

P.C. Simonton & Associates, Inc.
Consulting Engineers

309 North Main Street
Post Office Box 649
Hinesville, Georgia 31310

1050 Parkside Commons
Suite 101
Greensboro, Georgia 30642

Addendum No. One

Date: November 5, 2014

Project: Hinesville/Ft Stewart WWTP Modification
For the City of Hinesville
PCS No. 2009-63

Engineer: P.C. Simonton & Associates, Inc.
Hinesville, Georgia

The original plans, specifications, and bid documents are amended to include the following:

Bid Documents:

- Instructions to Bidders:
 - The Instructions to Bidders, paragraph 10 "Supplied Equipment", paragraph B, second sentence shall be replaced with the following sentence.
"The successful Bidder will be required to take delivery of equipment, inspect the shipment along with the engineer to determine correctness of content, inspect for damage, and if satisfied with the shipment, assume responsibility for the equipment, **complete the installation of the equipment in accordance with the plans**, coordinate start up with the supplier, conduct successful startup, and be responsible for any warranty claims until the plant is fully operational".
 - The Instructions to Bidders, paragraph 11 "City of Hinesville MWBE Policy", attach enclosed City of Hinesville MWBE Policy Forms.
 - The Gorman Rupp equipment list and information included in the Bid Document is amended with the attached list of materials to be supplied by Gorman Rupp.
- The original Supplemental General Conditions shall be replaced with the enclosed Supplemental General Conditions.
- The original Proposal Form (pages P-1 through P-4) shall be replaced with the enclosed pages P-1 through P-4.

Specifications:

- Section 11501 – Open Channel UV Disinfection System,
 - Part 1 – General, 1.01 Scope of Work,
 - Paragraph A – delete “for installation by the owner an open channel”
 - Paragraph B – delete “(to be installed by the owner)”
 - Part 3 – Execution, 3.01 Installation,
 - Paragraph A - replace the original paragraph with the following:
 - A. The contractor shall relocate the installed interim UV equipment operating in the current plant UV channel to the newly constructed UV channel and shall install the purchased equipment, described in the purchased equipment section, into the newly constructed channel.

- Section 15176 – Pneumatic Tank,
 - Part 1 - General, 1.01 Description,
 - Paragraph B - change the pump stop pressure from 60 psi to 66 psi.
 - Part 2 - Materials,
 - 2.01 Pneumatic Tank
 - Paragraph A - change the tank size from 5,000 to 10,000 gallons.
 - Paragraph B - change 70 psi internal pressure to 80 psi internal pressure.
 - Paragraph D - change pressure relieve valve set at 65 psi to 75 psi.
 - 2.02 Controls
 - Add Paragraph D:
 - D. The pneumatic system shall be controlled with the “Pulsco Hydropneumatic Pressure Control System, designed and manufactured by Pulsco, Irvine, California or approved equal”.

- Section 15201 – Vertical Turbine Pumps,
 - Part 2 – Products, 2.01 Pumps,
 - Paragraph B – Modify Paragraph B to the following:

“Pump for the on-site reuse system and the reject/reuse water tank drain shall be manufactured by Peerless, Goulds, or other comparable manufacturer that has experience and a proven track record in the water and wastewater industry.”

- Section 15202 – Factory Built Above-Ground Pump Station - Replace the original Specification with the enclosed in its entirety.

- Section 15280 – Chemical Feed System,
 - Part 2 – Products, 2.03 Chemical Storage Tanks,
 - Paragraph A – change the FRP tank capacity from 6,000 gallons to 8,000 gallons

- Section 15302 - Flow Metering Equipment – Replace the original Specification with the enclosed in its entirety.

Plans:

- Sheet M-1 – Replace the original Sheet M-1 with the enclosed revised sheet M-1.
- Sheet M-5 – Replace the existing sheet M-5 with the enclosed revised sheet M-5
- Sheet M-16 – Replace the original Sheet M-16 with the enclosed revised sheet M-16.
- Sheet M-23 – Include the attached Sheet M-23 in the Plan set.
- Sheet C-4 – OCS # 3 – add a 3” orifice at elevation 58.50 on the influent side of the box. See attached revised detail for OCS #3.
- Sheet C-5 – changed the length of pipe between the pumps station and MH 6. Shown as future connection on revised sheet attached.
- Sheet C-8 – Change the note in the plan view from ‘connect to existing JB A-1” to “Connect to New JB A-1”
- Sheet C-18 – Replace sheet 18 with the attached Sheet 18
- Sheet C-18A – Include the attached Sheet 18A in the plan set.
- Sheet E3.0, Power House – Power Plan 2/E3.0., Reference sheet E5.3, MCC-GR One-Line Diagram 3/E5.3, Reference Sheet E5.3, Note 5.
 - The contractor shall provide MCC-GR as part of the furnished electrical power distribution equipment package.
 - Delete note 5, sheet E5.3, and replace with the following:
 - The contractor shall provide MCC-GR.
 - Coordinate with the Gorman-Rupp vendor and provide all interlocks, safeties, etc. as required for protection of the pumps.
 - Coordinate control of the pumps (start/stop/speed setting/alternation) with Gorman-Rupp control panel inputs.
 - Coordinate the variable frequency drives shall be coordinated with the pumps provided (100hp 460V 3-Phase).
 - Provide harmonic mitigation as required by the results of the required harmonic study.

-END-



CITY OF HINESVILLE
M/WBE POLICY DOCUMENTS
FOR
CONSTRUCTION CONTRACTS

ALL M/WBE POLICY DOCUMENTS TO BE
SUBMITTED IN SEPARATE SEALED ENVELOPE

NON DISCRIMINATION STATEMENT

I, _____, hereby certify that
(Contractor Name)

_____ will adhere to the City of Hinesville M/WBE policy and
(Company Name)

undertake measures to ensure maximum practicable participation of M/WBE's and not engage in discriminatory conduct of any type against M/WBE's. I understand a copy of the Hinesville M/WBE policy documents may be obtained from Hinesville City Hall at 115 East M.L. King Jr. Drive and City of Hinesville website.

Signature:

By: _____

Title: _____

Seal

Notary Signature

DBE COMPLIANCE FORM

Job Number: _____

Project Name: _____

Prime Contractor and Owners Certifications:

I certify that the information submitted on and with this form is true and accurate and that this firm has met and will continue to meet the conditions of this construction contract regarding M/WBE solicitation and utilization.

Prime Contractor Signature

Date

Printed Name

General Information:

Total Contract Amount: \$ _____

Proposed Total MBE: \$ _____

Proposed Total WBE: \$ _____

Percentage M/WBE: % _____

Goal: % _____

**Disadvantaged Business Enterprise Program
DBE Subcontractor Utilization Form**

ALL M/WBE'S TO BE USED SHALL BE SHOWN ON THIS FORM:

JOB NUMBER	PROJECT NAME
NAME OF PRIME BIDDER/PROPOSER	E-MAIL ADDRESS
ADDRESS	
TELEPHONE NO.	FAX NO.

The following subcontractors will be used on this project:			
COMPANY NAME, ADDRESS, PHONE NUMBER, AND E-MAIL ADDRESS	TYPE OF WORK TO BE PERFORMED	ESTIMATE DOLLAR AMOUNT	CURRENTLY CERTIFIED AS AN MBE OF WBE?

I certify under penalty of perjury that the forgoing statements are true and correct. In the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302(c).

Signature of Prime Contractor

Date

Print Name

Title

NON COMPLIANCE FORM

In the event that the City’s M/WBE goals have not been met the Contractor must demonstrate a good faith effort to meet the goal or that subcontractors are not being used on the project:

_____, will not utilize any subcontractors on _____
Company Name _____ and understand that in the event that subcontractors are needed the
Project Name _____ M/WBE policy will still apply.

_____, has made a good faith effort to meet the City’s M/WBE goals but
Company Name _____ have been unable to do so. Good faith efforts are defined in the Hinesville M/WBE policy as those that meet or exceed the good faith efforts described in 49 C.F.R 26(c). The chart below shall be filled out demonstrating a summary of good faith efforts.

	M/WBE Contractor Contacted	Date	Method of Communication	Responded to Solicitation?	Reason for non-use	If financial list percentage increase of total cost
1				Y/N		
2				Y/N		
3				Y/N		
4				Y/N		
5				Y/N		
6				Y/N		
7				Y/N		
8				Y/N		

Signature

(Contractor to submit with each pay request)

PAGE NO. _____
 ESTIMATE NO. _____

M/WBE CONTRACTOR COMPLIANCE TRACKING FORM

PROJECT NAME: _____
 CONTRACTOR: _____
 FOR PERIOD ENDING: _____

PROJECT NO. _____
 DIVISION NO. _____
 M/WBE GOAL 10.00%

D. M/WBE CONTRACTOR TRACKING

Total Contract Amount to Date \$

ITEM #	CONTRACTOR	WORK COMPLETED	DOLLAR AMOUNT	PERCENT OF TOTAL CONTRACT
1			\$	
2			\$	
3			\$	
4				
5				

TOTAL M/WBE DOLLARS SPENT		
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PERCENTAGE OF TOTAL CONTRACT		
------------------------------	--	--

HAS THE ESTIMATED M/WBE GOALS CHANGED FROM THE TIME OF BID?
 WILL THE M/WBE GOALS BE MET BY PROJECT COMPLETION?

YES NO
 YES NO

Contractor certifies the statements above by signing

END OF PROJECT REPORT FORM

Please submit a "negative" report even if \$0 is the amount paid to MBE/WBE subcontractors during the reporting period.

PROJECT CLOSE-OUT FORM	
1. PRIME CONTRACTOR	2. Project Completion Date:
3. Submit to: P.C. SIMONTON & ASSOCIATES, INC. P.O. BOX 649 HINESVILLE, GA 31310 PHONE NUMBER: 912-368-5212 FAX: 912-368-6071	4. CONTRACTOR:
5. TOTAL CONSTRUCTION AMOUNT:	6. ACTUAL DOLLAR AMOUNT PAID TO MBE/WBE SUBCONTRACTORS THIS PROJECT \$MBE _____ \$WBE _____ NEGATIVE REPORT (\$0) _____
7. RECIPIENTS'S MBE/WBE GOALS M/WBE 10.0%	8. TOTAL DOLLARS SPENT THIS PROJECT MBE \$ _____ WBE \$ _____ NON MBE/WBE \$ _____ TOTAL \$ _____
9. SIGNATURE OF PRIME CONTRACTOR REPRESENTATIVE	10. DATE
TOTAL MBE/WBE PAYMENTS MADE DURING THIS PROJECT	
NAME & ADDRESS of DBE (SUB)CONTRACTOR (indicate if MBE or WBE firm)	TOTAL DOLLAR AMOUNT PAID & DATE PAID \$ _____ DATE _____



The Gorman-Rupp Company
600 South Airport Road
Mansfield, OH 44903
Phone: (419) 755-1011

PROPOSAL/CONTRACT

Purchaser: City of Hinesville C/O PC Simonton & Assoc.

309 North Main Street

Hinesville, Georgia 31313

For: Hinesville/Fort Stewart WWTP Modifications

Equipment Purchase

Specification Section 15200 – In Plant PS (Self Priming ALT)

Note: *Our Contract includes the provisions set forth below and the Terms and Conditions on the final page hereof, including without limitation the reservation of security interest and warranty liability and price escalation clause. The information or data contained in the Proposal/Contract is proprietary to The Gorman-Rupp Company and should not be copied, reproduced, duplicated, or disclosed to any third party, in whole or in part, without the prior written consent of The Gorman-Rupp Company. The Gorman-Rupp Company will not be bound by any Terms and Conditions other than those identified in this Proposal/Contract, nor shall The Gorman-Rupp Company be liable for any liquidated damages or be a party to or bound by the terms and conditions of any other contract documents.*

Scope:

SKID MOUNTED PUMP STATION

Triplex 10 Series Model 112E60-B Pumps mounted on Individual RH Horizontal Bases, v-belt driven by 1750 RPM, 100 HP, 460/3/60, ODP/EISA/ Premium Efficiency motors. Station piping includes individual suction spools, individual swing check valves with Limit Switches and a 2-way plug valve. Suction and Discharge Connections to the Station will be 12" with 12" Valving. Pumps, motors, automatic air release valves with stainless steel fittings, some piping and the controls will be shipped loose.

Motor control and liquid level control (Loose w/ stands for field mounting by Contractor) are mounted in a common NEMA 4X Steel 36"x 30"x16" Control Panel with the following standard features: CompacLogix Model L2 with Panel View Plus 6 with 700 Color Touch HMI, **VFD wiring to Control Panel via Belden Cable (by others)** 500vA (Control Panel) Transformers, local pump disconnects, panel corrosion inhibitor, high water alarm circuit, Ultrasonic XDCR Level Control with Parallel Redundant Float Switch Control System, lead pump/lag pump alternation, fault indicators, elapsed time indicators, pump run lights, alarm silence switch, high pump temperature protection, motor overload resetters, pump sequence selection, duplex GFI receptacle, dry contacts wired to terminal blocks for high water alarm and high pump temperature shutdown All pumps.

Pump will be furnished with the following: Gauge Kits, Air Release Valves, Pump Drain Kits and Spare Parts Kit.

Also included:

- Alarm Horn - 115V AC, weatherproof horn on conduit box with mounting lugs (Mounted). Location TBA.

- Alarm Light - 115V AC weatherproof light with shatter resistant red Fresnel lens and outlet box (Shipped Loose or Mounted).

5 Days on-site for electrical start-up

GORMAN-RUPP SELLING PRICE:.....\$ 232,586.00

NOTE: Templeton & Associates is the authorized and exclusive Municipal Sales Representative for Gorman-Rupp in the State of Georgia. Please call Templeton & Associates @ 770-614-8550 if there are any questions regarding this quotation. Templeton & Associates Fax Number is 770-614-5992. Contact either Mike Kahren or Jon Baker regarding this quote.

NOTES:

1. Only items specifically mentioned in the above proposal are included in quotation. Any items not specifically mentioned shall be furnished by the Contractor.
2. Pricing is subject to change upon review of final/approved project plans and drawings. Pricing is based on preliminary information provide without review of final/approved project drawings.

TERMS: NET 30 TO APPROVED ACCOUNTS

Delivery will normally be direct to the job site via transport equipment.
 Price additional for initial operation supervision: INCLUDED

Estimated Submittals: 6-8 weeks after receipt of an acceptable order.
 Estimated shipment: 12-16 weeks after receipt in our office of complete approved submittal data and acceptable order.

Note: Estimated production time is based on either "approval- waived" submittals or submittal "approval" with no revisions required at time of release- to- production. If revisions to the station/ controls are required prior to release- to- production, add two- three weeks to the Estimated Production Time frame.

To purchase this equipment at the price offered herein, please sign two original Proposal/Contracts and return both originals to the aforementioned address. Upon acceptance of this Proposal/Contract, The Gorman-Rupp Company will execute this Contract and return one fully executed original for your records.

Accepted this <u> </u> day of <u> </u> , 2014 Buyer: _____ Company Name By: _____ Authorized Signature Print Name: _____ Title: _____	Submitted this 3 RD day of November, 2014 G-R Representative: <u>Templeton & Associates</u> Company Name By: _____ Authorized Signature Print Name: <u>Mr. Jon Baker</u> Title: <u>Outside Sales Engineer</u>
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QUOTATION REQUEST: # 14-196-G
0/31/2014 PG 1 of 3

THE GORMAN- RUPP COMPANY
MANSFIELD, OH.



To: Jon Baker	Proj. Name: Fort Stewart Army Base	Engineer:	M.E: N/A
Company: Templeton & Associates	Proj. Loc: City of Hinesville, GA	A.E.: John Hoffner	E.E.: N. Patel
Mech:		Controls:	
Station Type: LEH Individual		PLC Enclosure: Nema 1 SST	
Pump Model: 112E80-B RH horiz bases		VFD / MCC: N/A	
Number of Pumps: 3		PLC Size (H x W x D): 36 30 16	
		VFD Size (H x W x D): N/A N/A N/A	
Motor HP: 100		Primary Level Controller: PLC	
Motor Type: ODP/ EISA/ Prem- Efficient		Primary LLC Sensor: Ultra XDCR (Drex)	
Power Available (Ph/Hz/Vol): 3/60/460		Redundant Level Controller: Independent Floats (Non-Intrinsically Safe)	
Inletion Size: 12"		Redundant LLC Sensor: (2) Floats	
Recharge Check: 12"		Logic Control: CompacLogix Model L2	
Check Valve Type: Standard Swing w/ Limit Switch		Operator Interface: PanelView Plus 6 1000 Color Touch	
Flow Valve Size: 12"		Voltage: 3/60/460	
Flow Valve Type: 2- way		Starters: N/A	
Flow Valve actuator: Hand- Wheel w/chainfalls		Harmonic Mitigation Filters: N/A	
Force Main Conn: 12"		Local Pump Disconnects: 3	
Recharge Loc: Center		Priming Protection: VFD kW & Limit Switches	
Recharge Bypass: N/A		VFD Wiring to Control Panel: via Belden cable (by others)	
IRV Release Valves: GRP33-07		SCADA: (by others - see pg. 2)	
IRV Isolation Valves: Yes		Transformer: 500vA (Control Panel)	
Panel Mounting: Loose w/ stands		Spare GFI Receptacle: Yes	
Warm Lits: Mounted		U.L. Listing: Controls Only	
Warm Horn: Mounted		Electrical Start-Up: 5-days	
Drain Kits: Yes			
Spare Parts Kit: Yes			
Gauge Kits: Yes			
Witnessed Performance Test: Yes			
	Estimated Submittal Time:	6-9 weeks	
	Estimated Production Time A.R.O:.....	12-16 weeks	
	Note: Estimated production time is based on either "approval- waived" submittals or submittal "approval" with no revisions required at time of release- to- production. If revisions to the station/ controls are required prior to release- to- production, add two- three weeks to the Estimated Production Time frame.		
	This quotation has been prepared to cover the addition of other than standard catalog items to pumps, package pump stations or control panels. It includes only equipment specifically mentioned herein and does not include, or infer inclusion of any additional piping, valves, wiring, etc., regardless of its relation to the quoted equipment. Discounts or commissions normally applied to the appropriate type of equipment also apply to these prices. Prices and estimated delivery dates are subject to change without notice in the event that vendors fail to maintain their quoted price and time of delivery to The Gorman-Rupp Company.		
Shipping: Yes			

Estimated base dimensions 90" x 67"

Estimated suction dimension 41 7/8"

Revision C (08/15/14):

- Removed 20x20 enclosure (JCH)
- Replace Sub XDCR with Ultrasonic XDCR (Drex)

Revision D (9/2/14):

- Powerflex VFDs mounted remotely from station control panel in a Nema 1 enclosure (size TBD) with passive harmonic mitigation filters per drive. Building will be climate controlled. Note - Drives to be connected to control panel at wet well through approximately 75' of Belden cable.
- Changed CP to Nema 4X SST (it will be mounted outside under a roof at wet well with pump station); size TBD.
- SCADA to control/monitor via ethernet connection with PLC:
 - Pump On
 - Pump Off
 - Pump Run Time
 - Pump Speed
 - Flow Confirmation (check valve limit switch)
 - Wet well level
 - Alarms
- Added Priming Protection: VFD kW & Limit Switches

Revision E:

- Changed to MCC
- Added Electrical Start-up
- Changed CP to Nema 1 SST (was Nema 4X)

Revision F (10/31/2014):

- revise MCC to remove 7% passive harmonic mitigation filters
- add individual 7% harmonic mitigation filters in NEMA 1 enclosures, shipped loose, wall-mounted by others.

Revision G:

- Remove MCC (VFD & Harmonic Mitigation filters) and G-R Factory Test of complete station.
- Add local disconnects to station control panel.
- MCC factory representative required to be on-site during Electrical Start-up/Station Comm.
- VFD Servicing & Troubleshooting by others.

QUOTATION REQUEST: # 14-196-G

0/31/2014 PG 3 of 3

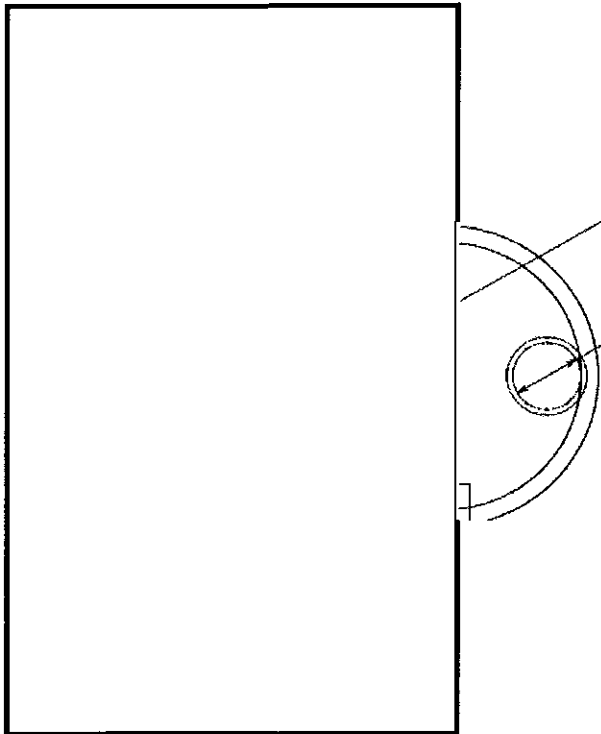
**THE GORMAN- RUPP COMPANY
MANSFIELD, OH.**



Modular Enclosure Description: Removed enclosure on Rev. C per customer request

				<u>Item Cost:</u>
<u>Size (L x W):</u>	N/A	x	N/A	\$0
<u>Yra Access Door:</u>	N/A			\$0
<u>Double- Doors:</u>	N/A			\$0
<u>Emergency Lites:</u>	N/A			\$0
<u>Enclosure Heater:</u>	N/A			\$0
<u>Ext. Security Lite:</u>	N/A			\$0
<u>Floor Drain:</u>	N/A			\$0
<u>Insulation:</u>	N/A			\$0
<u>Overhead Door:</u>	N/A			\$0
<u>Enclosure Color:</u>	N/A			\$0
<u>Modular Finish:</u>	N/A			\$0
<u>Wall- Mount GFI:</u>	N/A			\$0
				\$0
				\$0
				\$0
				\$0
<u>Shipping:</u>				\$0

N/A N/A Width
L
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SUPPLEMENTAL CONDITIONS

01. GENERAL CONDITIONS:

The "Standard General Conditions of the Construction Contract", Engineers Joint Contract Documents Committee, 2007 Edition, Articles 1 through 17 inclusive, included herein preceding these supplements, is a part of this Contract.

ARTICLE 5 - BONDS & INSURANCE

5.04 B 1& 2 Contractor's protective liability insurance, with limits as follows:

Personal injury including death - limits of \$100,000. for each person and \$1,000,000. for each occurrence.

Property damage - \$100,000. for each and \$200,000. for the aggregate for operations.

Contractor's public and automobile liability insurance (including contractual liability insurance as applicable to the Contractor's obligations under paragraph 6.20) with limits as follows:

Personal injury including death - limits of \$100,000. for each person and \$1,000,000. for each occurrence.

Property damage - limits of \$100,000. for each occurrence and \$200,000. for the aggregate of operations.

- (a) Any exclusion of so-called underground damage to pipes, collapse of structures or damage resulting from explosion or blasting, shall be deleted.
- (b) The policy shall provide completed operations coverage, and such coverage shall be maintained by the Contractor for a period of one year from the date of payment of the final amounts owed the Contractor by the Owner, whichever occurs first.

Owner's protective liability insurance, in the name of the Owner, his professional consultants and their agents as additional insureds under the contractor's general liability insurance policy with respect to the services performed by the Contractor for the Owner, with the following limits:

Personal injury including death - limits of \$100,000. for each person and \$300,000. for each occurrence.

Property damage - limits of \$50,000. for each occurrence and \$100,000. for the aggregate of operations.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.02

Progress Payments

A. Applications for Payments

1. Add a sentence after the second sentence stating, "Each payment request shall be accompanied with record drawings showing as-built conditions of all work requested during the pay period."

ARTICLE 16 - DISPUTE RESOLUTION

16.01

Any dispute arising under this agreement shall first be resolved by utilizing non-binding mediation, however should the dispute not be resolved by this method it shall be heard in the Superior Court of the County in which the owner resides, and the parties consent to jurisdiction and venue in that Court. The parties waive any defense they may have to lack of jurisdiction or improper venue and agree to have all disputes resolved in the Superior Court of the County in which the owner resides.

PROPOSAL

City of Hinesville
115 East M.L. King Jr. Dr.
Hinesville, GA 31313

Submitted: _____, _____

The undersigned, as Bidder, hereby declares that the only person or persons interested in the Proposal as principal or principals is or are named herein and that no other person that herein mentioned has any interest in this Proposal or in the contract to be entered into; that this Proposal is made without connection with any other person, company or parties making a bid or Proposal; and that it is in full respect fair and in good faith without collusion or fraud.

The Bidder further declares that he has examined the site of the work and informed himself fully in regard to all conditions pertaining to the place where the work is to be done; that he has examined the Plans and Specifications for the work and Contractual Documents relative thereto, and has read all Special Provisions and General Conditions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed.

The Bidder proposes and agrees, if the Proposal is accepted, to contract with the City of Hinesville in the form of contract specified, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of the work, in full and in complete accordance with the shown, noted, described, and reasonably intended requirements of the Specifications and Contract Documents, to the full and entire satisfaction of the City of Hinesville with a definite understanding that no money will be allowed for extra work except as set forth in the attached General Conditions and Contract Documents, for prices on the following pages.

BID ITEMS

- A. Lump sum bid for the necessary additional equipment and installation of the supplied equipment to successfully complete an operational wastewater treatment facility. All cost included except the itemized items below which will be included below.

LUMP SUM BID \$_____

In addition to the lump sum bid the following items will be bid at unit prices to provide a unit price for adjustment of quantities if required during the project duration.

	Estimated Quantity	Units	Description	Unit Price	Total Price
1.	<u>620</u>	SY.	7"-5000PSI Concrete Paving	\$_____	\$_____
2.	<u>250</u>	SY.	8"Granite Crusher Run Base	\$_____	\$_____
3.	<u>220</u>	SY.	2"-12.5mm Superpave Asphalt Pavement	\$_____	\$_____
4.	<u>3500</u>	SY.	1 ½"-12.5mm Superpave Asphalt Overlay	\$_____	\$_____
5.	<u>250</u>	SY.	4" Sidewalk	\$_____	\$_____
6.	<u>100</u>	SY.	Concrete Drainage Channel Removal & Replacement	\$_____	\$_____
Total Unit Price Items				\$_____	
Total Project Bid				\$_____	

The Bidder further proposes and agrees hereby to commence work under his Contract, with adequate force and equipment, on a date to be specified in written order of the ENGINEER and shall fully complete all work hereunder within Five Hundred Forty (540) consecutive days from and including said date.

The Bidder declares that he understands that the quantities shown for unit price items, are approximate only, are valid only upon written authorization of the ENGINEER, and are subject to either increase or decrease and that should the quantities of any items of work be increased, the Bidder proposes to do the additional at the unit prices stated herein; and should the quantities be decreased, the Bidder also understands that payment will be made on the basis of actual quantities at the unit price bid and will make no claim for anticipated profits for any decrease in quantities, and that actual quantities will be determined upon completion of the work, at which time adjustment will be made to the Contract amount by direct increase or decrease.

The undersigned further agrees that, in case of failure on his part to execute the Construction Contract and the bond within ten (10) consecutive calendar days after written notice being given of the award of the Contract, the check or bond accompanying this bid, and the monies payable thereon, shall be paid into the funds of the _____ as liquidated damages for such failure, otherwise the check or bid bond accompanying this proposal shall be returned to the undersigned.

Attached hereto is a certified check on the _____ Bank of _____ or a Bid Bond by the _____ in the amount of _____ Dollars (\$ _____) made payable to the _____, in accordance with the conditions of the advertisement and provisions herein.

Submitted:

By:

Title:

Bidders Address: _____

City, State, Zip Code: _____

Telephone Number: _____

Bonding Agent: _____

Physical Address: _____

Telephone Number: _____

Underwriters Name: _____

Physical Address: _____

Telephone Number: _____

FAILURE TO COMPLETE THIS SECTION IS GROUNDS FOR REJECTION

BIDDER ACKNOWLEDGE RECEIPT OF THE FOLLOWING ADDENDUM:

No. _____ Date _____ No. _____ Date _____

No. _____ Date _____ No. _____ Date _____

EXPERIENCE AND REFERENCES

The Bidder shall state what work he had done (minimum of three) of similar nature to that bid for, and give references that will afford the Owner opportunity to judge as to experience, skill, business standing and financial ability. Failure to complete this section is grounds for rejection.

SECTION 15202

ABOVE GROUND SELF-PRIMING PUMPS (IN-PLANT PUMP STATION)

PART 1 – GENERAL

1.01 Section Includes

- A. Work under this section includes, but is not limited to installing three factory built pump station units as indicated on the project drawing, herein specified, as necessary for proper and complete performance.

1.02 Reference

- A. Publications listed below form part of this specification to extent reference in the text by basic designation only. Consult latest edition of publication unless otherwise noted.
 - 1. American Nation Std. Institute (ANSI) / American Water Works Assoc. (AWWA)
 - a. ANSI B16.1 Cast iron pipe flanges and flanged fittings.
 - b. ANSI/AWWA C115/A21.21 Cast/ductile iron pipe with threaded flanges.
 - c. ANSI 253.1 Safety Color Code for Marking Physical Hazards.
 - d. ANSI B40.1 Gages, Pressure, and Vacuum.
 - e. AWWA C508 Single Swing Check Valves.
 - 2. American Society for Testing and Materials (ASTM)
 - a. ASTM A48 Gray Iron Castings.
 - b. ASTM A126 Valves, Flanges, and Pipe Fittings.
 - c. ASTM A307 Carbon Steel Bolts and Studs.
 - d. ASTM S36 Structural Steel.
 - 3. Institute of Electrical and Electronics Engineers (IEEE)
 - a. ANSI/IEEE Std 100 Standard Dictionary of Electrical Terms.
 - b. ANSI/IEEE Std 112 Test Procedure for Polyphase Induction.
 - c. IEEE Std 242 Protection of Industrial and Control Power Systems.
 - 4. National Electric Code (NEC) / National Electrical Manufacturers Assoc. (NEMA)
 - a. NEC National Electric Code.
 - b. NEC 701 National Electric Code article 701.
 - c. NEMA Std MG1 Motors and Generators.
 - 5. Miscellaneous References
 - a. Ten-State Standards Recommended Standards for Sewage Works.
 - b. Hydraulic Institute Std for Centrifugal, Rotary and Reciprocating Pumps.
 - c. NMTBA and JIC Std National Machine Tool Builders Association and Joint Industrial Council Standards.
 - d. ISO 9001 International Organization for Standardization.

1.03 System Description

- A. The principle items of equipment shall include two horizontal, self-priming, centrifugal sewage pumps, V-belt drives, motors, internal piping valves, motor control panel, automatic liquid level control system, and internal wiring.
- B. Factory built pump station design, including materials of construction, pump features, valves and piping, and motor controls shall be in accordance with requirements listed under PART 2 – PRODUCTS of this section.

1.04 Performance Criteria

- A. Pumps must be designed to handle raw, unscreened, domestic sanitary sewage. Pump station shall have **12"** suction connection, and **12"** discharge connection. Each pump shall be selected to perform under following operating conditions:
 - 1. Capacity (GPM) **4,965**
 - 2. Total Dynamic Head (FT) **47'**
 - 3. Total Dynamic Suction Lift (FT) **15.2'**
 - 4. Maximum Repriming Lift (FT) **11.0'**
 - 5. Maximum Static Suction Lift (FT) **15.0'**
 - 6. Total Discharge Static Head (FT) **41.5'**
 - 7. Minimum Submergence Depth (FT) **2.00'**
- B. Site power furnished to pump station shall be **3** phase, **60** hertz, **460** volts, **4** wire, maintained within industry standards. The available fault current provided at the pump station control panel is **14** kA rms symmetrical. Voltage tolerance shall be plus or minus 10 percent. Phase-to-phase unbalance shall not exceed 1% average voltage as set forth in NEMA Standard MG-1. Control voltage shall not exceed 132 volts.

1.05 Submittals

- A. Product Data
 - 1. Prior to fabrication, pump station manufacturer shall submit six (6) copies of submittal data for review and approval.
 - 2. Submittal shall include shop drawings, electrical ladder drawings, and support data as follows: Catalog cut sheets reflecting characteristics for major items of equipment, materials of construction, major dimensions, motor and v-belt drive data, pump characteristic curves showing the design duty point capacity (GPM), head (FT), net positive suction head required (NPSHr), and hydraulic brake horsepower (BHP). Electrical components used in the motor branch and liquid level control shall be fully described.

3. Shop drawings shall provide layout of mechanical equipment and anchor bolt locations for station. Pipe penetrations and station access clearances shall be dimensioned relative to the station centerline. The electrical ladder logic drawings shall illustrate motor branch and liquid level control circuits to extent necessary to validate function and integration of circuits to form a complete working system.

B. Operations and Maintenance Manuals

1. Operation shall be in accordance with written instructions provided by the pump station manufacturer. Comprehensive instructions supplied at time of shipment shall enable personnel to properly operate and maintain all equipment supplied. Content and instructions shall assume operating personnel are familiar with pumps, motors, piping and valves, but lack experience on exact equipment supplied.
2. Documentation shall be specific to the pump station supplies and collated in functional sections. Each section shall combine to form a complete system manual covering all aspects of equipment supplied by the station manufacturer. Support data for any equipment supplied by others, even if mounted or included in overall station design, shall be provided by those supplying the equipment. Instructions shall include the following as a minimum:
 - a. Functional description of each major component, complete with operating instructions.
 - b. Instructions for operating pumps and pump controls in all modes of operation.
 - c. Calibration and adjustment of equipment for initial start-up, replacement of level control components, or as required for routine maintenance.
 - d. Support data for commercially available components not produced by the station manufacturer, but supplied in accordance with the specifications, shall be supported by literature from the prime manufacturer and incorporated as appendices.
 - e. Electrical schematic diagram of the pump station circuits shall be in accordance with NFPA 79. Schematics shall illustrate, to the extent of authorized repair, pump motor branch, control and alarm system circuits including interconnections. Wire numbers and legend symbols shall be shown. Schematic diagrams for individual components, not normally repairable by the station operator, need not be included. Details for such parts shall not be substituted for an overall system schematic. Partial schematics, block diagrams, and simplified schematics shall not be provided in lieu of an overall system diagram.
 - f. Mechanical layout drawing of the pump station and components, prepared in accordance with good commercial practice, shall provide installation dimensions and location of all pumps, motors, valves, and piping.
3. Operation and maintenance instructions which rely on vendor cut-sheets and literature which include general configurations, or require operating personnel to selectively read

portions of the manual shall not be acceptable. Operation and maintenance instruction must be specific to equipment supplied in accordance with these specifications.

1.06 Quality Assurance

- A. The pumps and pump station manufacturer must be ISO 9001:2000 revision certified, with scope of registration including design control and service after sales activities.
- B. The pumps must be of standard catalog design, totally warranted by the manufacturer. Under no circumstances will a system consisting of parts compiled and assembled by a manufacturer's representative or distributor be accepted.
- C. Manufacturer must show proof of original product design and testing. Products violating intellectual property regulations shall not be allowed, as they may violate international law and expose the user or engineer to unintended liabilities. "Reverse-engineered" products fabricated to substantially duplicate the design of original product shall not be allowed, as they may contain substantial differences in tolerances and material applications addressed in the original design, which may contribute to product failure.
- D. The term "pump manufacturer" or "pump station manufacturer" shall be defined as the entity which designs, machines, assembles, hydraulically tests and warranties the final product. Any entity that does not meet this definition will not be considered a "pump manufacturer" or "pump station manufacturer" and is not an acceptable supplier. For quality control reasons and future pump and parts availability, all major castings of the pump shall be sourced and machined in North America.
- E. Pump Performance Certifications
 - 1. All internal passages, impeller vanes, and recirculation ports shall pass a 3" spherical solid. Smaller internal passages that create a maintenance nuisance or interfere with priming and pump performance shall not be permitted. Upon request from the engineer, manufacturer's certified drawings showing size and location of the recirculation port(s) shall be submitted for approval.
 - 2. Reprime Performance
 - a. Consideration shall be given to the sanitary sewage service anticipated, in which debris is expected to lodge between the suction check valve and its seat, resulting in the loss of the pump suction leg, and siphoning of liquid from the pump casing to the approximate center line of the impeller. Such occurrence shall be considered normal, and the pump must be capable of automatic, unattended operation with an air release line installed.
 - b. During unattended operation, the pump shall retain adequate liquid in the casing to insure automatic repriming while operating at its rated speed in a completely open system. The need for a suction check valve or external priming device shall not be required.

- c. Pump must be capable of repriming 11' vertical feet at the specified speed and impeller diameter. Reprime lift is defined as the static height of the pump suction above the liquid, while operating with only one-half of the liquid remaining in the pump casing. The pump must reprime and deliver full capacity within five minutes after the pump is energized in the reprime condition. Reprime performance must be confirmed with the following test set-up:
- 1) A check valve is to be installed downstream from the from the pump discharge flange. The check valve size shall be equal (or greater than) the pump discharge diameter.
 - 2) A length of air release pipe shall be installed between pump and the discharge check valve. This line shall be open to the atmosphere at all times duplicating the air displacement rate anticipated at a typical pump station fitted with an air release valve.
 - 3) The pump suction check valve shall be removed. No restrictions in the pump or suction piping will prevent the siphon drop of the suction leg. Suction pipe configuration for reprime test shall incorporate a 2 feet minimum horizontal run, a 90° elbow and vertical run at the specified lift. Pipe size shall be equal to the pump suction diameter.
 - 4) Impeller clearances shall be set as recommended in the pump service manual.
 - 5) Repeatability of performance shall be demonstrated by testing five consecutive cycles. Full pump capacity (flow) shall be achieved within five minutes during each cycle.
 - 6) Liquid to be used for reprime test shall be water.
3. Upon request from the engineer, certified reprime performance test results, prepared by the manufacturer, and certified by a registered professional engineer, shall be submitted for approval prior to shipment.

F. Factory System Test

1. All internal components including the pumps, motors, valves, piping and controls will be tested as a complete working system at the manufacturer's facility. Tests shall be conducted in accordance with Hydraulic Institute Standards at the specified head, capacity, rated speed, and horsepower. Factory operational test shall simulate actual performance anticipated for the complete station.
2. Upon request from the engineer, the operational test may be witnessed by the engineer, and/or representatives of his choice, at the manufacturer's facility.

- G. The manufacturer's technical representative shall inspect the completed installation, correct or supervise the correction of any defect or malfunction, and instruct operating personnel in the proper operation and maintenance of the equipment as described in Part 3 of this section.

1.07 Manufacturer's Warranty

- A. The pump station manufacturer shall warrant all equipment to be of quality construction, free of defects in material and workmanship. A written warranty shall include specific details described below.
 - 1. All equipment, apparatus, and parts furnished shall be warranted for sixty (60) months, excepting only those items that are normally consumed in service, such as light bulbs, oils, grease, packing, gaskets, O-rings, etc. The pump station manufacturer shall be solely responsible for warrant of the station and all components.
- B. Components failing to perform as specified by the engineer, or as represented by the manufacturer, or as proven defective in service during the warranty period, shall be replaced, repaired, or satisfactorily modified by the manufacturer.
- C. Equipment supplied by others and incorporated into a pump station is not covered by this limited warranty. Any warranty applicable to equipment selected or supplied by others will be limited solely to the warranty, if any, provided by the manufacturer of the equipment.
- D. This limited warranty shall be valid only when installation is made and use and maintenance is performed in accordance with manufacturer recommendations. A start-up report completed by an authorized manufacturer's representative must be received by manufacturer within thirty (30) day of initial date the unit is placed into service. The warranty shall become effective on the date of acceptance by the purchaser or the purchaser's authorized agent, or sixty (60) days after installation, or ninety (90) days after shipment from the factory, whichever occurs first.

PART 2 – PRODUCT

- 2.01 In order to unify responsibility for proper operation of the complete pumping station, it is the intent of these Specifications that all system components except electrical be furnished by a single supplier. The pumping station must be of standard catalog design, totally warranted by the manufacturer. Under no circumstances will a system consisting of parts compiled and assembled by a manufacturer's representative or distributor be accepted.

2.02 Manufacturer

- A. The pump station system integrator must be ISO 9001:2000 revision certified, with scope of registration including design control and service after sales activities.

- B. After execution of the contract, the contractor may offer substitutions to the specified equipment for consideration. The equipment proposed for substitution must be superior in construction and performance to that specified in the contract, and the higher quality must be demonstrated by a list of current users of the proposed equipment in similar installations.

2.03 Pump Design

- A. Pump shall be horizontal, self-priming centrifugal type, designed specifically for handling raw unscreened domestic sanitary sewage or industrial waste. Pump solids handling capability and performance criteria shall be in accordance with requirements listed under PART 1 – GENERAL of this section.

- B. The pump manufacturer must be ISO 9001:2000 revision certified, with scope of registration including design control and service after sales activities.

C. Materials and Construction Features

1. Pump casing shall be cast iron Class 30 with integral volute scroll. Casing shall incorporate following features:
 - a. Mounting feet sized to prevent tipping or binding when pump is completely disassembled for maintenance.
 - b. Fill port coverplate, 3 ½" diameter, shall be opened after loosening a positive lock clamp bar assembly. In consideration for safety, capscrew threads must provide slow release of pressure, and the clamp bar shall be retained by détente lugs. A non-metallic gasket shall prevent adhesion of the fill port cover to the casing while assuring a reliable seal.
 - c. Casing drain plug shall be at least 1 ¼" NPT to insure complete and rapid draining.
 - d. Liquid volume and recirculation port design shall be consistent with performance criteria listed under PART 1 – GENERAL of this section.
2. Coverplate shall be cast iron Class 30. Design must incorporate the following maintenance features:
 - a. Retained by hand nuts for complete access to pump interior. Coverplate removal must provide ample clearance for removal of stoppages, and allow service to the impeller, seal, wearplate or check valve without removing suction or discharge piping.
 - b. A replaceable wearplate secured to the coverplate by weld studs and nuts shall be AISI 1015 HRS. Wearplate shall be self-cleaning design ensuring that debris is cleared away and does not collect on the impeller vanes.
 - c. In consideration for safety, a pressure relief valve shall be supplied in the coverplate. Relief valve shall open at 75-200 PSI.

- d. Two O-rings of Buna-N material shall seal coverplate to pump casing.
 - e. Pusher bolt capability to assist in removal of coverplate. Pusher bolt threaded holes shall be sized to accept same retaining capscrews as used in rotating assembly.
 - f. Easy-grip handle shall be mounted to face of coverplate.
3. Rotating assembly, which includes impeller, shaft, mechanical shaft seal, lip seals, bearings, seal plate and bearing housing, must be removable as a single unit without disturbing the pump casing or piping. Design shall incorporate the following features:
- a. Seal plate and bearing housing shall be cast iron Class 30. Anti-rotation ribs shall be cast into the sealplate to reduce internal wear and maximize component life. Separate oil filled cavities, vented to atmosphere, and shall be provided for shaft seal and bearings. Cavities must be cooled by the liquid pumped. Three lip seals will prevent leakage of oil.
 - 1) The bearing cavity shall have an oil level sight gauge and fill plug check valve. The clear sight gauge shall provide easy monitoring of the bearing cavity oil level and condition of oil without removal of the fill plug check valve. The check valve shall vent the cavity but prevent introduction of moist air to the bearings.
 - 2) The seal cavity shall have an oil level sight gauge and fill/vent plug. The clear sight gauge shall provide easy monitoring of the seal cavity oil level and condition of oil without removal of the fill/vent plug.
 - 3) Double lip seal shall provide an atmospheric path providing positive protection of bearings, with capability for external drainage monitoring.
 - b. Impeller shall be ductile iron, two vane, semi-open, non-clog, with integral pump out vanes on the back shroud. Impeller shall be statically or dynamically balanced. Impeller shall thread onto the pump shaft and be secured with a lockscrew and conical washer.
 - c. Shaft shall be AISI 4140 alloy steel unless otherwise specified by the engineer, in which case AISI 17-4 pH stainless steel shall be supplied.
 - d. Bearings shall be anti-friction ball type of proper size and design to withstand all radial and thrust loads expected during normal operation. Bearings shall be oil lubricated from a dedicated reservoir. Pump designs which use the same oil to lubricate the bearings and shaft seal shall not be acceptable.
 - e. Shaft seal shall be oil lubricated mechanical type. The stationary and rotating seal faces shall be silicon carbide alloy. Each mating surface shall be lapped to within three light bands flatness (35 millionths of an inch), as measured by an optical flat under monochromatic light. The stationary seal seat shall be double floating by virtue of a dual O-ring design. An external O-ring secures the stationary seat to the sealplate, and an

internal O-ring holds the faces in alignment during periods of mechanical or hydraulic shock (loads which cause shaft deflection, vibration, and axial/radial movement). Elastomers shall be Viton; cage and spring to be stainless steel. Seal shall be oil lubricated from a dedicated reservoir. The same oil shall not lubricate both shaft seal and shaft bearings. Seal shall be warranted in accordance with requirements listed under PART 1 – GENERAL of this section.

- f. Pusher bolt capability to assist in removal of rotating assembly. Pusher bolt threaded holes shall be sized to accept same capscrews as used for retaining rotating assembly.
4. Adjustment of the impeller face clearance (distance between impeller and wearplate) shall be accomplished by external means.
 - a. Clearances shall be maintained by a four point external shimless coverplate adjustment system, utilizing a four collar and four adjusting screw design allowing for incremental adjustment of clearances by hand as required. Each of the four points shall be lockable to prevent inadvertent clearance increases or decreases due to equipment vibration or accidental operator contact. The four point system also allows for equal clearance gaps at all points between the impeller and wear plate. Requirement of realignment of belts, couplings, etc., shall not be acceptable. Coverplate shall be capable of being removed without disturbing clearance settings. Clearance adjustment systems that utilize less than four points will not be considered.
 - b. There shall be provisions for additional clearance adjustment in the event that adjustment tolerances have been depleted from the coverplate side of the pump. The removal of stainless steel tabbed spacers from the rotating assembly side of the pump shall allow for further adjustment as described above.
 - c. Clearance adjustment which requires movement of the shaft only, thereby adversely affecting seal working length or impeller back clearance, shall not be acceptable.
 5. An externally removable suction check valve shall be molded Neoprene with integral steel and nylon reinforcement. A blow-out center shall protect pump casing from hydraulic shock or excessive pressure. Removal or installation of the check valve must be accomplished from the top of pump without disturbing the suction piping or completely draining the casing. Sole function of check valve shall be to save energy by eliminating need to reprime after each pumping cycle. Pumps requiring a suction check valve to assist reprime will not be acceptable.
 6. Pump shall include flange kit consisting of two ASA spool flanges that shall be one piece cast iron class 30 suitable for attachment to suction and discharge ports. Each spool shall have one 1 – 1/4" NPT and one 1/4" NPT tapped hole with pipe plugs for mounting gauges or other equipment.

D. Serviceability

1. The pump manufacturer shall demonstrate to the engineer's satisfaction that consideration has been given to reducing maintenance costs.
2. No special tools shall be required for replacement of any components within the pump.

E. Drain Kit:

1. Pumps to be supplied with a drain kit for east of maintenance. The kit to contain 10' length of reinforced plastic hose with female quick connect fitting at one end, and factory installed drain fittings in each pump. Fittings include a stainless steel pipe nipple, stainless steel bushing, stainless steel ball valve and aluminum male quick connect fitting.

F. Spare Parts Kit:

1. The following minimum spare parts shall be furnished with the pump station:
 - a. One spare pump mechanical seal (complete with shaft sleeve)
 - b. One cover plate O-ring
 - c. One rotating assembly O-ring
 - d. One set of rotating assembly spacers

2.04 Valves and Piping:

- A. Each pump shall be equipped with a full flow type check valve, capable of passing a 3" spherical Solid, with flanged ends and be fitted with an external lever and spring. 316 stainless steel body ring shall be threaded into the valve port. Valve clapper shall be cast iron, rubber face, and shall swing completely clear of waterway when valve is full open. The seating shall be by a resilient field replaceable ring on the valve disc contacting a bronze or stainless seat ring in the valve body. Hinge pin shall be of 18-8 stainless steel construction and shall be utilized with bronze bushings and packing type seal. Valves shall be equipped with removable cover plate to permit entry or for complete removal of internal components without removing the valve from the line. Valve shall be rated at 175 psi water working pressure, 350 psi hydrostatic test pressure. Valves other than full flow type or valves mounted in such a manner that prevents the passage of a 3"spherical solid shall not be acceptable.
- B. Plug valves shall be of the non-lubricated, tapered type. Valve body shall be semi-steel with flanged end connection drilled in ANSI 125 lb. Standard. Valves shall have ports designed to pass spherical solids equal to the pumps capability. Valves shall be furnished with a drip-tight shutoff plug mounted in stainless steel or Teflon over phenolic bearings, and shall have a resilient facing bonded to the sealing surface.
- C. Automatic air release valves:
 1. An automatic air release valve shall be furnished for each pump designed to permit the escape of air to the atmosphere during initial priming or unattended repriming cycles. Upon completion of the priming cycle or repriming cycle, the valve shall close to prevent recirculation. Valves shall provide visual indication of valve closure, and shall operate solely

on discharge pressure. Valves which require connection to the suction line shall not be acceptable.

2. All valve parts exposed to sewage shall be constructed of cast iron, stainless steel, or similar corrosion resistant materials. Diaphragms, if used, shall be of fabric-reinforced neoprene or similar inert material.
3. A cleanout port, three inches in diameter, shall be provided for east of inspection, cleanout and service.
4. Valves shall be field adjustable for varying discharge heads.
5. Connection of the air release valves to the station piping shall include stainless steel fittings.

D. Gauge Kit

1. A gauge kit shall be supplied for each pump. Suction pressure must be monitored by a glycerin-filled compound gauge, and discharge pressure by a glycerin-filled pressure gauge. Gauges to be at least 4 inches in diameter, graduated in feet water column. Rated accuracy shall be 1% of full scale reading. Compound gauge shall be graduated -34 to +34 feet water column minimum. Pressure gauge to be graduated 0 to 140 feet water column minimum.
2. Gauges to be factory mounted on a resilient panel with frame assembly secured to pumps or piping. Gauge installations shall be complete with all hoses and stainless steel fittings, including a shutoff valve for each gauge line at the point of connection to suction and discharge pipes.

E. Piping

1. Flanged header pipe shall be centrifugally cast, ductile iron, complying with ANSI/AWWA A21.51/C115 and class 53 thickness.
2. Flanges shall be cast iron class 125 and Comply with ANSI B16.1.
3. Pipe and flanges shall be threaded and suitable thread sealant applied before assembling flange to pipe.
4. Bolt holes shall be in angular alignment within 1/2° between flanges. Flanges shall be faced with a gasket finish.

- F. Contractor must insure all pipes connected to the pump station are supported to prevent piping loads from being transmitted to pumps or station piping. Pump station discharge force main piping shall be anchored with thrust blocks where shown on the contract drawings.

2.05 Drive Unit

A. Motors (Note: Maximum motor frame size is 405T open drip-proof.)

1. Pump motors shall be **100 HP, 3 phase, 60 hertz, 24VAC**, horizontal ODP, 1,750 RPM, NEMA design B with cast iron frame with copper windings, induction type, with Class F insulation and 1.15 service factor for normal starting torque and low starting current characteristics, suitable for continuous service. The motors shall not overload at the design condition or at any head in the operating range as specified.
2. Motors shall be tested in accordance with provisions of ANSI/IEEE Std 112.

2.06 Drive Transmission

- A. Power to pumps shall be transmitted through V-belt drive assemblies. The sheave/belt combination shall provide the speed ratio needed to achieve the specified pump operating conditions.
- B. Each drive assembly shall utilize at least two V-belts providing minimum a combined safety factor of 1.5. Single belt drives or systems with a safety factor of less than 1.5 are not acceptable. Computation of safety factors shall be based on performance data published by the drive manufacturer.
- C. Precise alignment tolerances of the drive assemblies shall be achieved by means of a belt/sheave laser alignment system resulting in the reduction of vibration, accelerated wear, and premature failure.
- D. The pump manufacturer shall submit power transmission calculations which document the following:
 1. Ratio of pump/motor speed.
 2. Pitch diameter of driver and driven sheaves.
 3. Number of belts required per drive.
 4. Theoretical horsepower transmitted per belt, based on vendor's data.
 5. Center distance between pump and motor shafts.
 6. Arc-length correction factor applied to theoretical horsepower transmitted.
 7. Service factor applied to established design horsepower.
 8. Safety factor ratio of power transmitted/brake horsepower required.

E. Pump drives to be enclosed on all sides by a guard constructed of fabricated steel or combination of materials including expanded, perforated, or solid sheet metal. No opening to a rotating member and braced to the unit base.

1. Guards must be completely removable without interference from any unit component, and shall be securely fastened and braced to the unit base.
2. Metal to be free from burrs and sharp edges. Structural joints shall be continuously welded. Rivet spacing on panels shall not exceed five inches. Tack welds shall not exceed four inch spacing.
3. The guard shall be finished in accordance with Section 3, Color Definitions of ANSI 253.1; Safety Color Code for Marking Physical Hazards.

2.07 Pumps, piping and exposed steel framework shall be cleaned prior to painting. Exposed surfaces to be coated with one coat gray W.R. non-lift primer and one coat white acrylic alkyd W.R. enamel. Paint shall be low VOC, alkyd based, high solids, semi-gloss white enamel for optimum illumination enhancement, incorporating rust inhibitive additives. The finish coat shall be 1.0 to 1.2 MIL dry film thickness (minimum), resistant to oil mist exposure, solvent contact, and salt spray. The factory finish shall allow for over-coating and touch up after final installation.

2.08 Electrical Control Components

A. General

1. The pump control system shall be supplied by the pump manufacturer to assure a complete unit and total system responsibility. The pumps, motors, and control system shall be set-up and tested as unit at the pump manufacturer's facility.
2. This specification includes a modified Gorman-Rupp duplex pump control system using Allen-Bradley model PowerFlex 70 or 700 variable torque drives. The drives and level/logic control are an integrated system utilizing factory wired and tested with the motors, pumps, valves and other equipment. The control system is mounted in a NEMA 1 stainless steel motor control center. The level/logic control includes an Allen-Bradley programmable logic control utilizing a MicroLogix 1500, digital and analog I/O and PanelView 550 operator interface. Wet well level is measured using a submersible pressure transducer 4-20mA transmitter in conjunction with a PLC analog input.

B. System Power Characteristics

1. Electrical power to be furnished to the site will be 3 phase, 60 hertz, 4 wire, 460 volts, maintained within plus or minus 10 percent. Control voltage shall not exceed 132 volts.

C. Panel Enclosures

1. Enclosures shall be constructed in conformance with applicable section of National Electrical Manufacturer's Association (NEMA) standards for type 1, stainless steel enclosures.

Enclosure shall be fabricated of steel having a minimum thickness of not less than 0.075 inch (14 gauge). Interior and exterior surfaces shall be enamel over phosphatized surfaces.

D. Door

1. Enclosure shall be equipped with a hinged door held closed with clamps that are quick and easy to operate. The door shall accommodate the mounting of switches and indicators.

E. Mounting

1. All control components shall be securely fastened to a removable back panel with screws and lock washers. Switches, indicators, and instruments shall be mounted through the control panel door. Self-tapping screws shall not be used to mount and components.
2. Wiring Class
 - a. All motor control center wiring to be NEMA call IIB including interwiring and interlocking between units and the liquid level control. Units shipped separately because of shipping requirements shall be equipped with wiring harnesses with match-marked and keyed connectors for field assembly.
 - b. Complete control system engineering shall be supplied by the pump manufacturer and shall include system drawings showing all control units as they are interwired. Diagrams of individual units will not be acceptable.
3. Main Connections
 - a. Each control assembly shall be furnished with main terminals and ground lug for field connection of the electrical supply. The connections shall be designed to accept copper conductors of sufficient size to serve the loads. The main terminals shall be mounted to allow incoming wire bending space in accordance with article 373 of the National Electric Code (NEC). A separate terminal strip shall be provided for 115 volt, single phase control power and shall be segregated from the main terminals. The percent of the control terminals shall be furnished as spares.

F. Branch Circuit Components

1. Motor branch components to be of highest industrial quality, secured to the sub-plate with machine screws and lockwashers. Mounting holes shall be drilled and tapped; Self-tapping screws shall not be used to mount any components.
2. Circuit Breakers and Operating Mechanisms
 - a. A properly sized heavy duty motor circuit breaker, with RMS interrupting rating of **14,000** amperes at **460** volts, shall be furnished for each pump motor. The circuit breakers must be sealed by the manufacturer after calibration to prevent tampering.

- b. An operating mechanism installed on each motor circuit breaker shall penetrate the control panel door. A padlockable operator handle shall be secured on the exterior surface. Interlocks must prevent opening the door until circuit breakers are in "OFF" position.

3. Starting Equipment

- a. The inverter shall be suitable for operation of NEMA Design B, 4 pole motors. The inverter will have a diode bridge rectifier on the input to minimize the generation of electrical noise back into the line and provide near unity power factor. Output devices shall be transistors.
- b. Bypass: When the start ramp time is complete, the starter shall energize an integral bypass contactor. When in the bypass mode, the bypass contactor shall carry the motor load to minimize internal heating in the electrical enclosure.

4. Environment Conditions

- a. The inverter shall be capable of operation under any combination of the following conditions without mechanical or electrical damage. Temperature: 0 to +40 degrees C.
- b. Relative Humidity: Less than 95% non-condensing
- c. Altitude: Less than 1,000M (3300 ft) above sea level
- d. Vibration: .006 inches displacement, 1G peak
- e. Shock: 15G peak for 11mS (+/- 1.0mS)

5. Control Specification

- a. Control System: Sinusoidal pulse width modulated voltage waveform
- b. Frequency Accuracy: +/- 0.4% of max. frequency
- c. Volts/Hertz Ratio: V/Hz user programmable
- d. Operation Frequency: 0 to 400 Hz
- e. Overload Capacity: 110% Overload capability for up to 1 minute, 150% Overload capability for up to 3 seconds.

G. Digital Readout and Monitor

- 1. See Scada & Instrumentation Spec.

H. Protection

1. The variable speed drive system shall include a diode or fully gated bridge rectifier, capacitor filter, and transistorized inverter section. Base driver signals to control firing of the power transistors will be designed with optically coupled isolators for maximum protection of the control circuits from high voltage and noise. The output will be a sinusoidal, pulse width modulated, voltage waveform for reduced harmonic heating in the motor.
2. The system protection will provide the following:
 - a. Intermittent overload – 50 to 150%
 - b. Current limit – 50 to 115%
 - c. Overcurrent- 220-300% of rated output current
 - d. Inverse time overload – 50 to 100 %
 - e. Short circuit – Phase to phase or phase to ground
 - f. Overvoltage – 10% above input line or DC bus voltage
 - g. Undervoltage – 10% below line voltage
 - h. Power loss ride-through – 500 mS
3. When the inverter trips out on a fault, the fault relay shall activate and the display shall indicate the reason for the trip as follows:
 - a. Overcurrent
 - b. Short Circuit
 - c. Overload
 - d. Overvoltage
 - e. Undervoltage
 - f. Overheat
 - g. Ground fault
 - h. Motor stalled
 - i. Power supply fault
4. Auto restart occurs when the inverter faults. Auto restart shall be adjustable up to 9 attempts with a 0.5 to 30 second interval. Auto restart will not be attempted for ground fault, output shorted, transistor shorted or internal microprocessor fault but will trip out immediately, activate the fault relay and make the appropriate indication on the display. At the last attempt to run on VFD, run the pumps via the bypass contactor.

5. In the event of a fault trip, the microprocessor shall save the status of the inverter at the time of the fault and make that information available on the digital display. Information regarding the last 4 faults is maintained in even of a power loss.

6. Operational Function:

- a. Acceleration and deceleration time independently adjustable from 0.1 to 3600.0 seconds (selectable ranges),
- b. Volts/Hertz patterns user selectable.
- c. Maximum and minimum frequency limit adjustments.

I. Secondary Lightning Arrestor:

1. The control panel shall be equipped with a secondary lightning arrestor to minimize damage to the pump motors and control from transient voltage surges. The arrestor shall utilize silicon-oxide varistors encapsulated in a non-conductive housing. The arrestor shall have a current rating of 60,000 Amps, and a Joule rating of 1500.

J. Phase Monitor:

1. The control panel shall be equipped to monitor the incoming power and shut down the pump motors when required to protect the motor(s) from damage caused by phase reversal, phase loss, low voltage, and voltage unbalance. An integral time delay shall be provided to minimize nuisance trips. The motor(s) shall automatically restart when power conditions return to normal.

K. Control Circuit Components

1. A normal duty thermal-magnetic circuit breaker shall protect all control circuits by interrupting control power.
2. Pump mode selector switches shall permit manual start or stop of each pump individually, or permit automatic operation under control of the liquid level control system. Manual operation shall override all shutdown systems, except the drive fault. Selector switches to be heavy duty, oil-tight design with contacts rated NEMA A300 minimum.
3. Six digit elapsed time meter (non-reset type) shall be connected to each motor starter to indicate total running time of each pump in "hours" and "tenths of hours".
4. The PLC shall be a CompacLogix Model L2 with Panel View 6. The PLC shall be equipped with CPU with 14k of user memory, and two configurable RS-232-C communication ports. One is used for connection to the electronic operator interface. The remaining RS-232 port is reserved for future customer use.

5. The PLC shall operate a 120 VAC power and be equipped with the communication devices, digital and analog I/O necessary to accomplish the specified operation. A minimum of 10% spare of the I/O used shall be supplied.
6. The program logic shall be stored in battery backed random access memory, as well as on a programmable, read only memory module. The memory module shall auto load and run when installed in the programmable control processor and is included to facilitate field repair or replacement of the programmable control hardware without the use of programming terminals or personal computers.
7. The power supply to the programmable control shall include an active tracking filter protection system to minimize the effects of electrical noise. Each motor starter or contactor shall be equipped with a surge suppressor.
8. Electromechanical relays and timers, when used shall be equipped with 120vac coils and contacts rated NEMA A-300 minimum. Timers shall be pneumatic or synchronous motor driven.
9. A duplex ground fault receptacle providing 115 VAC, 60 Hz, single phase current, will be mounted on the control enclosure. Receptacle circuit shall be protected by a 15 ampere thermal-magnetic circuit breaker.

L. Control Logic

1. See Scada & Instruction Section

M. Auxiliary Power Transformer:

1. The lift station shall be equipped with a 5 KVA stepdown transformer to supply 115 volt, AC, single phase for the control and auxiliary equipment. The primary and secondary side of the transformer to be protected by a thermal magnetic circuit breaker, sized to meet the power requirements of the transformer. An operating mechanism shall penetrate the control panel door and a padlockable operator handle shall be secure on the exterior surface. Interlocks must prevent opening the door until circuit breaker are in "OFF" position.

N. Wiring

1. The pump station, as furnished by the manufacturer, shall be completely wired, except for power feed lines to the branch circuit breakers and final connections to remote alarm devices.
2. All wiring, workmanship, and schematic wiring diagrams shall comply with applicable standards and specification on the National Electric Code (NEC).
3. All user serviceable wiring shall be type MTW or THW, 600 volts, color coded as follows:
 - a. Line and Load Circuits, AC or DC powerBlack

- b. AC Control Circuit Less Than Line Voltage.....Red
 - c. DC Control Circuit.....Blue
 - d. Interlock Control Circuit from external source.....Yellow
 - e. Equipment Grounding Conductor.....Green
 - f. Current Carrying Ground.....White
 - g. Hot with Circuit Breaker Open.....Orange
4. Control circuit wiring inside the panel, with exception of internal wiring of individual components, shall be 18 gauge minimum, type MTW or THW, 600 volts. Power wiring to be 14 gauge minimum. Motor branch wiring shall be 10 gauge minimum.
 5. Motor branch and other power conductors shall be sized to carry the circuit load without exceeding either the conductor ampacity or the temperature rating of the connecting termination. Wires shall be clearly numbered or identified at each end. All wires in the control panel shall be bundled and tied or routed in ducts. All wires extending from components on the door shall terminate at a terminal block mounted on the back panel. All wiring extending outside the control panel shall terminate in a terminal without undue stress or abrasion. Bundles shall be held on each side of hinge by mechanical fastening devices.

O. Conduit

1. Factory installed conduit shall conform to following requirements:
 - a. All conduit and fittings to be UL listed.
 - b. Liquid tight flexible metal conduit to be constructed of smooth, flexible galvanized steel core with smooth abrasion resistant, liquid tight polyvinyl chloride cover.
 - c. Conduit to be supported in accordance with articles 346, 347, and 350 of the National Electric Code.
 - d. Conduit shall be sized according to the National Electric Code.

P. Grounding

1. Station manufacturer shall ground all electrical equipment inside the pump station to the control panel back plate. All paint must be removed from the grounding mounting surface before making final connection.
2. The contractor shall provide an earth driven ground connection to the pump station at the main grounding lug in accordance with the National Electric Code (NEC).

Q. Equipment Marking

1. Permanent corrosion resistant name plate(s) shall be attached to the control and include following information:
 - a. Equipment serial number
 - b. Supply voltage, phase and frequency

- c. Current rating of the minimum main conductor
 - d. Electrical wiring diagram number
 - e. Motor horsepower and full load current
 - f. Motor overload heater element
 - g. Motor circuit breaker trip current rating
 - h. Name and location of equipment manufacturer
2. Control components shall be permanently marked using the same identification keys shown on the electrical diagram. Labels shall be mounted adjacent to device being identified.
 3. Switches, indicators, and instruments mounted through the control panel door shall be labeled to indicate function, position, etc. Labels shall be mounted adjacent to, or above the device.

2.09 Liquid Level Control (Primary Control)

- A. The level control system shall start and stop the pump motors in response to changes in wet well level, as set forth herein.
- B. The level control system shall be capable of operating as a Multitrode Level Sensing Unit.
- C. The level control system shall continuously monitor the wet well level, permitting the operator to read wet well level at any time.
- D. The level control system shall utilize the PLC sequencer to select first one pump, then the second pump, to run as lead pump for a pumping cycle. Alternation shall occur at the end of a pumping cycle or if one pump runs as the lead pump for an excessive time.
- E. *Level and speed controls shall include logical comparator setpoints. Setting shall be provided to control the levels at which the pumps start and stop as well as level endpoints for minimum and maximum speed. Two sets of speed setpoints shall be provided. The first set will be enabled when a single pump is running. The second set shall be enabled when two pumps are running. Each of the settings shall be adjustable and accessible to the operator without opening the control panel. Controls shall be provided to permit the operator to read and adjust the selected levels and speeds on the operator interface. Setpoint adjustments which require hard wiring, the use of electronic test equipment or artificial level simulation are not acceptable.*
- F. *Upon operator selection of automatic operation, the PLC shall start the motor for one pump when the liquid level in the wet well rises to the "lead pump start level". When the liquid is lowered to the "lead pump stop level", the PLC shall stop this pump. These actions shall constitute one pumping cycle. Should the wet well level continue to rise, the PLC shall start the second pump when the liquid reaches the "lag pump start level" so that both pumps are operating.*

- G. When a single pump is running and the wet well is equal to the “1 pump minimum level”, the drive will run at the “1 pump minimum speed”. As the level rises, drive speed will increase to the “1 pump maximum speed” when the wet well level is equal to the “1 pump minimum level”. Likewise, when two pumps are running, the “1 pump” settings will be disabled and the control will use the “2 pump” level and speed settings.
- H. *Level control range shall be 0 to 12.0 feet of water. Speed control range shall be 40.0 to 60.0 hertz. Overall repeat accuracy shall be (plus/minus) 0.1 feet of water or hertz.*
- I. Alarms and shutdown routines shall operate as follows:
 - 1. Conditional abnormal: The general alarm pilot light will quick flash until silenced, then slow flash until reset, then glow steady until condition returns to normal, then off. The operator interface will display the alarm when acknowledged. The external alarms will be active until silenced, and then off.
 - 2. Condition abnormal then returns to normal: The general alarm pilot light will quick flash until silenced, the slow flash until reset, then off. The operator interface will display the alarm when acknowledged. The external alarms will be active until silenced, and then off.
 - 3. Subsequent alarms will re-alarm when silenced or reset.

2.10 Liquid Level Control (Backup Control)

- A. The backup liquid level control system shall be an independent redundant float control system.
- B. The system works independent of the primary level control, and utilizes a small PLC. The control consists of: a relay, a small PLC and two non-mercury float switches. The low level float (pump off) is placed below all primary pump off set-points. The high level float (pump start) is placed above all primary on set-points. If either float condition is achieved, a “Float Control Timer” begins to count. When the timer expires, the float control is latched in, and the floats become active causing an indicating light to become illuminated on the front of the control panel. If the high level float is achieved a pump will start, if the level persists the second pump will start after an adjustable time period. When the wet well level reaches the low level float, both pumps will shut off. The float control includes alternation. Dry contacts wired to terminal blocks will be provided for the float control active alarm circuit. The float control system will remain latched until reset. The redundant float control is mounted in a separate Nema 4X enclosure. Float system includes a PVC chain and weight.

2.11 Alarm Light (External):

- A. Station manufacturer will supply one 115 VAC NEMA 4X alarm light fixture with red globe, conduit box, and mounting base. The design must prevent rain water from collecting in the gasketed area of the fixture, between the base and globe. The alarm light will be shipped loose for installation by the contractor.

2.12 Alarm Horn (External):

- A. Station manufacturer will supply one 115 VAC weatherproof alarm horn with projector, conduit box, and mounting base. The design must prevent rain water from collecting in any part of the horn. The alarm horn will be shipped loose for installation by the contractor.

2.13 Automatic Telephone Dialer (Existing):

- A. The station has an existing automatic telephone dialer system. The existing system must be protected.
- B. The Contractor shall re-use the existing automatic dialer system for the new pump station.

PART 3 – EXECUTION

3.01 Examination

- A. Contractor shall off-load equipment at installation using equipment of sufficient size and design to prevent injury or damage. Station manufacturer shall provide written instruction for proper handling. Immediately after off-loading, contractor shall inspect complete pump station and appurtenances for shipping damage or missing parts. Any damage or discrepancy shall be noted in written claim with shipper prior to accepting delivery. Validate all station serial numbers and parts lists with shipping documentation. Notify the manufacturer's representative of any unacceptable conditions noted with shipper.

3.02 Installation

- A. Install, level, align, and lubricate pump station as indicated on project drawings. Installation must be in accordance with written instructions supplied by the manufacturer at time of delivery.
- B. Suction pipe connections must be vacuum tight. Fasteners at all pipe connections must be tight. Install pipe with supports and thrust blocks to prevent strain and vibration on pump station piping. Install and secure all service lines (level control, air release valve, or pump drain lines) as required in wet well.
- C. Check motor and control data plates for compatibility to site voltage. Install and test the station ground prior to connecting line voltage to station control panel.
- D. Prior to applying electrical power to any motors or control equipment, check all wiring for tight connection. Verify that protective devices (fuses and circuit breakers) conform to project design documents. Manually operate circuit breakers and switches to ensure operation without binding. Open all circuit breakers and disconnects before connecting utility power. Verify line voltage, phase sequence, and ground before actual start-up.

- E. After all anchor bolts, piping, and control connections are installed, completely fill the grout dam in the pump station base with non-shrink grout.

3.03 Field Quality Control

A. Operational Test

1. Prior to acceptance by owner, and operational test of all pumps, drives, and control systems shall be conducted to determine if the installed equipment meets the purpose and intent of the specifications. Tests shall demonstrate that all equipment is electrically, mechanically, structurally, and otherwise acceptable: it is safe and in optimum working condition: and conforms to the specified operating characteristics.
 2. After construction debris and foreign material has been removed from the wet well, contractor shall supply water volume adequate to operate station through several pumping cycles. Observe and record operation of pumps, suction and discharge gauge readings, ampere draw, pump controls, and liquid level controls. Check calibration of all instrumentation equipment, test manual control devices, and automatic control systems.
- B. Co-ordinate station start-up with manufacturer's technical representative. The representative or factory service technician will inspect the completed installation. The technician will calibrate and adjust instrumentation, correct or supervise correction of defects or malfunctions, and instruct operating personnel in proper operation and maintenance procedures.
- C. Prior to acceptance, inspect interior and exterior of pump station for dirt, splashed material, or damaged paint. Clean or repair accordingly. Remove from the job site all tools, surplus materials, scrap, and debris.
- D. The pump station should be placed into service immediately. If operation is delayed, station is to be stored and maintained per manufacturer's written instructions.

END OF SECTION

SECTION 15302
FLOW METERING EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE

The work of this section involves furnishing and installing the propeller meter with flow indicator, totalizer, and recorder at the land application pumping station and the parshall flume with ultrasonic flow meter at the effluent of the constructed wetlands.

1.02 SUBMITTALS

- A. Shop drawings shall be submitted in accordance with Section 01001, Paragraph 1.17 of these specifications.
- B. Operation and maintenance manuals shall be submitted in accordance with Section 01001, Paragraph 1.18 of these specifications.

PART 2 - PRODUCTS

2.01 PROPELLER METER (IF REQUIRED)

- A. The flow meter shall be flanged tube type with 150 lb. AWWA Class D flat face steel flanges.
- B. The propeller shall be magnetically coupled with the driven mechanism through the sealed oil filled gearbox.
- C. Provide an indicator/totalizer/transmitter on the meter. The transmitter shall be two-wire with 4-20 MA output.
- D. Provide a strip chart recorder with 7 - digit totalizer in NEMA - 1 wall mounting type enclosure.
- E. The propeller meter indicator, totalizer, transmitter shall be water specialties catalog number ML-04/TR16 or approved equal.

2.02 PARSHALL FLUME

- A. The flume shall be a 18" parshall flume designed to measure flows from 0.112 MGD to 15.9 MGD. The flume shall be a molded structure of fiberglass reinforced polyester. The interior surface shall have a ten (10) to fifteen (15) mil white ultraviolet-resistant gel-coat backed by a rich layer of resin and chopped glass forming a water and chemical resistant surface. The remainder of the laminate shall be fiberglass reinforced polyester containing not less than thirty percent (30%) glass content by weight. The thickness of the walls and floor of the flume shall not be less than one-fourth inch (1/4"); and shall be reinforced with stiffeners down the sides and across the bottom on flumes with a throat width of three inches (3") or greater. The stiffeners shall be joined together at the knee to form a rigid dimensionally stable flume.

- B. The flume shall be provided with anchoring clips fastened along the side of the flume to be used for anchorage into the concrete. Stiffeners made of FRP angle/channel shall be provided across the top of the flume to provide structural support during shipping and installation.
- C. Flume dimensions shall be in accordance with the United States Department of Interior, Water Measurement Manual, and latest revision. The flume shall be as manufactured by TRACOM, Inc., or equal.
- D. The flume shall be provided with a head gauge calibrated in tenths of a foot, molded into the side of the flume, at the point of measurement.

2.03 ULTRASONIC FLOW METER (Open Channel Flow)

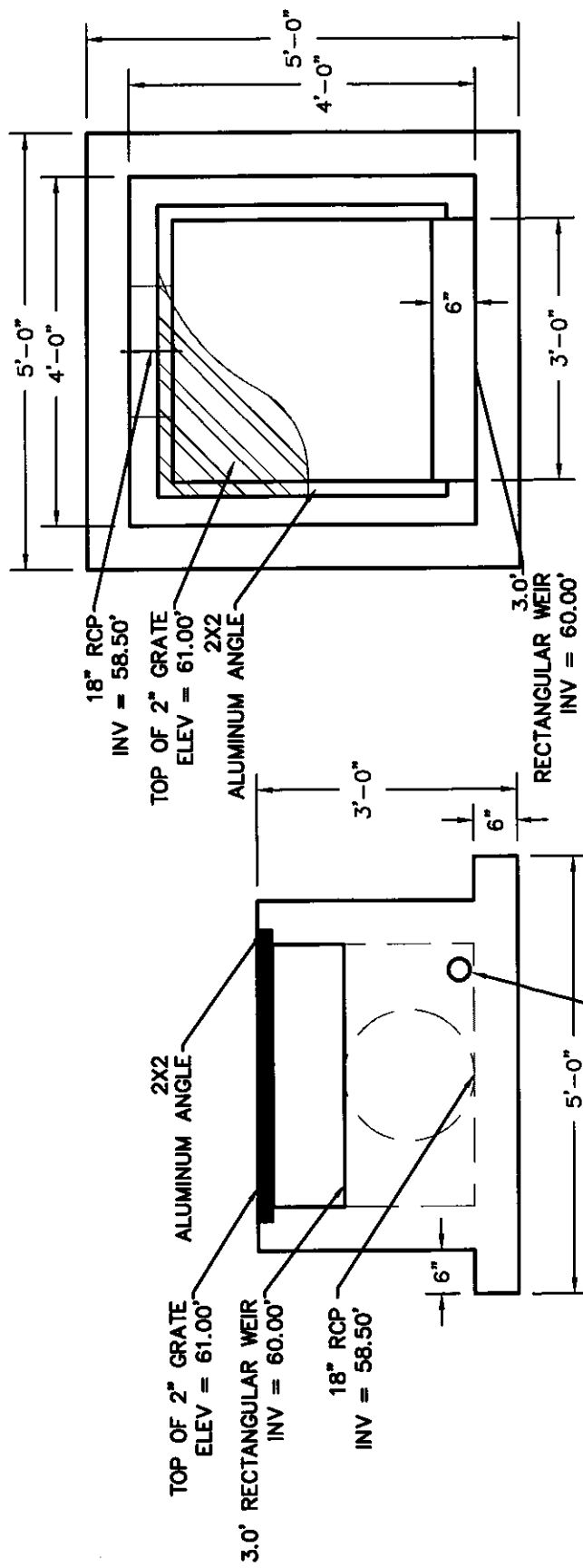
- A. There shall be furnished a recording, totalizing open channel flow meter suitable for portable or fixed-site monitoring. An ultrasonic sensor capable of measuring up to 10' shall be used to measure level. The flow meter shall be ISCO, Signature flow meter or equal and must be programmable for measuring flow based on the type flow monitoring device installed. Any application requiring level measurements over 10' shall be Rosemount Model 3108 Ultrasonic flow transmitter along with a Rosemount 3490 Series controller Unit.
- B. The sensor shall consist of a single ultrasonic transducer housed in a corrosion resistant Xenoy plastic enclosure. The sensor shall include a temperature probe to automatically compensate for air temperature changes. The sensor shall automatically adjust its gain in response to echo strength to maximize performance in the presence of steam, foam, and turbulence. The sensor shall include variable blanking distance to ignore echoes from within a programmable distance from the sensor.
 - 1. The level measurement span shall be from 0 to 10 feet (0 to 3.05 m) for ISCO or 0-39' for Rosemount. The level shall be measured with a maximum error of ± 0.02 feet (± 0.006 m) over a head change of 1 foot or less (0.31 m or less), and ± 0.03 feet (± 0.009 m) over a head change of 1 to 10 feet (0.31 to 3.05 m).
 - 2. The sensor cable shall be 25 feet (7.62 m) long. The cable shall terminate in a sealed, military style connector so that the sensor can be easily replaced in the field. [An optional (25 ft. -7.62 m) extension cable shall be supplied.] A stainless steel mounting bracket shall be supplied for mounting the sensor and a sunshade. It shall be possible to suspend the sensor using only the cable.
- C. Measured liquid level readings shall be converted into corresponding flow rate readings using internal conversion algorithms. The flow meter shall contain conversions for V-notch weirs, rectangular weirs with and without end contractions, Cipolletti weirs, and Parshall, Palmer-Bowlus, Leopold-Lagco, trapezoidal, H, HS, and HL flumes. For monitoring in applications using the Manning formula in round, U-shaped, rectangular and trapezoidal channels, the flow meter shall accept information for channel shape and size, and slope and roughness coefficient. The flow meter shall accept 4 sets of level-flow rate points, with up to 50 pairs of points in each set. The flow meter shall accept a two-term, level flow rate polynomial equation.

1. The flow meter shall include an input for a pH probe with a built-in temperature probe, a dissolved oxygen probe.
2. The flow meter shall be capable of activating a connected sampler based on an AND/OR combination of any two of level, flow rate, rainfall, pH or dissolved oxygen, and temperature.
3. The flow meter shall have a 12 volt pulse output for signaling a connected automatic sampler to collect flow proportioned samples. The flow meter shall have inputs to accept signals from the sampler indicating when a sample is collected and the bottle in which the sample is placed.
4. The flow meter shall contain a tactile keypad and a 2 line, 80 character, backlit alphanumeric liquid crystal display (LCD). The LCD shall visually prompt the user through the programming sequence. The LCD shall display level, flow rate, total flow, pH or dissolved oxygen, and temperature in user-selectable units of measure. The totalizer on the LCD shall be resettable. The flow meter shall include a non-resettable, mechanical totalizer. The LCD shall display the signal strength from the ultrasonic sensor to aid in installation and troubleshooting.
5. The flow meter shall contain a programmable transmitting unit that will allow output to the SCADA system.
6. The internal data storage memory in the flow meter shall have a capacity of 80,000 bytes, divided into up to 6 user-defined partitions. Each partition shall be programmable to store level, flow rate, rainfall, and pH or dissolved oxygen, temperature or sample data. Timing for the data storage shall be selectable in 1, 2, 5, 10, 15, 30, 60, or 120 minute intervals. Each partition shall be programmable to operate in either rollover, slate or triggered slate mode. Triggering events in slate mode shall be selectable from level, flow rate, rainfall, pH or dissolved oxygen and temperature.
7. The flow meter shall have a 4 to 20 mA output proportional to flow rate.
8. The flow meter shall have 2 form C relays with user-selectable trip points based on flow rate.
9. The program memory in the flow meter shall be non-volatile, programmable flash memory. The program memory shall be capable of being updated via the serial port on the flow meter without opening the enclosure.
10. The flow meter shall require 12 volt DC power for operation. Power shall be supplied from a rechargeable lead acid battery with included battery charger connected to permanent ac supply.

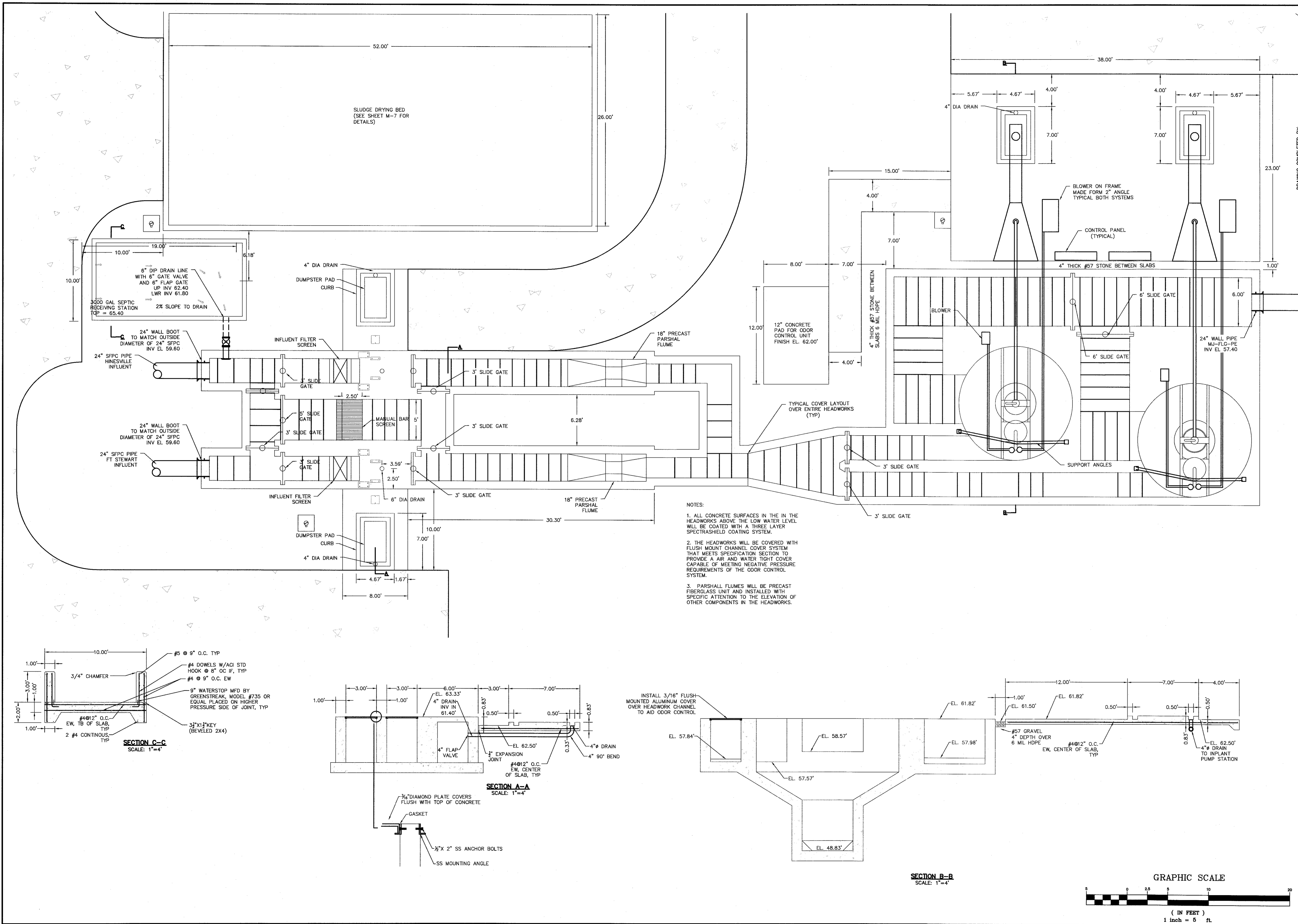
11. The flow meter shall be housed in a rugged, lockable, watertight, dusttight, corrosion resistant (self-certified NEMA 4X and IP65) enclosure. The enclosure shall include a carrying strap, wall mounting bracket and a clear polycarbonate window for viewing flow data. An internal, easily replaceable, rechargeable desiccant canister shall keep the inside of the flow meter free of moisture.

2.04 ELECTRO-MAGNETIC FLOWMETER (IF REQUIRED)

- A. Provide an electro-magnetic flow meter and converter (remote display) for installation as shown on the plan and shall be manufactured by ABB or Krohne.
- B. Flow meter shall have an accuracy of 0.15%.
- C. Flow meter shall match the size of the pipe shown on the plan.
- D. Flow meter shall be designed to measure flow rates of the material contained in the pipe line (i.e. sludge, raw wastewater or partially treated wastewater).
- E. Flow meter must be capable of submersible or buried environment.
- F. Flow meter power consumption should be < 20VA with transmitter.
- G. Meter lining shall be Teflon bonded (FEP)
- H. Electrode shall be 316 stainless steel.
- I. Flange shall be carbon steel.
- J. Housing shall be ABS plastic up to 24", fabricated steel on larger units.
- K. Flow meter shall not lose calibration if the pipe fails to stay full and will be capable of accurately measuring flow through the pipe at flows less than 100%.
- L. Remote converter shall be mounted on a post at least 36" above ground and will have a rain shield mounted above.
- M. Converter shall contain a keypad to allow changes to output information (to include flow rate, flow units) and must be compatible with SCADA system reporting flow.
- N. The unit shall include a self test and diagnostic mode.
- O. The converter must be the same manufacturer as the magmeter.
- P. Output must be 4 – 20 mA signal to the SCADA system



OCS-3 DETAIL
N.T.S.



- NOTES:
1. ALL CONCRETE SURFACES IN THE IN THE HEADWORKS ABOVE THE LOW WATER LEVEL WILL BE COATED WITH A THREE LAYER SPECTRASHIELD COATING SYSTEM.
 2. THE HEADWORKS WILL BE COVERED WITH FLUSH MOUNT CHANNEL COVER SYSTEM THAT MEETS SPECIFICATION SECTION TO PROVIDE A AIR AND WATER TIGHT COVER CAPABLE OF MEETING NEGATIVE PRESSURE REQUIREMENTS OF THE ODOR CONTROL SYSTEM.
 3. PARSHALL FLUMES WILL BE PRECAST FIBERGLASS UNIT AND INSTALLED WITH SPECIFIC ATTENTION TO THE ELEVATION OF OTHER COMPONENTS IN THE HEADWORKS.

DRAWING COMPLETED BY:

REVISED: 11-4-2014, EDITED FOR ODOR CONTROL

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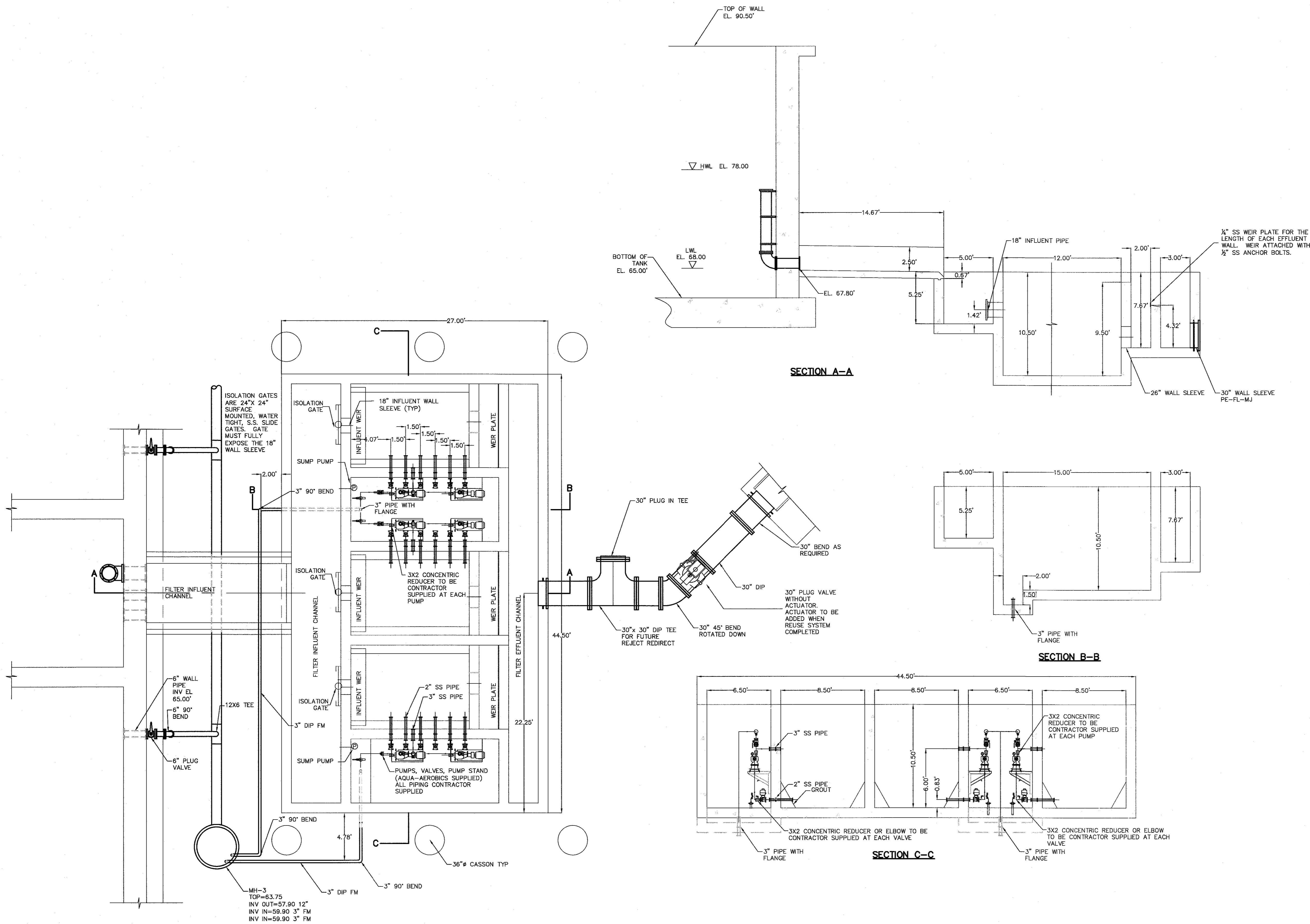
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GREENSBORO, GA 30642
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P.C. Simonton & Associates, Inc.
Consulting Engineers

**Hinesville/Ft Stewart
WWTP Upgrade**
for
The City of Hinesville
Ft Stewart
Liberty County, Georgia

Headworks Detail
Plan View

DATE: November 29, 2012
FILE NO: 2009-63PRJ
SHEET: M-1



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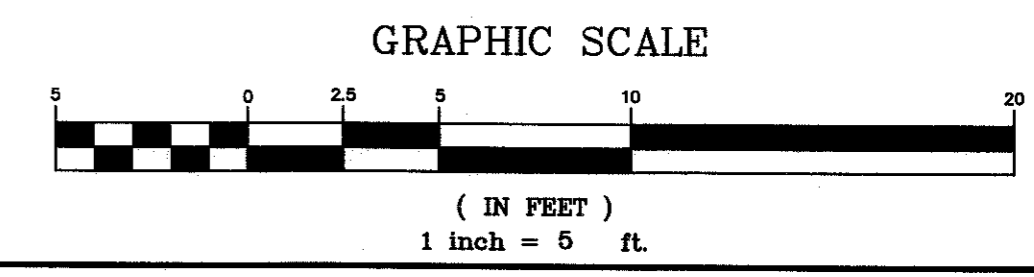
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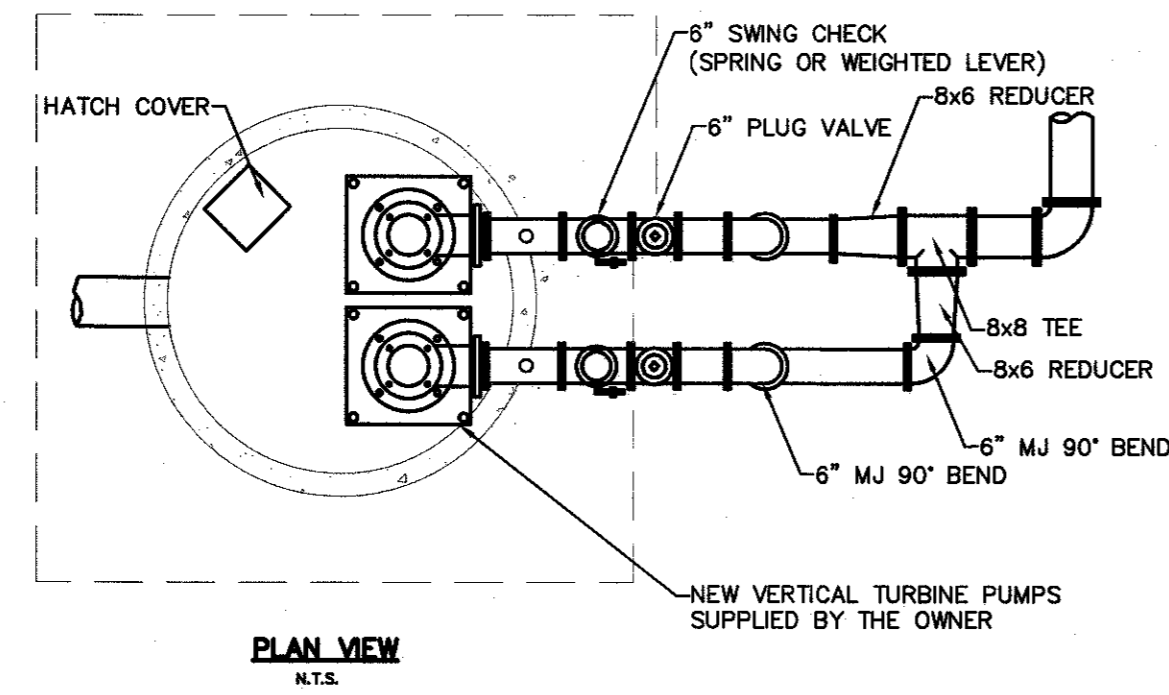
**Hinesville/Ft Stewart
for
WWTP Upgrade**
The City of Hinesville
Ft Stewart
Liberty County, Georgia

Disk Filter
Plan & Details

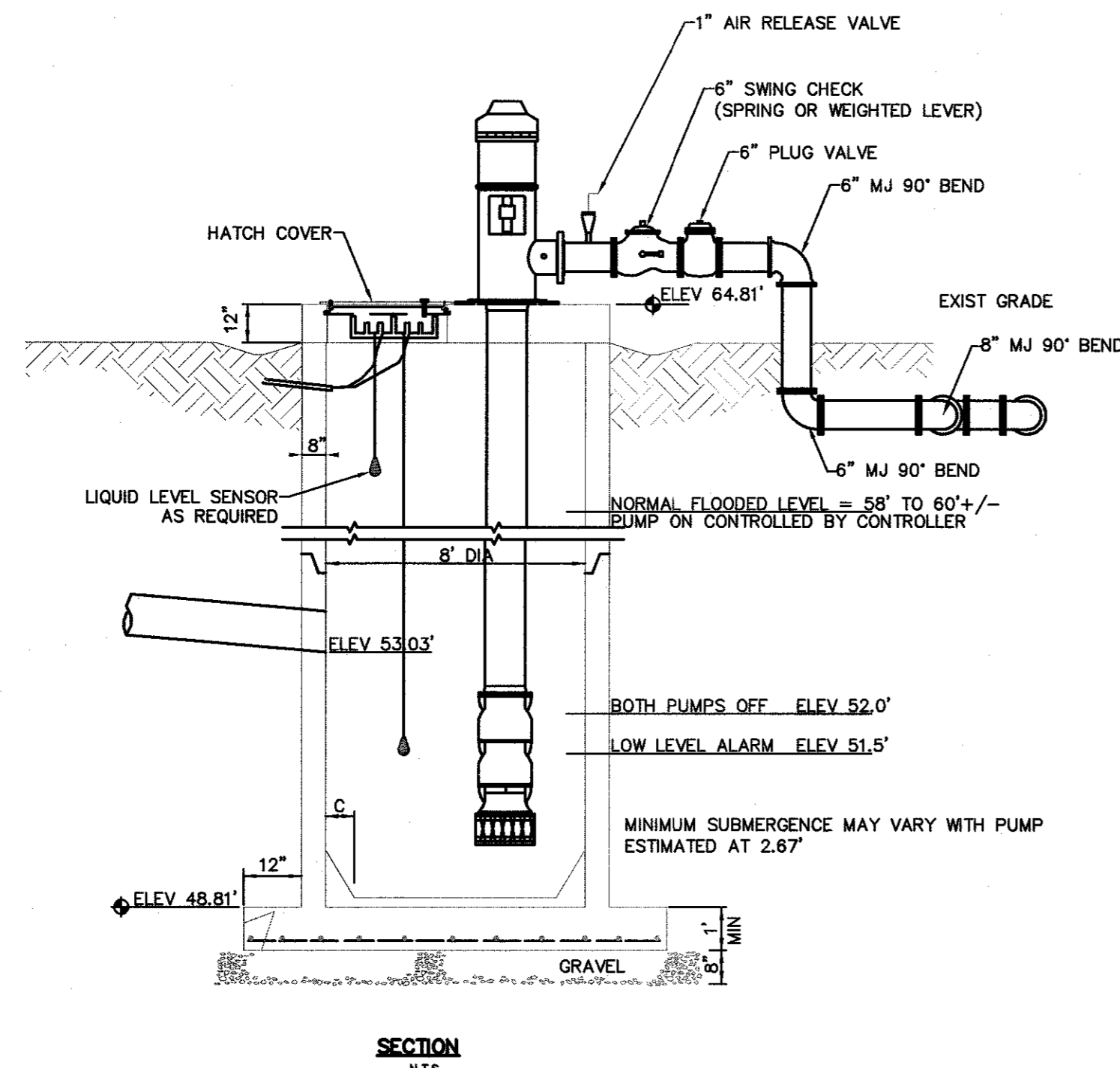
DATE: November 29, 2012
FILE NO: 2009-63PRJ
SHEET: M-5



- GENERAL NOTES REUSE SYSTEM PUMPS:
- PUMPS SHALL BE VERT. TURBINE- PEERLESS PUMP PEERLESS VERTICAL 10MA 1770 RPM 30 HP, 3 PHASE, 460 VOLTS, SUPPLIED BY THE CITY.
 - WET WELL SHALL BE COATED INSIDE WITH PROTECTIVE COATING APPROVED BY THE ENGINEER.
 - BASE AND FIRST RISER UNIT TO BE CAST MONOLITHIC.
 - ALL LOCATIONS WHERE PIPES ENTER OR LEAVE THE WET WELL OR VALVE VAULT SHALL BE MADE WATERTIGHT AND GAS TIGHT WITH WALL SLEEVE OR NON-SHRINK GROUT.
 - WET WELL COVER SHALL BE HEAVY DUTY ALUMINUM WITH TORSION BAR ASSIST AND POSITIVE LOCK AT 90°, COVER SHALL ALSO HAVE PADLOCKING CAPABILITIES. (LOADING 300 PSF)
 - ELECTRICAL CONDUIT SIZE SHALL BE LARGE ENOUGH TO ALLOW FOR PERIODIC REMOVAL AND REPLACEMENT OF ELECTRICAL CABLES.
 - CABLE HANGERS SHALL BE STAINLESS STEEL.

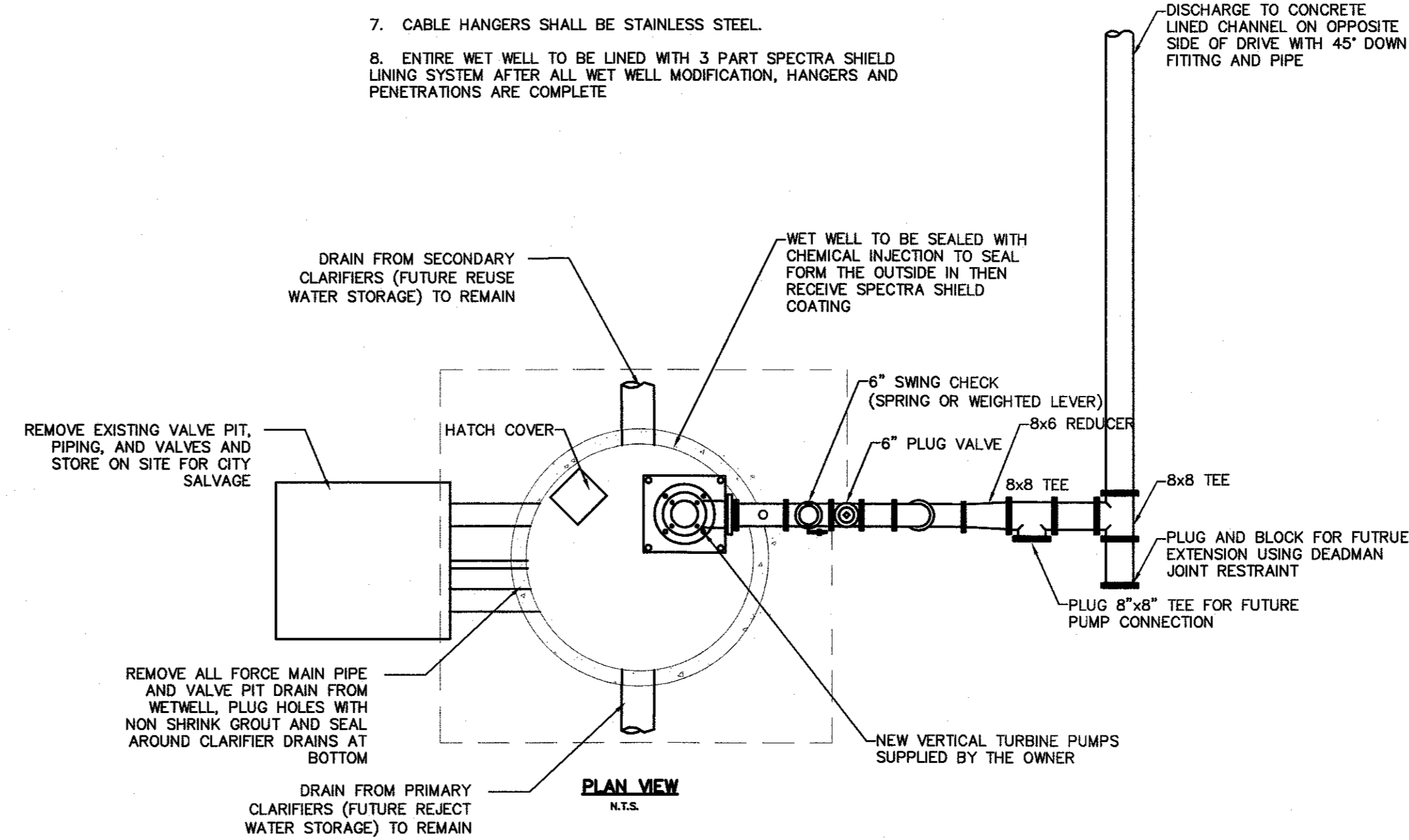


DUTY POINT
500 GPM @ 152' TDH

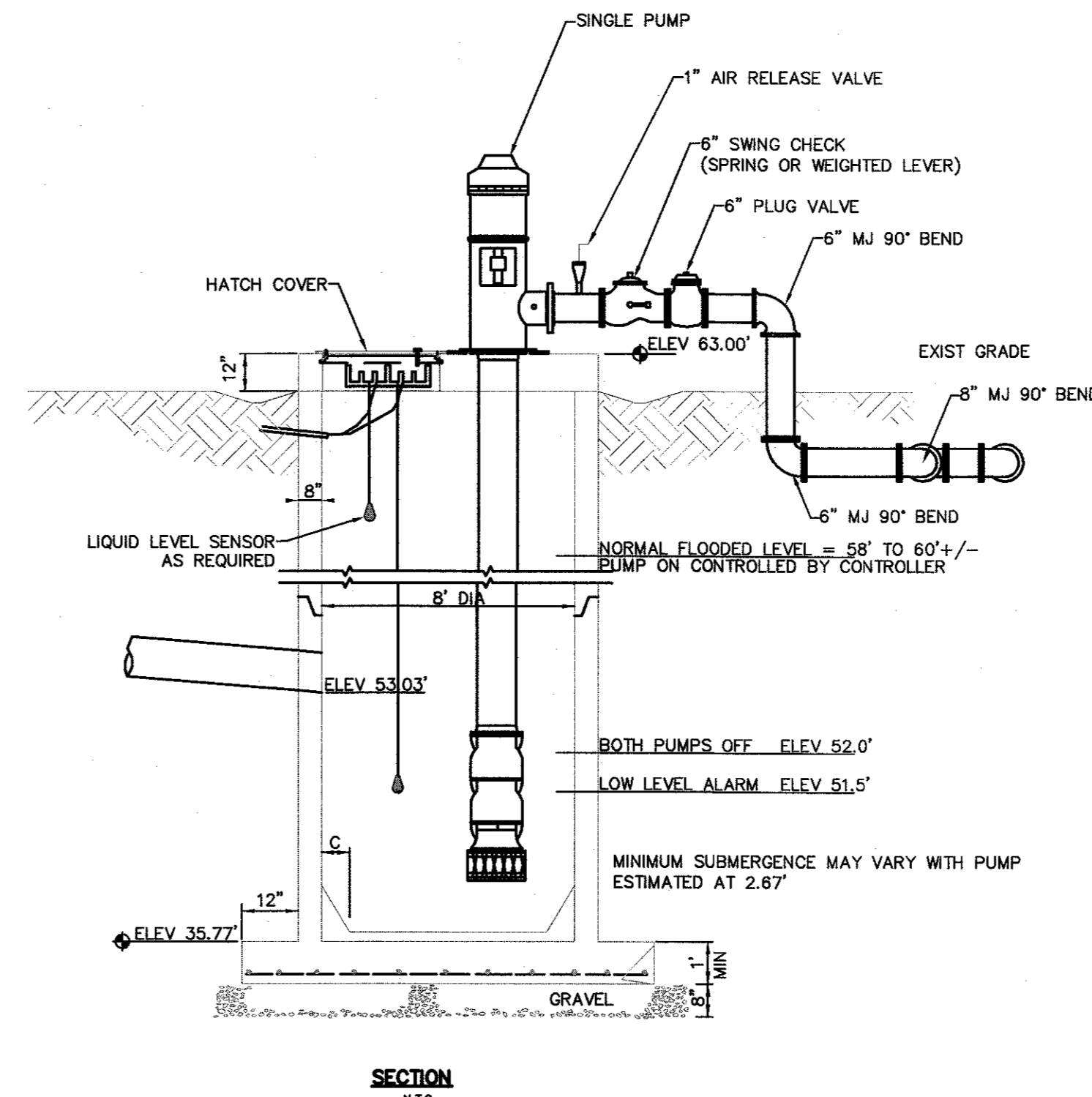


ON-SITE REUSE WET WELL DETAIL

- GENERAL NOTES PUMPS TO REUSE AND REJECT TANK DRAIN:
- PUMP SHALL BE VERT. TURBINE- PEERLESS PUMP PEERLESS VERTICAL 10MA 1770 RPM 30 HP, 3 PHASE, 460 VOLTS SUPPLIED BY THE CITY.
 - WET WELL SHALL BE COATED INSIDE WITH PROTECTIVE COATING APPROVED BY THE ENGINEER.
 - BASE AND FIRST RISER UNIT TO BE CAST MONOLITHIC.
 - ALL LOCATIONS WHERE PIPES ENTER OR LEAVE THE WET WELL OR VALVE VAULT SHALL BE MADE WATERTIGHT AND GAS TIGHT WITH WALL SLEEVE OR NON-SHRINK GROUT.
 - WET WELL COVER SHALL BE HEAVY DUTY ALUMINUM WITH TORSION BAR ASSIST AND POSITIVE LOCK AT 90°, COVER SHALL ALSO HAVE PADLOCKING CAPABILITIES. (LOADING 300 PSF)
 - ELECTRICAL CONDUIT SIZE SHALL BE LARGE ENOUGH TO ALLOW FOR PERIODIC REMOVAL AND REPLACEMENT OF ELECTRICAL CABLES.
 - CABLE HANGERS SHALL BE STAINLESS STEEL.
 - ENTIRE WET WELL TO BE LINED WITH 3 PART SPECTRA SHIELD LINING SYSTEM AFTER ALL WET WELL MODIFICATION, HANGERS AND PENETRATIONS ARE COMPLETE.



DUTY POINT
500 GPM @ 152' TDH

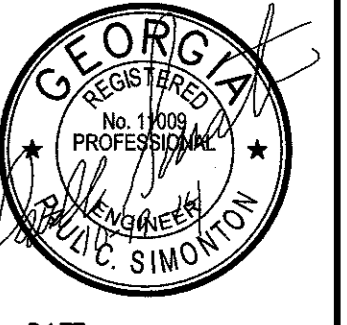


REJECT/REUSE WATER TANK DRAIN WET WELL DETAIL

DRAWING COMPLETED BY:

REVISED: 11-4-2014, ADD AIR RELEASE VALVE

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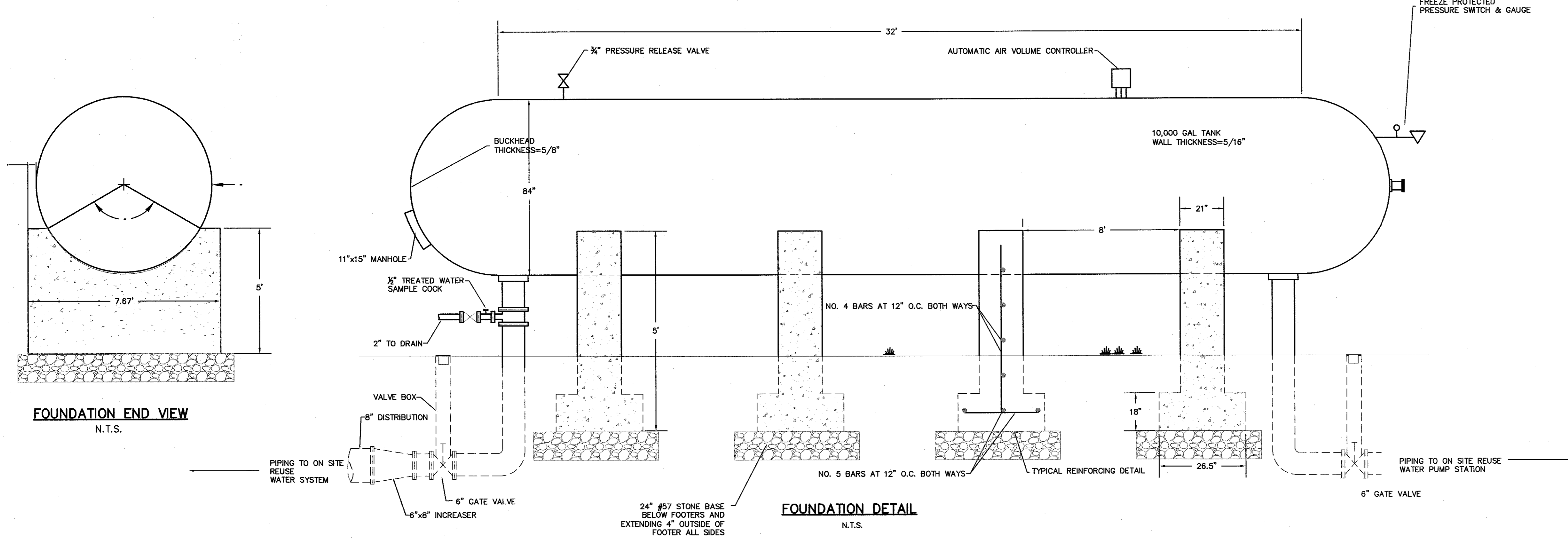
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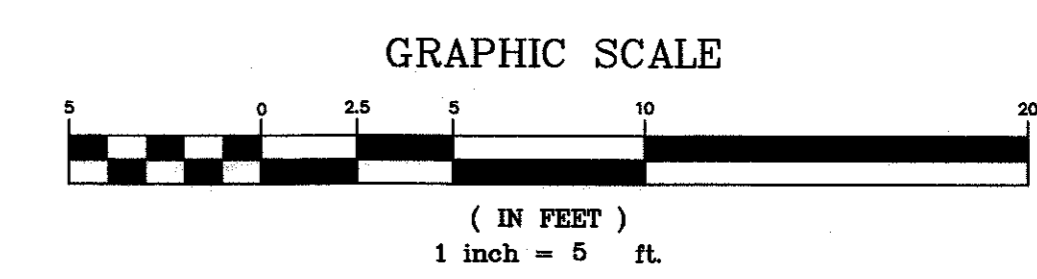
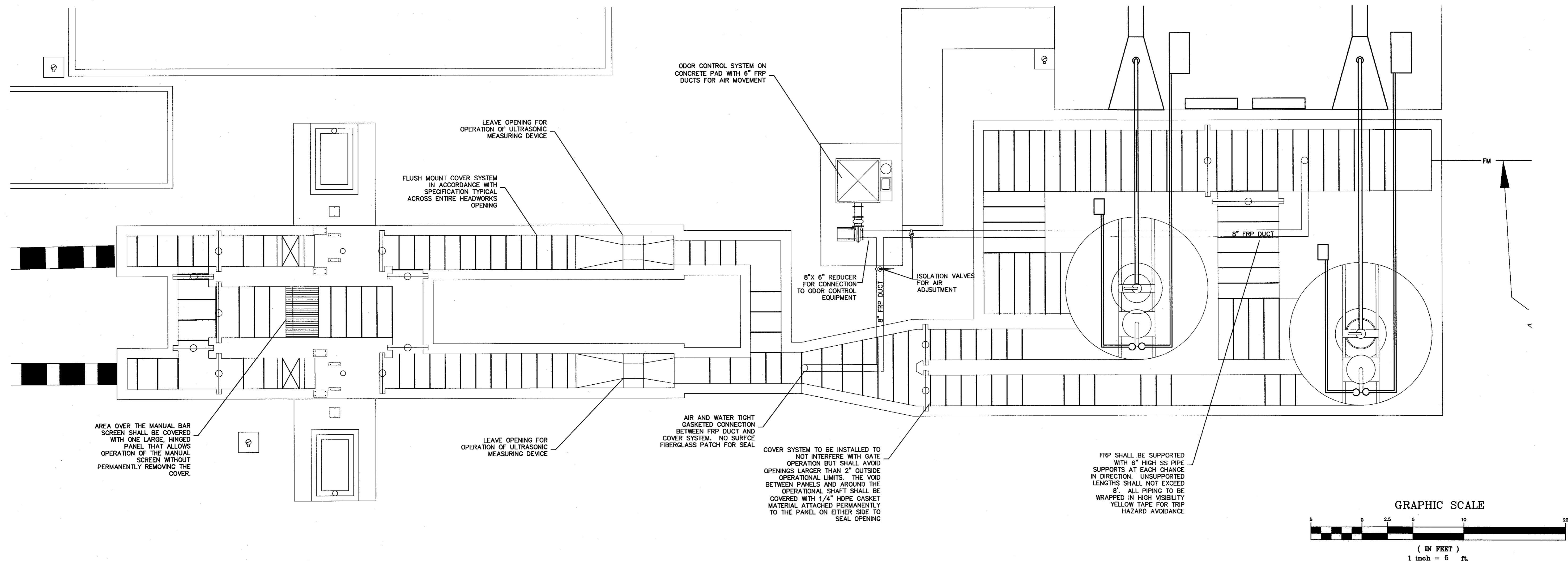
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WWTP Upgrade
for
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Ft Stewart
Liberty County, Georgia

Pump Station Details

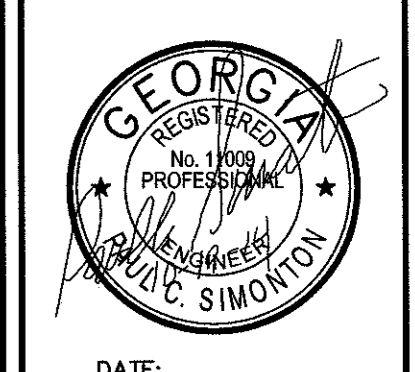
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FILE NO: 2009-63PRJ
SHEET#-16



NOTE:
 1. PNEUMATIC TANK CONTROLLER PULSCO HYDRO-PNEUMATIC CONTROL SYSTEM MOUNTED IN 4X PANEL UNDER UV COVER
 2. THE TANK DIMENSIONS MAY VARY MARGINALLY, HOWEVER ANY SUBSTANTIAL CHANGES IN DIMENSION MAY ALSO AFFECT THE FOUNDATION DESIGN.
 3. THE PIPING FROM THE ON SITE REUSE WATER PUMP STATION SHALL SUPPLY THE TANK.
 4. FOUNDATION DESIGN IS BASED ON BEARING PRESSURE OF 2000 PSI. IF THE CONDITIONS OF THE SOIL APPEAR TO BE DIFFERENT WHEN THE CONTRACTOR BEGINS INSTALLATION, HE SHALL NOTIFY THE ENGINEER FOR EVALUATION.



DRAWING COMPLETED BY:
 REVISED: 11-4-2014 ADDED PNEUMATIC TANK DETAIL
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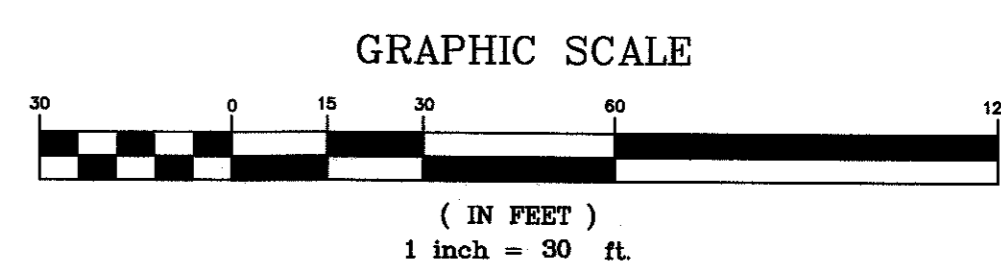
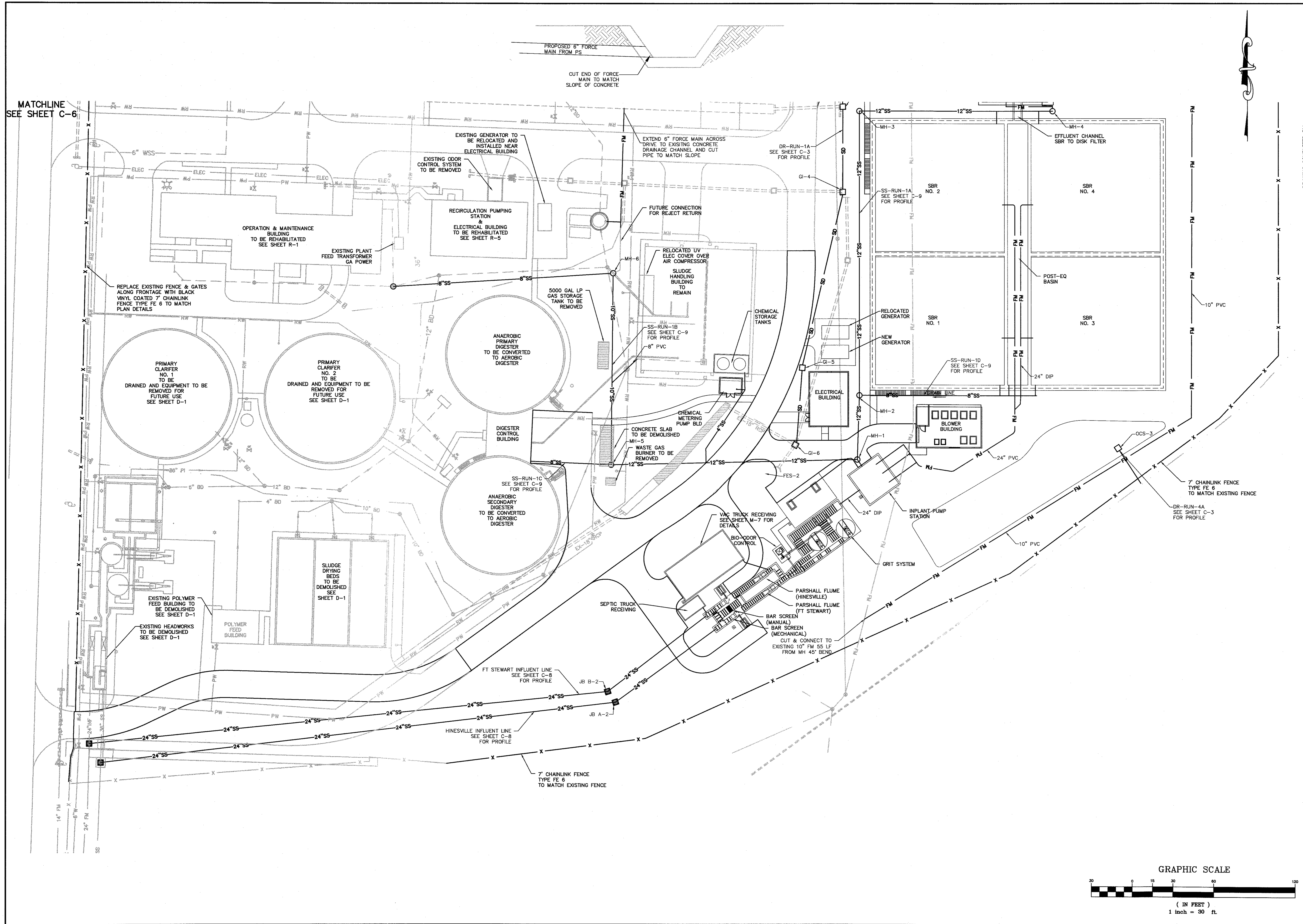


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Hinesville/Ft Stewart
 for
WWTP Upgrade
 The City of Hinesville
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Pneumatic Tank
 & Odor Control Duct
 Details
 DATE: November 29, 2012
 FILE NO: 2009-63PRJ
 SHEET: M-23



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 WWTP Upgrade**
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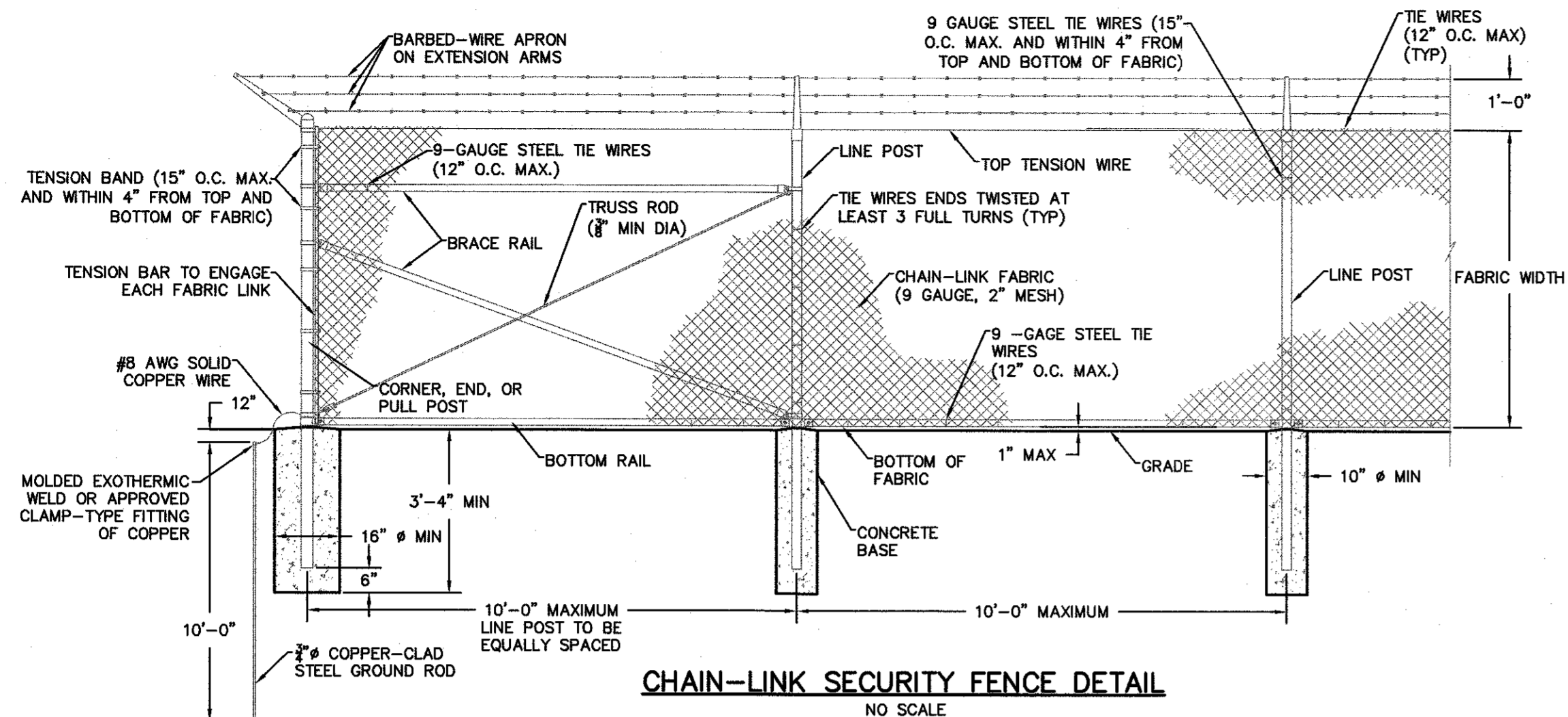
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Yard Piping Plan
 South Section

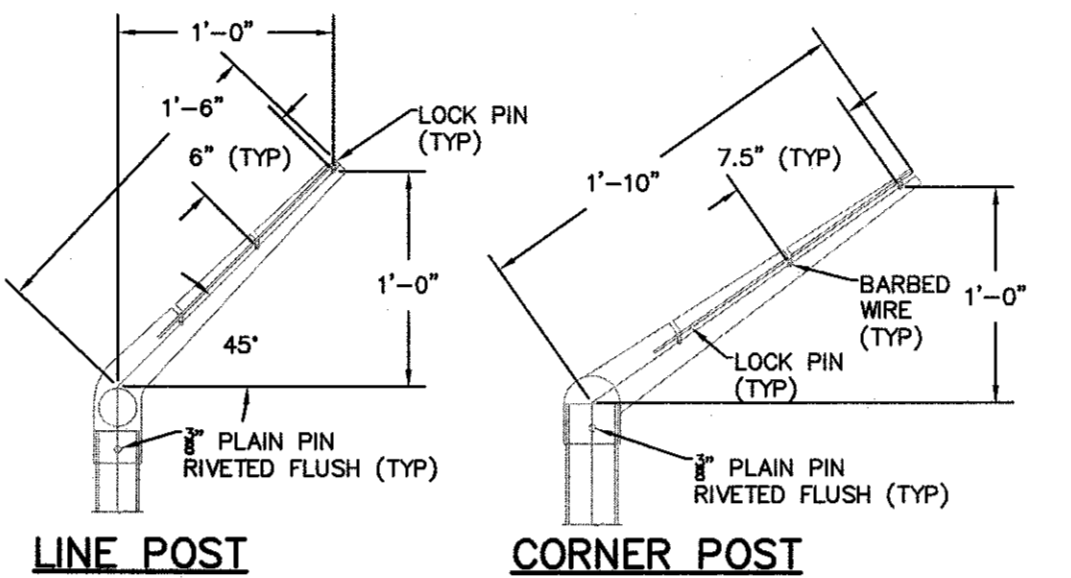
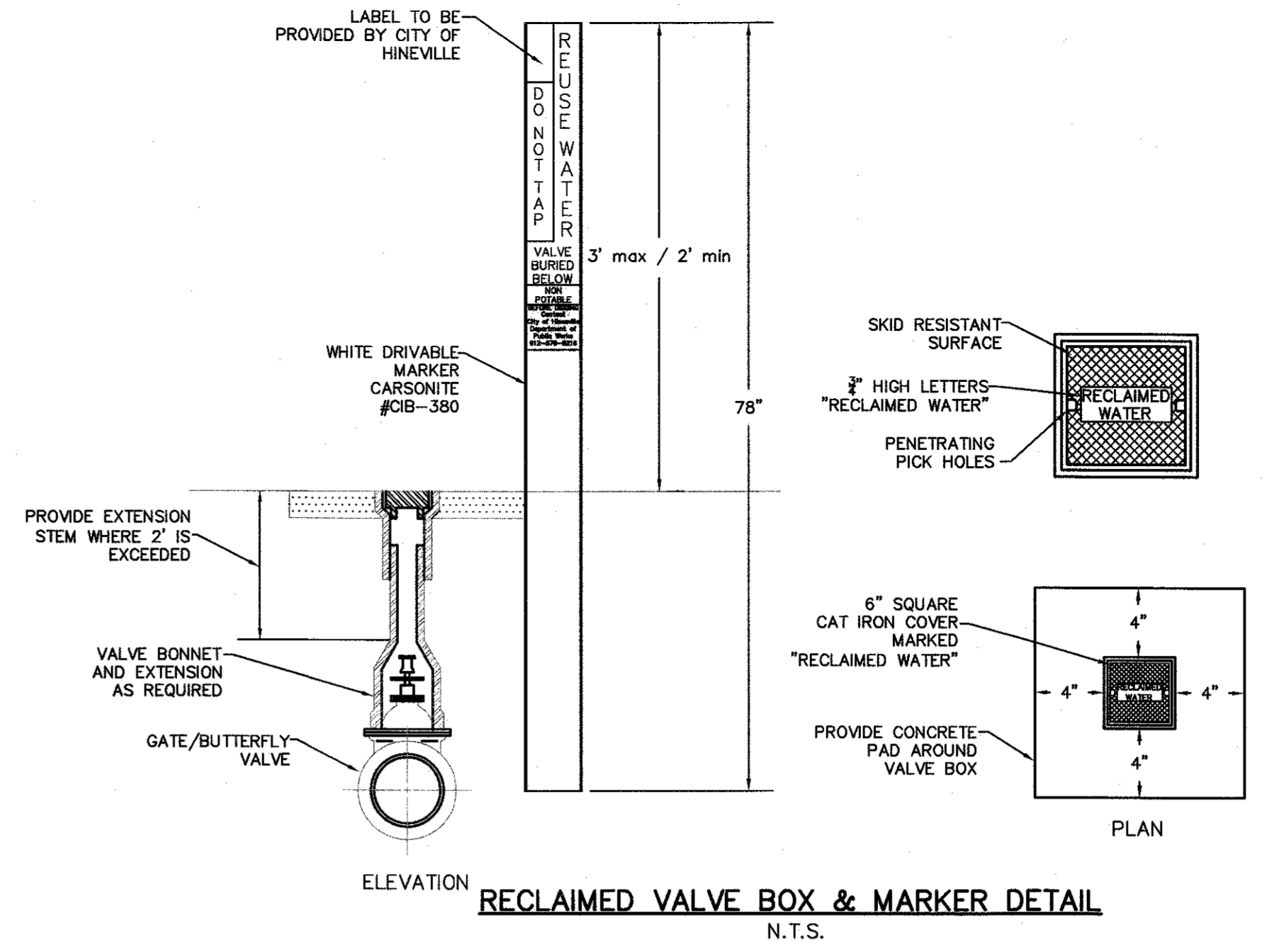
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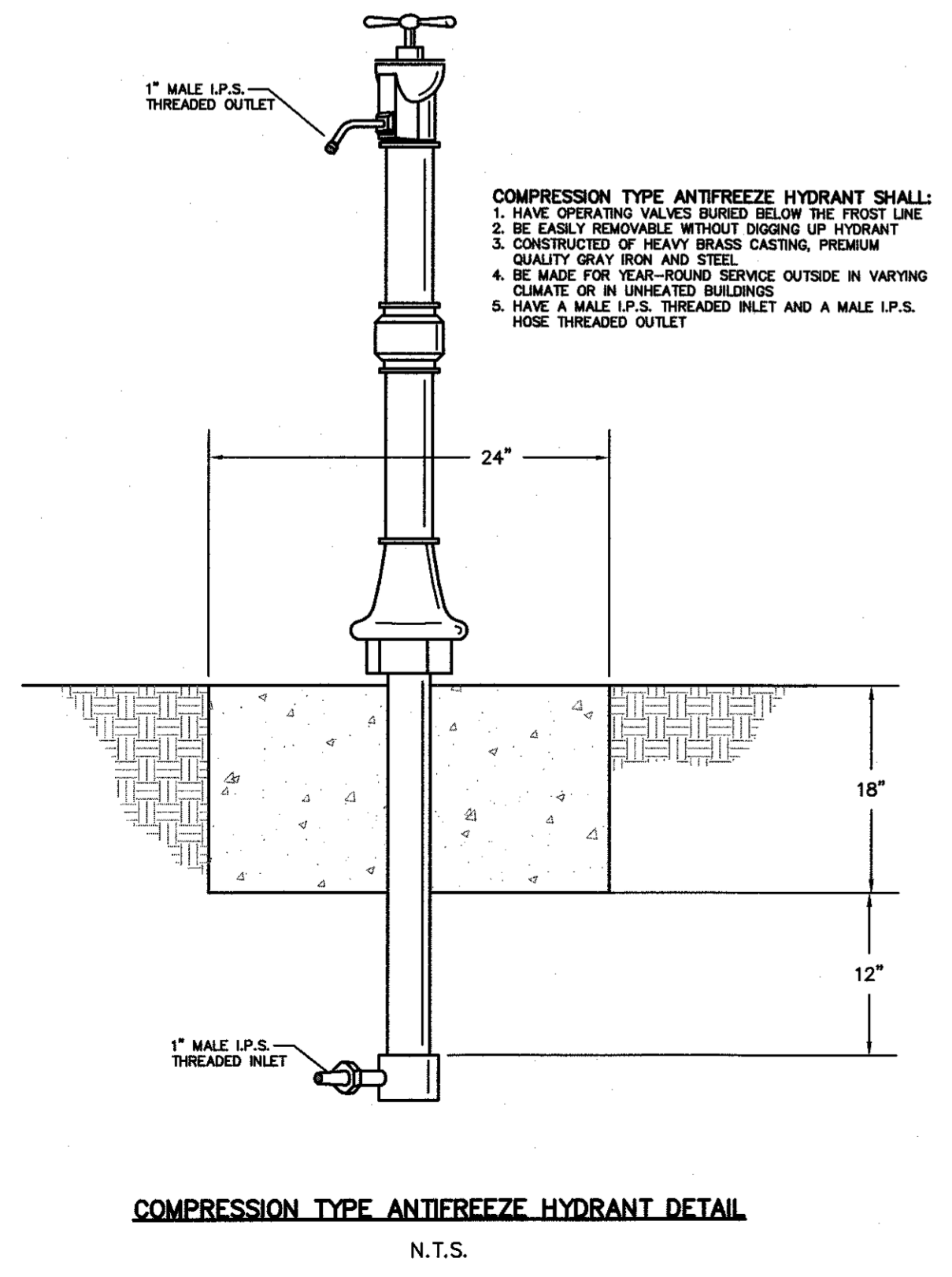
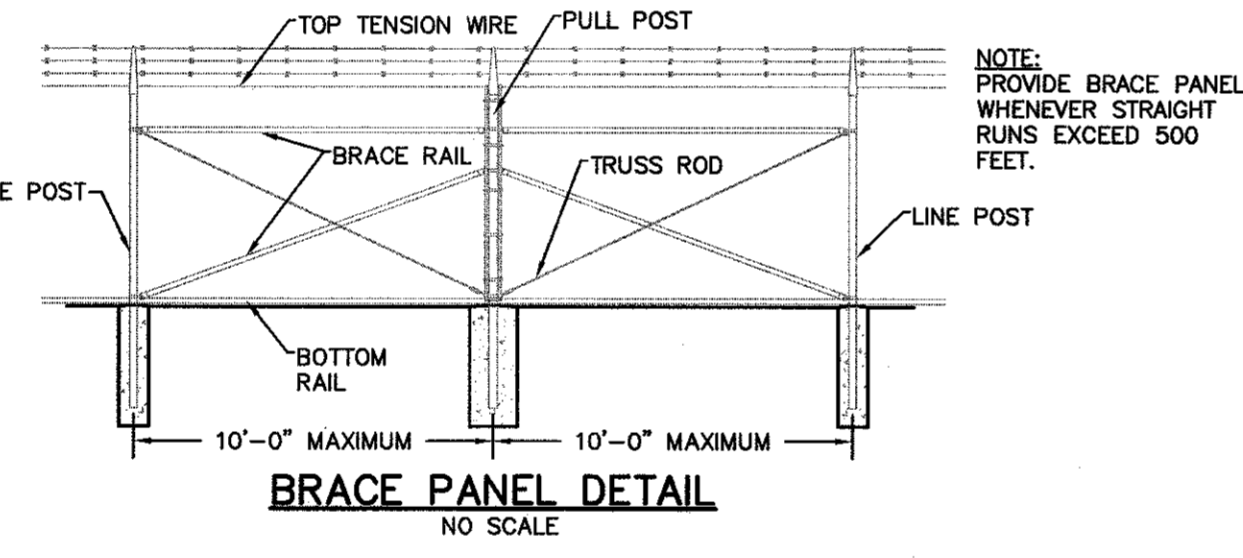
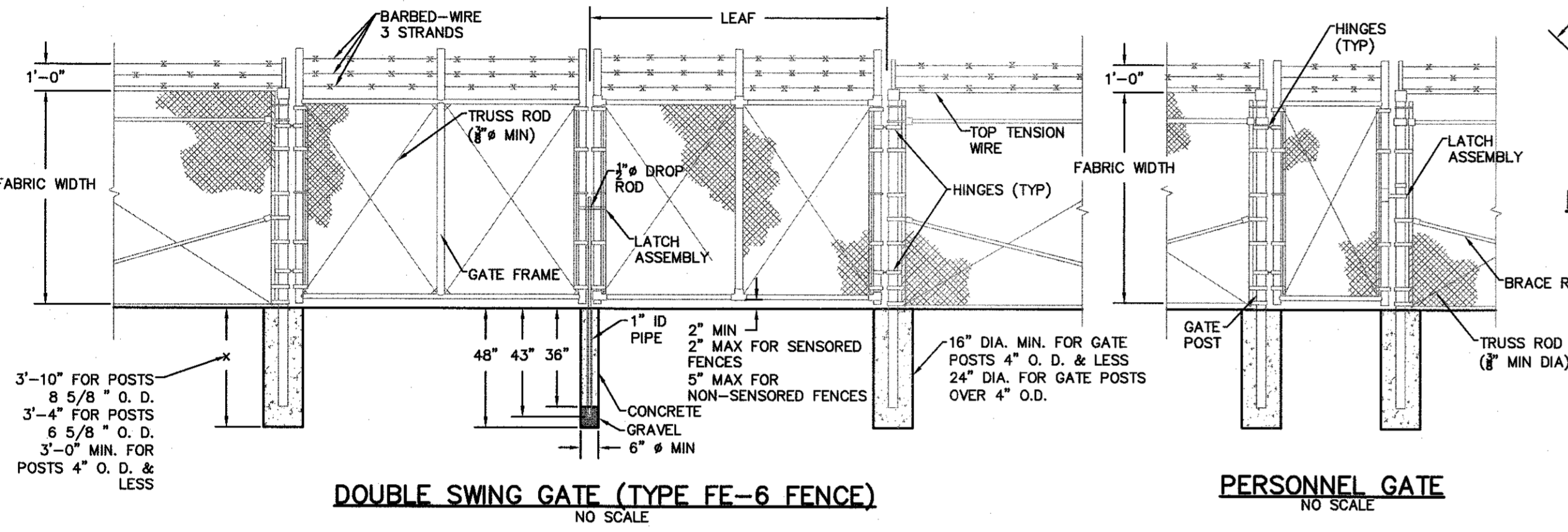
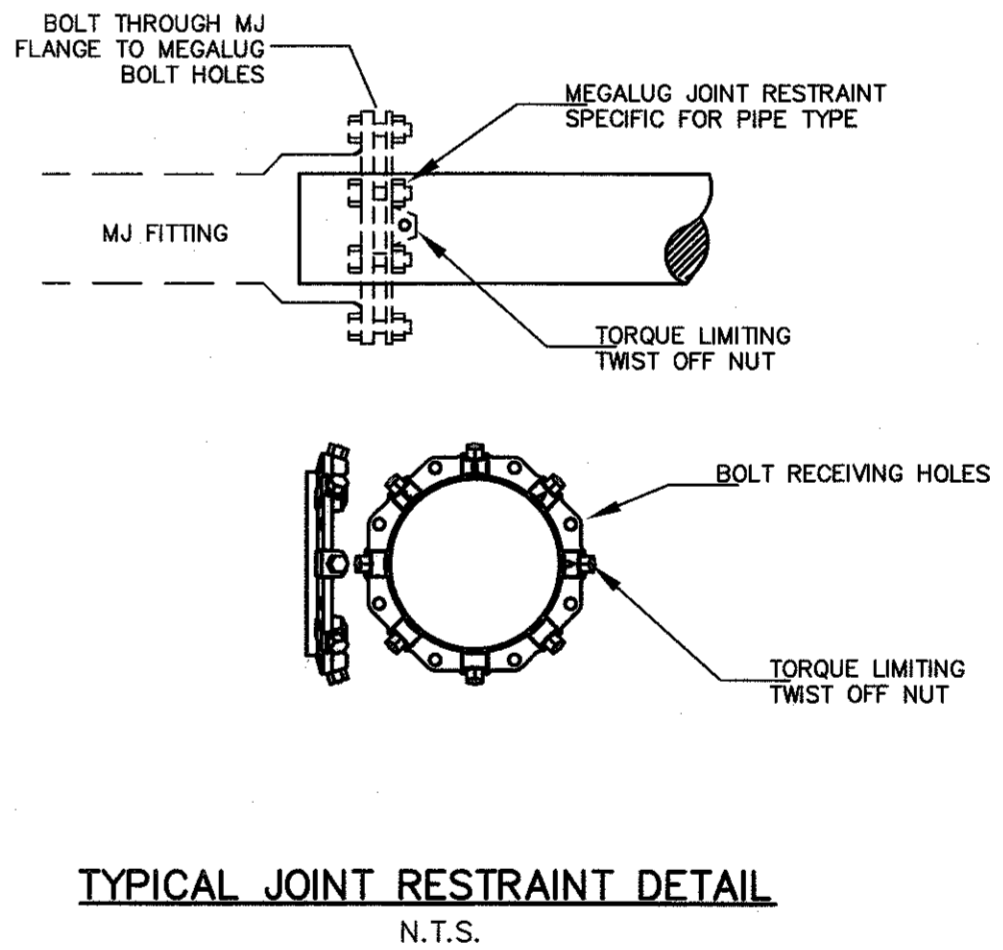
NOTES:
 1. WIRE TIES, RAILS, POSTS, AND BRACES SHALL BE CONSTRUCTED ON THE SECURE SIDE OF THE FENCE ALIGNMENT. CHAIN-LINK FABRIC SHALL BE PLACED ON THE SIDE OPPOSITE THE SECURE AREA.
 2. ONLY 9-GAUGE GALVANIZED STEEL TIE WIRES SHALL BE USED FOR FASTENING THE FENCE FABRIC TO FENCE POSTS AND RAILS. 16-GAUGE, STAINLESS STEEL TIE WIRES SHALL BE USED FOR FASTENING FENCE FABRIC TO TENSION WIRES. HOG RINGS SHALL NOT BE ALLOWED ON SENSORED FENCES.
 3. BOTTOM RAIL SHALL BE ATTACHED TO DOUBLE RAIL ENDS USING 3/8\"/>

USE AND SECTION	STEEL POST SCHEDULE		
	MINIMUM OUTSIDE DIMENSIONS (NOMINAL)	FABRIC WIDTH 72\"/>	
CORNER, END & PULL POSTS TUBULAR - ROUND	2.375\"/>		
LINE POSTS TUBULAR - ROUND	1.90\"/>		
BOTTOM & BRACE RAILS TUBULAR - ROUND	1.66\"/>		
TUBULAR - SQUARE	1.50\"/>		
H-SECTION	1.625\"/>		
C-SECTION (ROLL-FORMED)	1.625\"/>		

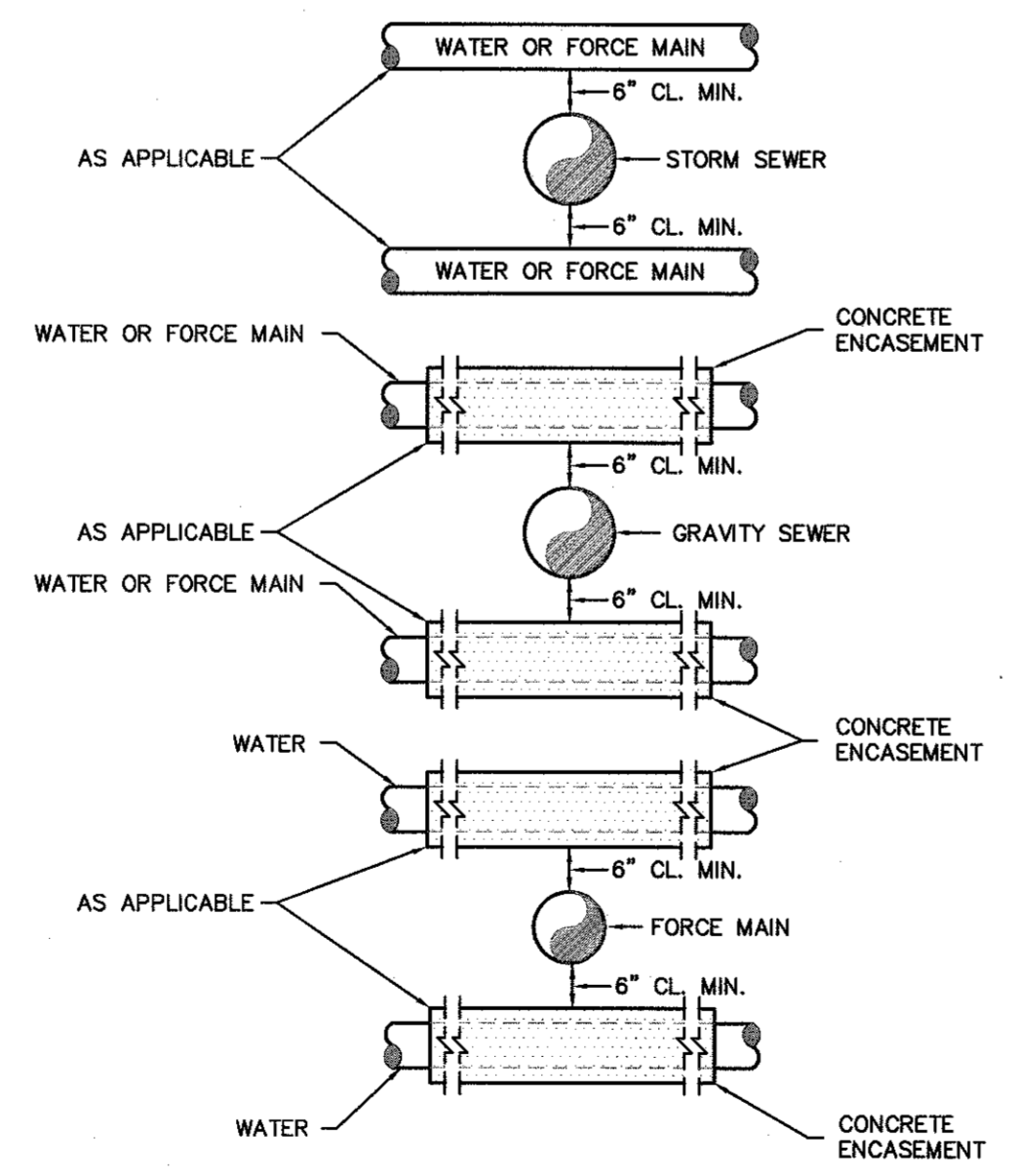


GATE LEAF WIDTH (NOMINAL)	OUTSIDE DIMENSION (NOMINAL)
6\"/>	
GREATER THAN 6\"/>	
GREATER THAN 12\"/>	
MORE THAN 18\"/>	

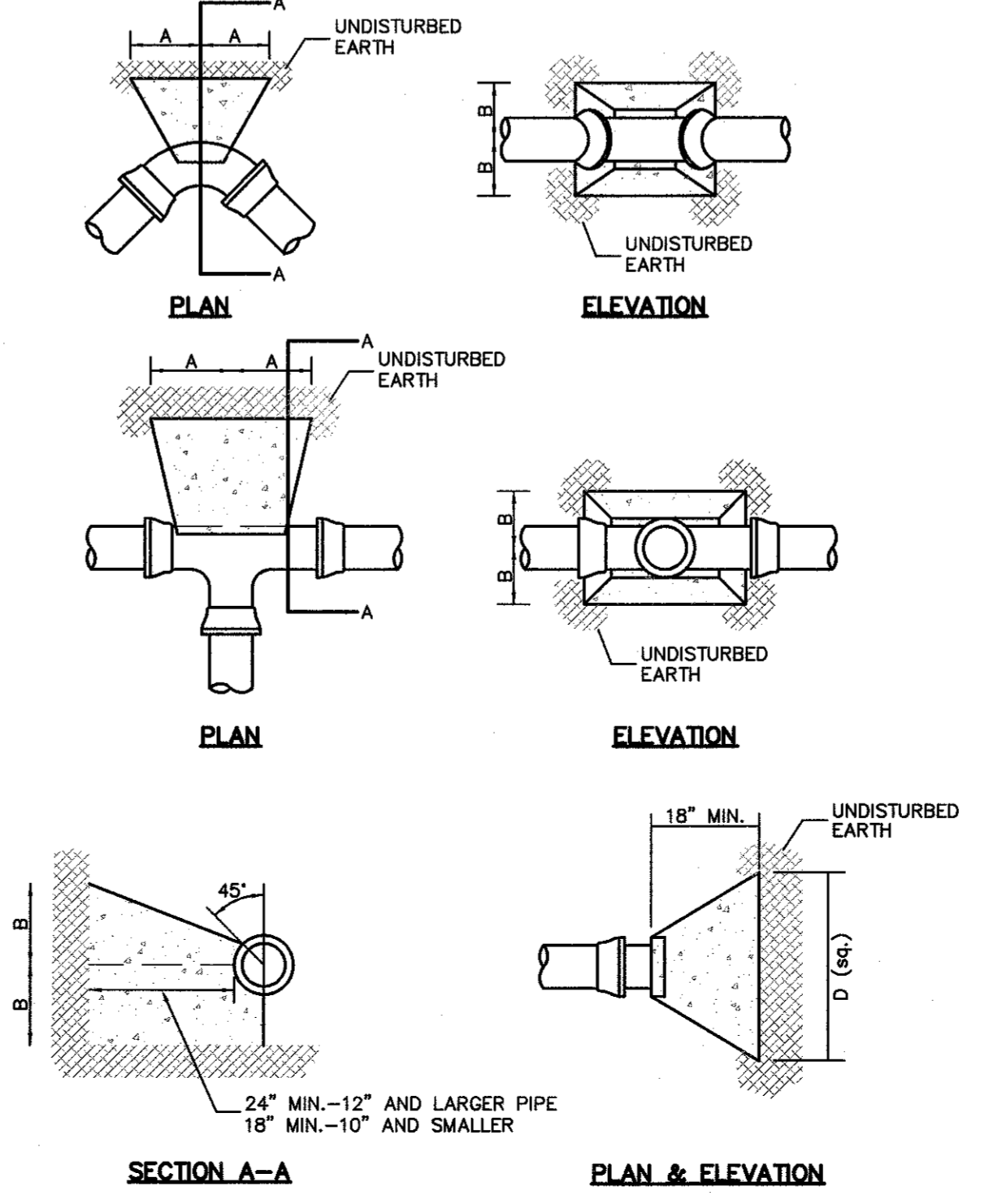
NOTES:
 1. FOR NON-SENSORED FENCES, DETAILS SHOWN ARE TO CLARIFY REQUIREMENTS AND ARE NOT INTENDED TO LIMIT OTHER TYPE OF FENCE SECTIONS AND METHODS OF INSTALLATION WHICH COMPLY WITH THE SPECIFICATIONS.
 2. SWING GATES SHALL BE CONSTRUCTED WITH DROP RODS, PADLOCKS, LATCH ASSEMBLY AND GATE KEEPERS EXCEPT AS NOTED.
 3. ALL GATE FRAMES SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM F900 1.90\"/>



COMPRESSION TYPE ANTIFREEZE HYDRANT SHALL:
 1. HAVE OPERATING VALVES BURIED BELOW THE FROST LINE
 2. BE EASILY REMOVABLE WITHOUT DIGGING UP HYDRANT
 3. CONSTRUCTED OF HEAVY BRASS CASTING, PREMIUM QUALITY IRON AND STEEL
 4. BE MADE FOR YEAR-ROUND SERVICE OUTSIDE IN VARYING CLIMATE OR IN UNHEATED BUILDINGS
 5. HAVE A MALE I.P.S. THREADED INLET AND A MALE I.P.S. ROSE THREADED OUTLET



NOTES:
 1. CONCRETE ENCASEMENT TO EXTEND A MINIMUM OF 10\"/>



STANDARD THRUST BLOCKS FOR WATER MAIN AND FORCE MAINS TO BE USED IN CONJUNCTION WITH JOINT RESTRAINT N.T.S.

TYPE	SIZE	1/4 BENDS		1/8 BENDS		1/16 BENDS		TEES			PLUGS	
		A	B	A	B	A	B	A	B	C	D	
TYPE 1 4,000 PSF SOIL	6"	8"	10"	6"	8"	3"	8"	8"	8"	10"	15"	
	8"	12"	12"	8"	10"	5"	9"	9"	12"	12"	20"	
	10"	16"	14"	10"	12"	6"	10"	11"	14"	14"	25"	
	12"	19"	16"	12"	14"	8"	11"	14"	16"	16"	30"	
	14"	23"	18"	14"	16"	10"	12"	16"	18"	18"	34"	
TYPE 2 2,000 PSF SOIL	6"	16"	10"	9"	10"	6"	8"	10"	12"	10"	21"	
	8"	22"	13"	12"	13"	8"	10"	13"	16"	12"	29"	
	10"	26"	17"	14"	17"	10"	13"	16"	20"	14"	36"	
	12"	29"	21"	16"	21"	11"	16"	18"	24"	16"	41"	
	14"	35"	24"	19"	24"	12"	20"	22"	27"	18"	48"	

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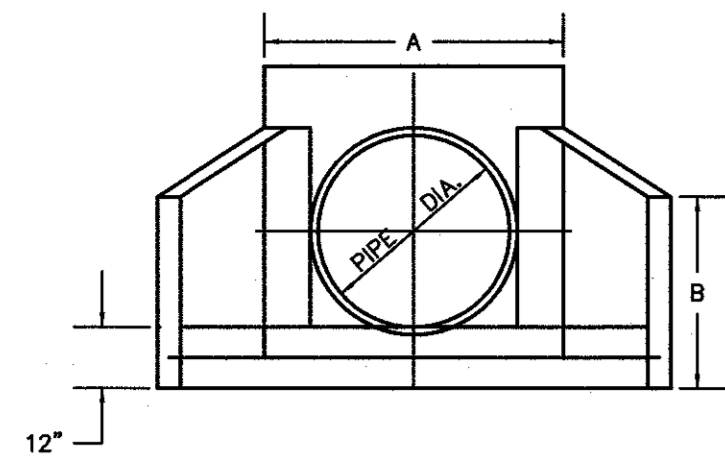
REGISTERED PROFESSIONAL ENGINEER
 No. 11009
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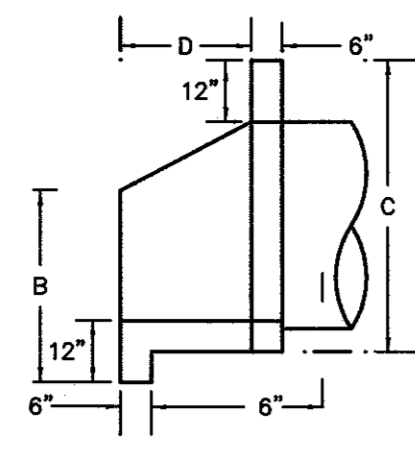
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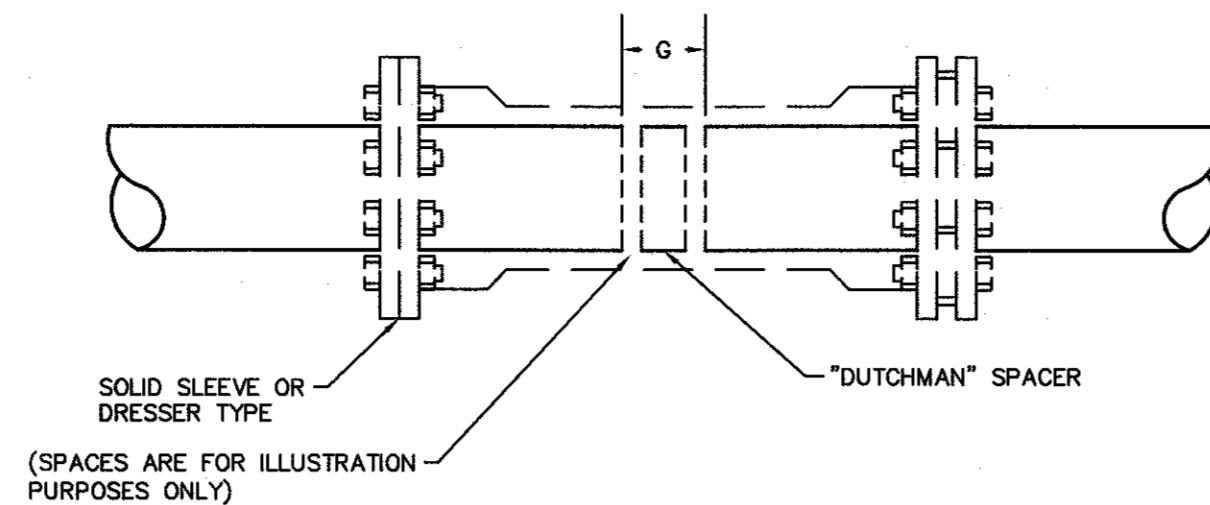
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FRONT ELEVATION



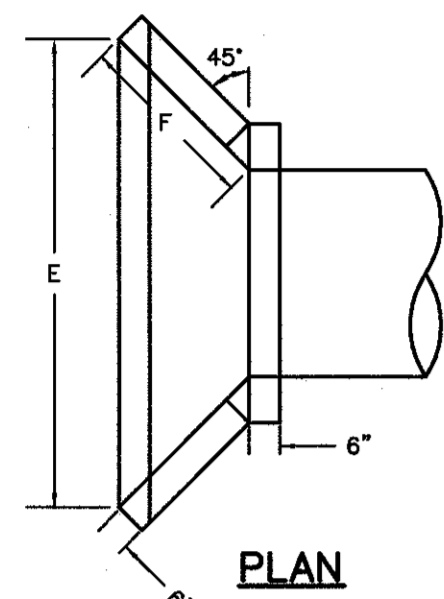
SIDE ELEVATION



SLEEVE INSTALLATION DETAIL
N.T.S.

- NOTES**
1. IF "G" IS GREATER THAN 1/2", AT ITS NARROWEST POINT, THEN A FULL-CIRCLE SPACER OR "DUTCHMAN" MUST BE CUT AND PLACED IN THE GAP BEFORE THE SLEEVE IS USED TO CLOSE THE JOINT.
 2. THE "DUTCHMAN" SPACER SHALL BE CUT TO A WIDTH NO LESS THAN 1/4" LESS THAN THE NARROWEST WIDTH OF "G".
 3. EACH PIPE SPIGOT SHALL BE MARKED TO INDICATE THE POINT WHERE THE SLEEVE WILL BE PROPERLY CENTERED OVER THE POINT.
 4. "FULL-CIRCLE" REPAIR CLAMPS ARE NOT APPROVED FOR JOINING PIPE. SUCH CLAMPS ARE SPECIFICALLY DESIGNED FOR REPAIRS ONLY.
 5. IF "STEEL" SLEEVE IS USED, PROPERLY COAT BEFORE BACKFILLING. SEE NOTE 5, DRWS. A-30 FOR COATING.

SLEEVE INSTALLATION DETAIL
N.T.S.

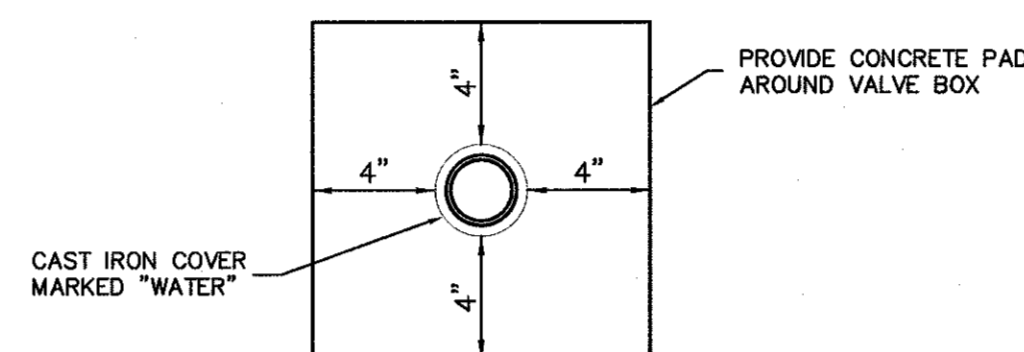


PLAN

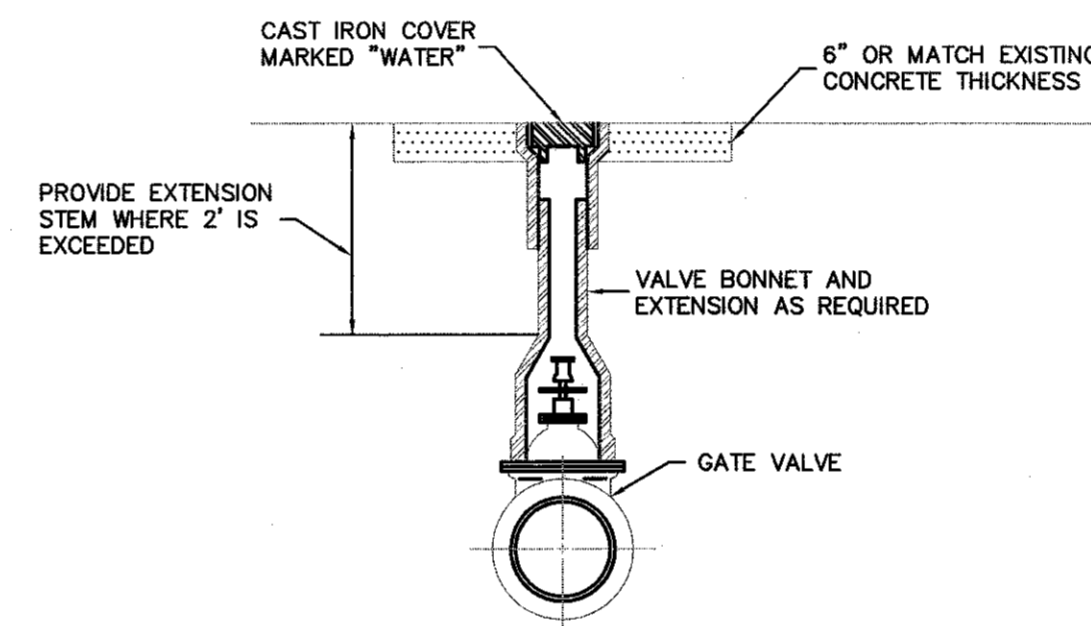
- NOTES**
1. TOP OF HEADWALL SHOULD BE SAME ELEVATION AS EDGE OF PAVEMENT WHEN WITHIN RIGHT OF WAY.
 2. ALL OUTLET HEADWALLS TO HAVE A SPLASH PAD.
 3. CHAMFER ALL EXPOSED EDGES.

PIPE DIA.	A	B	C	D	E	F
15"	3'5"	2'4"	3'4 1/2"	1'5"	4'10"	2'0"
18"	3'5"	2'4"	3'4 1/2"	1'5"	4'10"	2'0"
24"	4'0"	2'9"	3'11"	1'8"	5'11"	2'4 1/2"
30"	4'6 1/2"	3'1"	4'5 1/2"	2'0"	7'1 1/2"	2'10"
36"	5'1"	3'5"	5'0"	2'4"	8'0"	3'3 1/2"

WING HEADWALL
N.T.S.

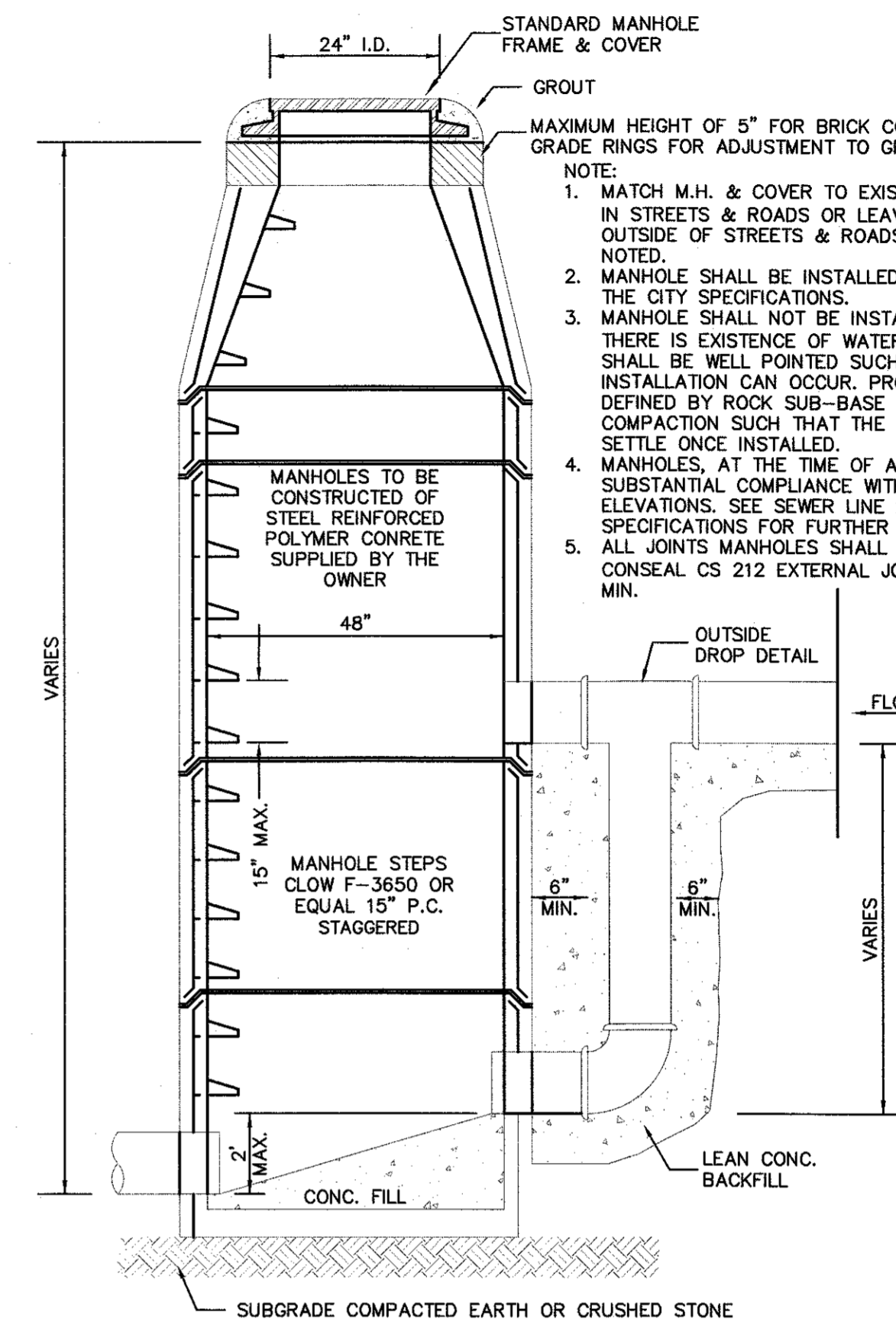


PLAN

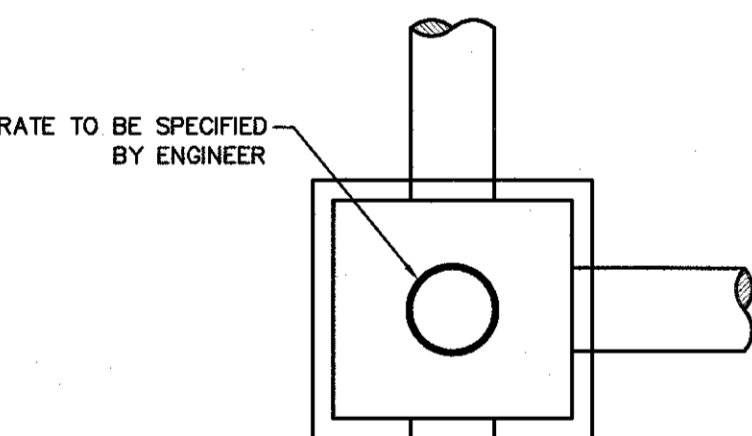


ELEVATION

VALVE BOX DETAIL
N.T.S.

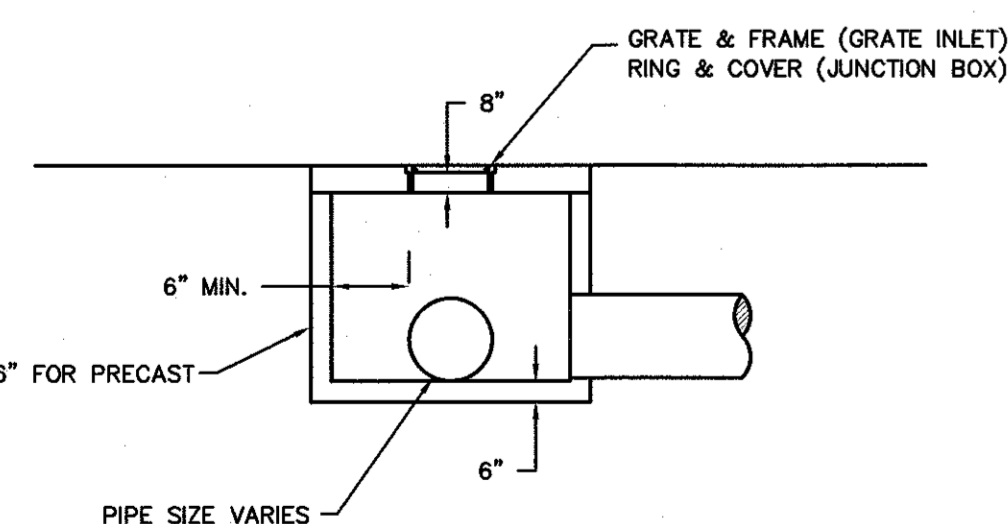


PRECAST CONCRETE MANHOLE
N.T.S.



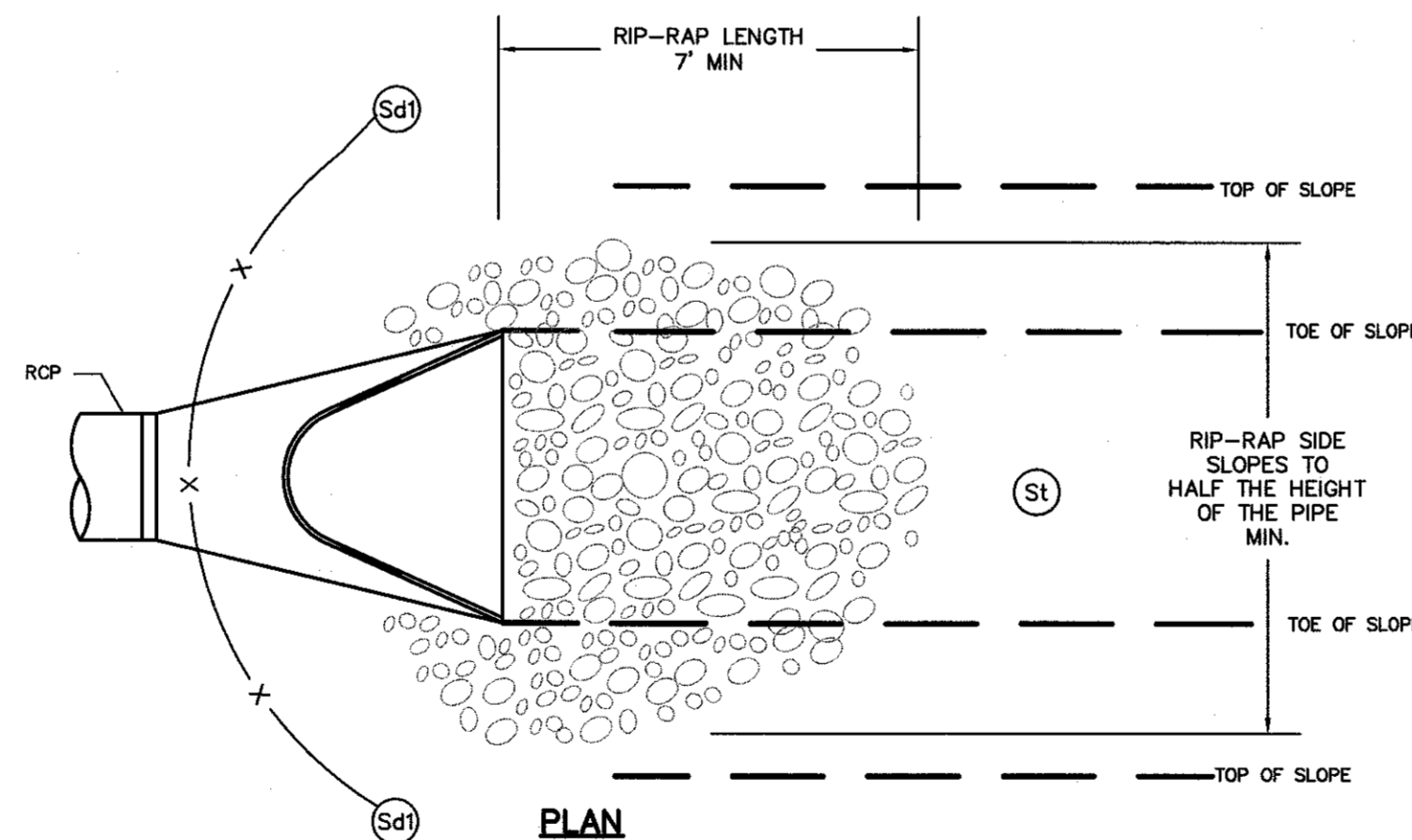
PLAN

- CONSTRUCTION NOTES:**
1. TWO COURSES OF BRICK MAX SHALL BE ALLOWED FOR LEVELING AND ADJUSTMENT OF LID. ANY SUPPORT OTHER THAN BRICK SHALL BE POURED IN PLACE MATCHING THE THICKNESS OF THE PRECAST WALL TO A MAXIMUM HEIGHT OF 24 INCHES.

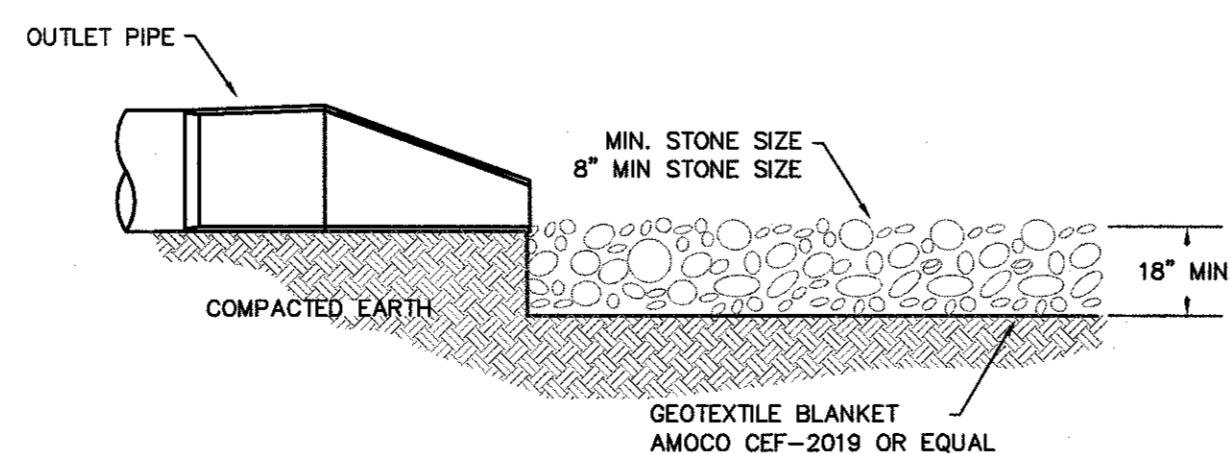


SECTION

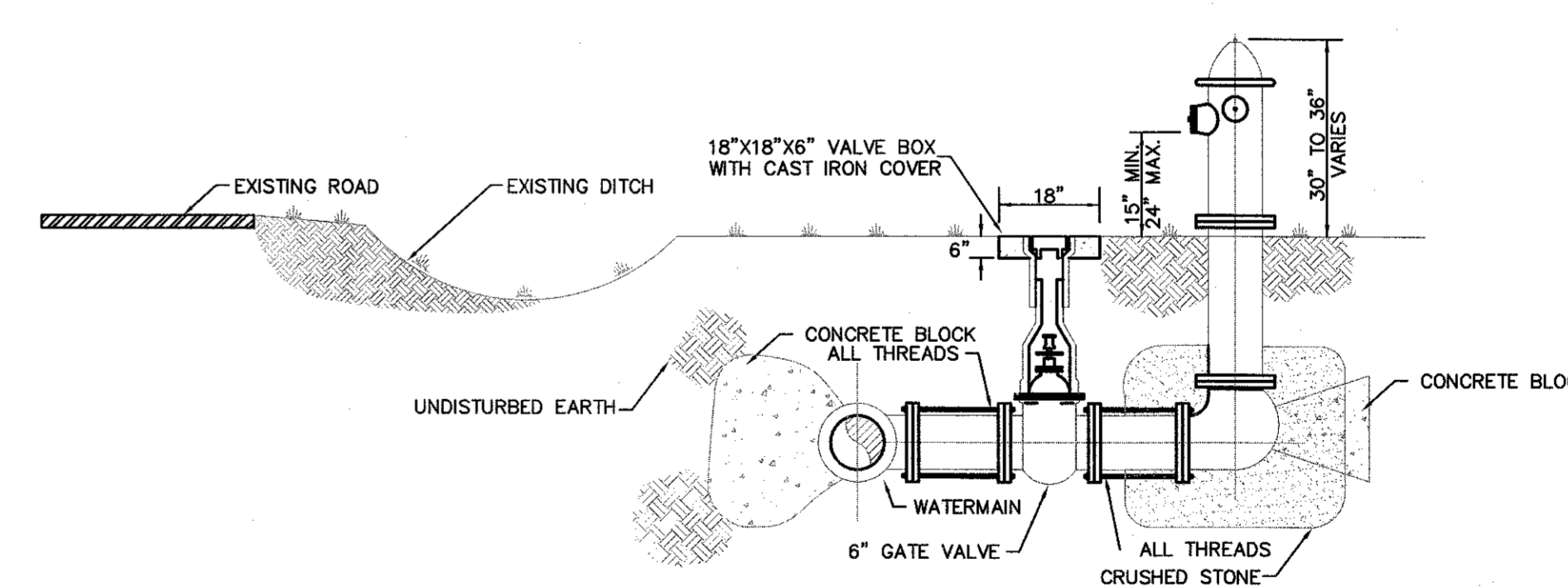
JUNCTION BOX / GRATE INLET
N.T.S.



PLAN



PRECAST FLARED END SECTION
N.T.S.



FIRE HYDRANT DETAIL
N.T.S.

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REVISED: 11-6-2014



DATE: _____

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**Hinesville/Ft Stewart
for
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Ft Stewart
Liberty County, Georgia

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