piedmont		All		
lb/Ac	lb/1000 sq.ft.	2/1-4/30	8/15-8/14	9/15-10/31	1/15-7/31	8/1-10/31	10/21-2/1		
9	Poorly Drained Soils	75	1.52	O	A	O	O	A	Quick stabilization of disturbed sites and waterways.
10	Creeping Red Fescue, Sheep Fescue, Rough Ryegrass	30	0.69	A	O	A	O	A	Good erosion control, wildlife cover and rapid vegetation.
11	Tall Fescue, Perennial Ryegrass, Kentucky Bluegrass Blend	100	2.3	O	A	O	O	A	High value, high maintenance, light traffic, irrigation necessary. Well drained soils, full sun.
12	Tall Fescue, Perennial Ryegrass, Sheep Fescue	100	2.3	O	A	O	O	A	Moderate value, low maintenance, traffic tolerant.
13	Creeping Red Fescue, Creeping Ryegrass, Kentucky Bluegrass	50	1.15	O	A	O	O	A	Shade tolerant, moderate traffic tolerance, moderate maintenance.
14	Creeping Red Fescue, Rough Ryegrass or Creeping Ryegrass	50	1.15	O	A	O	O	A	Shade tolerant, moderate maintenance.
15	K31 Tall Fescue	150	3.5	O	A	O	O	A	Monoculture, but performs well alone in farms. Discouraged.

1. When hydroseeding is the chosen method of application, the total rate of seed or mix can be increased by 25%.
 2. Winter seeding requires 3 tons per acre of straw mulch. Seeding dates listed above are average for Delaware. These dates may require adjustment to reflect local conditions.
 3. All seed shall meet the minimum purity and minimum germination percentages recommended by the Delaware Department of Agriculture. The minimum % of seed shall be in accordance with Section 1, Chapter 24, Title 3 of the Delaware Code.
 4. Cool season species may be planted throughout summer if soil moisture is adequate or seeded area can be irrigated.
 5. All leguminous seed must be inoculated.
 6. Warm season grass mix and Red Casey Grass cannot be mowed more than 4 times per year.
 7. Warm season grasses require a soil temperature of at least 60 degrees in order to germinate, and will remain dormant until then.

NOTE: Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.

Source:	Symbol:	Detail No.
Delaware ESC Handbook		DE-ESC-3.4.3 Sheet 3 of 4

Effective February 2019

Standard Detail & Specifications									
Vegetative Stabilization									
Construction Notes:									
1. Site Preparation									
a. Prior to seeding, install needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, graded waterways, and sediment basins.									
b. Final grading and shaping is not necessary for temporary seedings.									
2. Seedbed Preparation									
It is important to prepare a good seedbed to insure the success of establishing vegetation. The seedbed should be well prepared, loose, uniform, and free of large clods, rocks, and other objectionable material. The soil surface should not be compacted or crusted.									
3. Soil Amendments									
a. Lime - Apply liming materials based on the recommendations of a soil test in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply dolomitic limestone at the rate of 1 to 2 tons per acre. Apply limestone uniformly and incorporate into the top 4 to 6 inches of soil.									
b. Fertilizer - Apply fertilizer based on the recommendations of a soil test in accordance with the approved nutrient management plan. If a nutrient management plan is not required, apply a formulation of 10-10-10 at the rate of 600 pounds per acre. Apply fertilizer uniformly and incorporate into the top 4 to 6 inches of soil.									
4. Seeding									
a. For temporary stabilization, select a mixture from Sheet 1. For a permanent stabilization, select a mixture from Sheet 2 or Sheet 3 depending on the conditions. Alternative seed mixes may be used with prior approval from the Department or Delegated Agency.									
b. Apply seed uniformly with a broadcast seeder, drill, cultipacker seeder or hydroseeder. All seed will be applied at the recommended rate and planting depth.									
c. Seed that has been broadcast should be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used and the seed and fertilizer is mixed, they will be mixed on site and the seeding shall be done immediately and without interruption.									
5. Mulching									
All mulching shall be done in accordance with detail DE-ESC-3.4.5									
Source:	Symbol:	Detail No.							
Delaware ESC Handbook		DE-ESC-3.4.3 Sheet 4 of 4							

Effective February 2019

Standard Detail & Specifications									
Riprap Outlet Protection - 1									
<p>NOTE: Depress centerline of apron slightly to prevent edge-cutting.</p>									
<p>NOTE: Key into exist. grd</p>									
<p>DATA</p> <p>Pipe diameter (D_o) Apron length (L_a) Apron width (W) Riprap size (R No.) Riprap thickness (T)</p> <p>$T_w < 0.5 D_o$</p>									
Source:	Symbol:	Detail No.							
Adapted from MD Stds. & Specs. for ESC	ROP-1	DE-ESC-3.3.10.1 Sheet 1 of 2							

Effective February 2019

Standard Detail & Specifications									
Riprap Outlet Protection - 1									
<p>Construction Notes:</p> <ol style="list-style-type: none"> The subgrade for the riprap shall be prepared to the required lines and grades as shown on the plan. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material. The riprap shall conform to the grading limits as shown on the plan. Filter cloth shall be protected from punching, cutting or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of cloth over the damaged area. All connecting joints should overlap a minimum of 1 ft. If the damage is extensive, replace the entire filter cloth. Stone for the riprap or gabion outlets may be placed by equipment. Riprap shall be placed in a manner to prevent damage to the filter cloth. Hand placement will be required to the extent necessary to prevent damage to the conduits, structures, etc. 									
Source:	Symbol:	Detail No.							
Adapted from MD Stds. & Specs. for ESC	ROP-1	DE-ESC-3.3.10.1 Sheet 2 of 2							

Effective February 2019

Standard Detail & Specifications									
Stabilized Construct. Entrance									
<p>Provide positive drainage to sediment trapping device</p>									
Source:	Symbol:	Detail No.							
Adapted from VA ESC Handbook	SCE	DE-ESC-3.4.7 Sheet 1 of 2							

Effective February 2019

Standard Detail & Specifications									
Stabilized Construct. Entrance									
<p>Metal bars set in reinforced conc. (traffic bearing grates, timber mats or other approved equiv. may be substituted)</p> <p>Provide space for drainage</p> <p>Section A-A (Opt.)</p>									
<p>Construction Notes:</p> <ol style="list-style-type: none"> Stone size - Use DE #3 stone. Length - As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum length would apply). Thickness - Not less than size (6) inches. Width - Ten (10) foot minimum, but not less than the full width at points where ingress or egress occurs. Geotextile - Type GS-1; placed over the entire area prior to placing of stone. Surface Water - All surface water flowing or diverted toward construction entrances shall be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted. Maintenance - The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanup of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately. Washing - Vehicle wheels shall be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device. Inspection - Periodic inspection and needed maintenance shall be provided after each rain. 									
Source:	Symbol:	Detail No.							
Adapted from VA ESC Handbook	SCE	DE-ESC-3.4.7 Sheet 2 of 2							

Effective February 2019



Professional Certification
 I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Delaware.
 License No. 8359
 Expiration Date: June 30, 2022

Revisions	
INITIAL SUBMISSION - 01/21/22	
FIRST REVISION - 04/08/22	

Villas at Bridgeville	
Bridgeville, Delaware	12/22/21
First Election District - Sussex County	Scale: As Shown
Sediment & Erosion Control - Construction Details	PS1-803

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

DATA TO BE PROVIDED
Volume of Potential Pollution
Height of containment
Area of containment
Volume of containment

Source: Delaware ESC Handbook
Symbol:
Detail No. **DE-ESC-3.6.1**
Sheet 1 of 5

Effective February 2019

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

Pollution Prevention – Spill Prevention

- Fueling should only take place in signed designated areas, away from downstream drainage facilities and watercourses.
- Fueling must be with nozzles equipped with automatic shut-off to control drips. Do not top off.
- Protect the areas where equipment or vehicles are being repaired, maintained, fueled or parked from storm water run-on and runoff.
- Use barriers such as berms to prevent storm water run-on and runoff, and to contain spills.
- Place a "Fueling Area" sign next to each fueling area.
- Store hazardous materials such as fuel, solvents, oil and chemicals in secondary containment.
- Inspect vehicles and equipment for leaks on each day of use. Repair fluid and oil leaks immediately.
- Absorbent spill clean-up materials and spill kits must be available in fueling areas and on fuel trucks.
- If fueling is to take place at night, make sure the fueling area is sufficiently illuminated.
- Properly dispose of used oil, fluids, lubricants and spill clean-up materials.

CLEAN UP SPILLS

- If it is safe to do so, immediately contain and clean up any chemical and/or hazardous material spills.
- Properly dispose of used oil, fluids, lubricants and spill clean-up materials.
- Do not bury spills or wash them down with water.

LEAKS AND DRIPS

- Use drip pans or absorbent pads at all times. Place under and around leaky equipment.
- Do not allow oil, grease, fuel or chemicals to drip onto the ground.
- Have spill kits and clean up material on-site.
- Repair leaky equipment promptly or remove problem vehicles and equipment from the site. Clean up contaminated soil immediately.
- Store contaminated waste in sealed containers constructed of suitable material. Label these containers properly.
- Clean up all spills and leaks. Promptly dispose of waste and spent clean up materials.

Source: Delaware ESC Handbook
Symbol:
Detail No. **DE-ESC-3.6.1**
Sheet 2 of 5

Effective February 2019

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

Notes:
The Construction Site Pollution Prevention Plan should include the following elements:

- Material Inventory**
Document the storage and use of the following materials:
 - Concrete
 - Detergents
 - Paints (enamel and latex)
 - Cleaning solvents
 - Pesticides
 - Wood scraps
 - Fertilizers
 - Petroleum based products
- Good housekeeping practices**
 - Store only enough product required to do the job.
 - All materials shall be stored in a neat, orderly manner in their original labeled containers and covered.
 - Substances shall not be mixed.
 - When possible, all of a product shall be used up prior to disposal of the container.
 - Manufacturers' instructions for disposal shall be strictly adhered to.
 - The site foreman shall designate someone to inspect all BMPs daily.
- Waste management practices**
 - All waste materials shall be collected and stored in securely lidded dumpsters in a location that does not drain to a waterbody.
 - Waste materials shall be salvaged and/or recycled whenever possible.
 - The dumpsters shall be emptied a minimum of twice per week, or more if necessary. The licensed trash hauler is responsible for cleaning out dumpsters.

Source: Adapted from USEPA Pub. 840-B-92-002
Symbol:
Detail No. **DE-ESC-3.6.1**
Sheet 3 of 5

Effective February 2019

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

Notes (cont.)

- Trash shall be disposed of in accordance with all applicable Delaware laws.
- Trash cans shall be placed at all lunch spots and littering is strictly prohibited. Recycle bins shall be placed near the construction trailer.
- If fertilizer bags can not be stored in a weather-proof location, they shall be kept on a pallet and covered with plastic sheeting which is overlapped and anchored.

- Equipment maintenance practices**
 - If possible, equipment should be taken to off-site commercial facilities for washing and maintenance.
 - If performed on-site, vehicles shall be washed with high-pressure water spray without detergents in an area contained by an impervious berm.
 - Drip pans shall be used for all equipment maintenance.
 - Equipment shall be inspected for leaks on a daily basis.
 - Washout from concrete trucks shall be disposed of in a temporary pit for hardening and proper disposal.
 - Fuel nozzles shall be equipped with automatic shut-off valves.
 - All used products such as oil, antifreeze, solvents and tires shall be disposed of in accordance with manufacturers' recommendations and local, state and federal laws and regulations.
- Spill prevention practices**
 - Potential spill areas shall be identified and contained in covered areas with no connection to the storm drain system.
 - Warning signs shall be posted in hazardous material storage areas.
 - Preventive maintenance shall be performed on all tanks, valves, pumps, pipes and other equipment as necessary.
 - Low or non-toxic substances shall be prioritized for use.

Source: Adapted from USEPA Pub. 840-B-92-002
Symbol:
Detail No. **DE-ESC-3.6.1**
Sheet 4 of 5

Effective February 2019

Standard Detail & Specifications
Construction Site Waste Mgt & Spill Control

Notes (cont.)

- Contact information for reporting spills through the DNREC 24-Hour Toll Free Number shall be prominently posted.

- Education**
 - Best management practices for construction site pollution control shall be a part of regular progress meetings.
 - Information regarding waste management, equipment maintenance and spill prevention shall be prominently posted in the construction trailer.

CONTACT INFORMATION

DNREC 24-Hour Toll Free Number 800-662-8802
DNREC Solid & Hazardous Waste Management Section 302-739-9403

Source: Adapted from USEPA Pub. 840-B-92-002
Symbol:
Detail No. **DE-ESC-3.6.1**
Sheet 5 of 5

Effective February 2019

Standard Detail & Specifications
Dust Control

Temporary Methods:

- Mulches - See **DE-ESC-3.4.5**, Standard Detail and Specifications for Mulching.
- Vegetative cover - See **DE-ESC-3.4.3**, Std. Detail and Specifications for Vegetative Stabilization.
- Adhesives - Use on mineral soils only (not effective on muck soils). Keep traffic off these areas. The following table may be used for general guidance.

Type of Emulsion	Water Dilution	Type of Nozzle	Apply Gal/Ac.
Latex emulsion	12.5:1	Fine spray	235
Resin-in-water emulsion	4:1	Fine spray	300
Acrylic emulsion (non-traffic)	7:1	Coarse spray	450
Acrylic emulsion (traffic)	3.5:1	Coarse spray	350

- Tillage - For emergency temporary treatment, scarify the soil surface to prevent or reduce the amount of blowing dust until a more appropriate solution can be implemented. Begin the tillage operation on the windward side of the site using a chisel-type plow for best results.
- Sprinkling - Sprinkle site with water until the surface is moist. Repeat as needed.
- Calcium Chloride - Apply as flakes or granular material with a spreader at a rate that will keep the soil surface moist. Re-apply as necessary.
- Barriers - Place barriers such as solid board fences, snow fences, hay bales, etc. at right angles to the prevailing air currents at intervals of approx. 10X their height.

Permanent Methods:

- Vegetative cover - See **DE-ESC-3.4.3**, Std. Detail and Specifications for Vegetative Stabilization.
- Stone - Apply layer of crushed stone or coarse gravel to protect soil surface.

Source: Adapted from VA ESC Handbook
Symbol:
Detail No. **DE-ESC-3.4.8**
Sheet 1 of 1

Effective February 2019

Standard Detail & Specifications
Soil Stockpile

Source: Adapted from Colorado Urban Storm Drainage Criteria Manual, Vol 3
Symbol: **SP**
Detail No. **DE-ESC-3.7.3**
Sheet 1 of 2

Effective February 2019

Standard Detail & Specifications
Soil Stockpile

Construction Notes:

- Locate stockpiles so that they are 50 feet from any storm drain inlet, open channel, wetland or waterbody. Redirect any concentrated flow around the stockpile using an approved erosion and sediment control measure.
- Secure the perimeter of the stockpile with an approved erosion and sediment control perimeter device.
- If stockpile is to remain inactive for more than 14 calendar days, the stockpile must be vegetated. Follow the temporary vegetation specifications. The vegetation chosen last the duration of the stockpile, the stockpile shall be restabilized if the temporary vegetation dies or erosion results.

Source: Adapted from Colorado Urban Storm Drainage Criteria Manual, Vol 3
Symbol: **SP**
Detail No. **DE-ESC-3.7.3**
Sheet 2 of 2

Effective February 2019

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Professional Certification

I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Delaware.

License No. 8359
Expiration Date: June 30, 2022

ROBERT D. RAUCH
LICENSED PROFESSIONAL ENGINEER
DELAWARE
12/22/21

Revisions	
INITIAL SUBMISSION - 01/21/22	
FIRST REVISION - 04/08/22	

Villas at Bridgeville	
Bridgeville, Delaware	12/22/21
First Election District - Sussex County	Scale: As Shown
Sediment & Erosion Control - Construction Details	PS1-804