Pickering
Service and Good Work...
Our Foundation, Our Future
Since 1946

City of Madison, MS
Tisdale Pump Station and Force Main
Pickering Firm, Inc. Project 26374.01

Plans, Specifications, and Contract Documents

TO: ALL PLANHOLDERS

FROM: Jon McLeod, PE

DATE: Wednesday, 11 September 2024

The Plans, Specifications, and Contract Documents for this Project shall be amended as follows:

ADDENDUM #1

General

1. Bid Opening:

   Bid opening location has changed. The location for the bid opening will be City of Madison, Public Works, 1239 HWY 51, Madison, MS 39110. Physical bids will be accepted until 9:30 AM at City of Madison, City Hall; and until 10:00 AM at City of Madison, Public Works.

2. Pre-bid Meeting Minutes and Sign-in sheet.

   A pre-bid meeting was held on 8-28-24. A copy of the meeting minutes & sign-in sheet is being provided FOR INFORMATION ONLY and is not to be considered part of the Contract Documents.

Plans & Specification

1. Revised bid form attached

   Added bid item **Electrical Upgrades** – Lump Sum

   Added bid item **Miscellaneous Concrete** – 25 CY

   Added bid item **Miscellaneous Grout** – 25 CY

   Added bid item **Muck Excavation (FM) –** 100 CY

   Added bid item **#57 Crushed Stone (FM)** – 100 CY

2. Revised the following specification sections:

Section 01025 Measurement and Payment – added new bid items.

Section 02563 Sewage Force Mains – removed conflicted valve information; refer to specifications 15100, 15103, 15104, & 15106 for valve specs.

Section 09885 Manhole Lining System – added Geopolymer lining material to products section.

Section 011300 Submersible Pump – changed minimum motor horsepower and electrical service

3. Added the following specification sections:

   Specification Section 400519 – Ductile Iron Process Pipe

4. Revised plan sheet M1.02

   Added emergency bypass connection to existing force main.

   Added additional general and electrical notes.

5. Revised plan sheet M1.04

   Changed wet well liner to geopolymer liner.

   Delineated break between stainless and ductile lift station piping.

6. Revised plan sheet C1.20

   Updated utilities

7. Detail sheet SD1.01

   Omit Casing table included with boring detail. Refer to Specification Section 02326 Pipe Jacking, Boring, Tunneling for steel casing requirements

Questions/Clarifications

1. All ditch/creek crossings appear to be open cut with rip rap to follow, is this correct? Yes
2. All clearing and grubbing is absorbed in other items correct? Yes
3. All potholing of existing utilities is absorbed even if not shown on the plans? Contractor is responsible for locating utilities shown and not shown on the plans. Refer to notes on G0.01.

ITEMS IN CONFLICT WITH THIS ADDENDUM ARE HEREBY DELETED.

THIS ADDENDUM IS TO BE ACKNOWLEDGED BY THE BIDDER ON THE BID FORM.

Pickering Firm, Inc.

Jon McLeod, PE
11 September 2024

Pickering

MEETING MINUTES

DATE OF MEETING: August 28, 2024

LOCATION OF MEETING: Madison Public Works Break Room
Madison, MS

PROJECT NAME: Tisdale Pump Station & Force Main
MCWI # 72-2-CW-5.5
PFI Reference #26374.01

MEETING PURPOSE: Pre-Bid Meeting

ATTENDEES:

Chris Buckalew	Thornton Construction	601.825.8806	601.259.6738	chris@thorntonms.com
Jesse Hedgepeth	Greenbriar DSLP	601.833.0975	601.455.7666	jhedgepeth@greenbriar-dslp.com
Chris Woodward	Woodward Contracting		601.850.4077	woody@woodwardcontracting.net
Sam Agnew	Water Transport Solutions		225.907.3832	sam@wtsolutions.org
Jon McLeod	Pickering Firm	601.956.3663	601.382.1636	jmcleod@pickeringfirm.com
Jack Gratwick	Hemphill Constr.		601.818.0564	jgratwick@hemphillconstruction.com
Steven Womack	United Rentals		601.613.6563	jwomack2@UR.com
Hunter Atwood	Utility Constructors		601.500.0631	hatwood@uci-ms.com
Jeff Green	Pickering Firm	601.932.7878	601.497.5256	jgreen@pickeringfirm.com

THE FOLLOWING WAS DISCUSSED:

1. Sign-in sheet circulated
2. Project is funded with ARPA funds – Federal funds and requirements per provisions CRF Part 200; No wage rates or Davis Bacon are part of the requirements;
3. Forms required after award of the project:
    - Solid Waste Disposal Act
    - Byrd Anti Lobbying
    - Suspension & Debarment
    - Attachment C
4. All questions need to be submitted, in writing, to Jon McLeod no later than 5 PM on 9/9/2024; Anticipate an addendum to address emergency bypass to City of Jackson sewer line;
5. Bid Opening is 5/16/2024 @ 10 AM;
6. Bid Form:
    - Online bids will be accepted on Central Bidding
    - Must submit bid on form provided;
    - Include Certificate of Responsibility number on outside of bid;
    - Non-resident contractor – Provide a copy of your state's law concerning treatment of non-resident contractors;
    - Bidder must bid any and all alternates; Owner will select which alternate they want to award;

7. Contract time is 450 calendar days;
8. Easements Status: Most of the easements have been acquired; One remaining along Hwy 51;
9. Summary of Work:
    - Manifold connection to MCWA Green Oak force main- Contractor will need to coordinate with City of Jackson regarding shutting off their upstream pumps to achieve this connection; Need to likely anticipate a hot tap connection;
    - Emergency bypass to divert flow via existing force main – Detail to be added with addendum;
    - Anticipate installing temporary fence along Hwy 51 due livestock
    - New wet well will provide additional storage;
    - The pit for the new wet well will have to be sheeted and the design has to be signed/sealed by a MS PE;
    - Coordinate salvageable items (pumps, valves, etc.) with City of Madison;
    - Maintain driveway connections at all times;

QUESTIONS

1. Is there any clearing required? Yes, as needed within the temporary and permanent easements. Contractor will only need to clear what's necessary to perform the work.
2. Why does a PE need to stamp the new wet well sheeting design? To insure protection of the existing wet well.
3. What's the engineer's estimate? $3.5M to $ 4.0 M.
4. Will the contractor have to submit a M.O.T. plan? Yes, plan will need to be approved by the City of Madison PWD. Jon will discuss necessary signage with PWD.
5. Who is the contact to gain access to the existing pump station? Pete Vozzo – pvozzo@madisonthecity.com
6. What's the anticipate start date? ASAP, construction has to be complete by 9/2026. City wants to get this project started soon.

MEETING ADJOURNED

These minutes are from the memory and notes of the writer. If anyone has an understanding different than stated herein, please contact this office within 72 hours.

Respectfully submitted,

Jeff Green
Senior Construction Engineer

JSG:jsg

TISDALE PUMP STATION AND FORCE MAIN
MADISON, MS
MCWI 72-2-CW-5.5
PFI Reference No.: 26374.01
August 28, 2024

Pre-Bid Meeting Sign In

Name	Representing	Phone	Mobile	Email
Jon McLeod	PFI		601-382-1636	jmcleod@pickeringfirm.com
Jack Gratwick	Hemphill Construction		601-818-0564	jgratwick@hemphillconstruction.com
Steven Womack	United Rentals		601 613 6563	Jwomack2@UR.com
Hunter Atwood	UCI		601-500-0631	hatwood@uci-ms.com
Jeff Green	PFI		601-497-5256	jgreen@pickeringfirm.com

TISDALE PUMP STATION AND FORCE MAIN
MADISON, MS
MCWI 72-2-CW-5.5
PFI Reference No.: 26374.01
August 28, 2024

Pre-Bid Meeting Sign In

Name	Representing	Phone	Mobile	Email
Chris Buckalew	Thornton Construction	601 825 8886	6012596738	chris@thorntonms.com
Jesse Hedgepeth	Greenbriar Digging Service	601 833 0975	6014557666	jhedgepeth@greenbriardsp.com
Chris Woodward	Woodward Contracting	601.850.4077		woody@woodwardcontracting.net
SAM AGNEW	WATER TRANSPORT SOLUTIONS	225-907-3832	same	sam@wtsolutions.org

BID FORM (revised by addendum 1)

PLACE: _MADISON, MISSISSIPPI_

DATE: _____

TISDALE PUMP STATION AND FORCE MAIN

Bid of _____

(hereinafter called "BIDDER") organized and existing under the laws of the State of _____ doing business as a _____.*

(* Insert "a Corporation", "a Partnership" or "an Individual" as applicable.)

TO: ATTN: City of Madison
1004 Madison Avenue
Madison, MS 39110…….. (hereinafter called "OWNER".)

GENTLEMEN:

The BIDDER, in compliance with your Invitation for Bids, having examined the Plans and Specifications with related documents and the site of the proposed work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, supplies and to construct the Project in accordance with the Contract Documents within the time set forth therein and at the Unit Prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents of which this Proposal is a part.

The BIDDER further understands that the OWNER reserves the right to reject any or all Bids and waive informalities in the Bidding.

The BIDDER agrees that this Bid shall be valid and may not be withdrawn for a period of sixty (60) calendar days after the scheduled closing time for receiving Bids.

Bidder understands that the quantities mentioned below are approximate only and are subject to either increase or decrease, and hereby proposes to perform any increased or decreased quantities of work at the Unit Price bid.

In accordance with the requirements of the Plans, Specifications and Contract Documents, Bidder proposes to furnish all necessary materials, equipment, labor, tools and other means of construction and to construct the Project in accordance with the Contract Documents within the specified Contract Time for the following Unit Prices:

(NOTE: Final amounts are to be shown in **both** words and **figures.** In case of discrepancy, the amount shown in **words** will govern.)

Unit Prices shall include all labor, equipment, materials, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

All erasures, changes or alterations of any kind must be initialed by the Bidder.

COMMON BID ITEMS

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
1	Mobilization / Demobilization	LS	1		
2	Connection to Existing Force Main	EA	1		
3	12” Plug Valve	EA	1		
4	18” Plug Valve	EA	2		
5	24” Steel Casing Bored w/ 12” Carrier Pipe	LF	255		
6	18” Steel Casing Open Cut w/ 12” Carrier Pipe	LF	20		
7	Combination Air Release Vacuum Valve & Vault	EA	3		
8	Wet Well Rehabilitation	LS	1		
9	Lift Station Upgrades	LS	1		
10	Electrical Upgrades	LS	1		
11	Seeding, Fertilizing, and Mulching	AC	2		
12	Solid Sodding	SY	25		
13	Erosion Control & SWPPP	LS	1		
14	Rip Rap	TON	200		
15	#610 Crushed Stone	CY	25		
16	Traffic Control	LS	1		
17	Site Restoration	LS	1		
18	Miscellaneous Concrete	CY	25		
19	Miscellaneous Grout	CY	25		
20	Muck Excavation (FM)	CY	100		
21	#57 Crushed Stone (FM)	CY	100		

TOTAL COMMON BID ITEMS:	

TOTAL COMMON BID ITEMS (1-21) :_____
(IN WORDS)

_____

OPEN CUT - FORCE MAIN

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
A1	12” Fusible PVC	LF	8,225		

TOTAL OPEN CUT FORCE MAIN A1 BID:_____
(IN WORDS)

_____

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
A2	12” Restrained Joint PVC	LF	8,225		

TOTAL OPEN CUT FORCE MAIN A2 BID:_____
(IN WORDS)

_____

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
A3	12” C900 PVC	LF	8,225		

TOTAL OPEN CUT FORCE MAIN A3 BID:_____
(IN WORDS)

_____

HORIZANTAL DIRECTIONAL DRILL - FORCE MAIN

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
B1	12” Fusible PVC	LF	3,340		

TOTAL HORIZONTAL DIRECTIONAL DRILL FORCE MAIN B1 BID:

_____
(IN WORDS)

_____

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
B2	12” Restrained Joint PVC	LF	3,340		

TOTAL HORIZONTAL DIRECTIONAL DRILL FORCE MAIN B2 BID:

_____
(IN WORDS)

_____

72” DIAMETER WET WELL

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
C1	Precast Concrete	LS	1		

TOTAL 72” DIAMETER WET WELL C1 BID:_____
(IN WORDS)

_____

ITEM #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
C2	Precast Polymer Concrete	LS	1		

TOTAL 72” DIAMETER WET WELL C2 BID:_____
(IN WORDS)

_____

SECTION 01025

MEASUREMENT AND PAYMENT

1.1 DESCRIPTION

1.1.1 Contractor shall furnish all labor, materials, tools, equipment, appurtenances and all services necessary to perform all work required, at the contract prices set forth in the Contract Agreement.

1.1.2 No direct or separate payment will be made for providing miscellaneous temporary or accessory works, plant, services, Contractor's or Engineer's field offices, layout surveys, job signs, sanitary requirements, testing, safety devices, approval and record drawings, water supplies, power, removal of waste, watchmen, bonds, insurance, and all other requirements of the Contract Documents. Compensation for all such services, things and materials shall be included in the contract prices bid.

1.2 COMPENSATION

1.2.1 GENERAL: The compensation as herein provided shall constitute full payment for performance of the work. The compensation shall further constitute full payment for all materials, labor, equipment and incidental items of construction furnished by the Contractor.

Material or work (for which a Pay Item is not included in the Contract) necessary to complete the work as contemplated under any section in the Specifications, shall be furnished or performed and shall be considered incidental to the completed construction. No additional payment will be made therefore.

1.2.2 ALLOWANCE ITEMS: Payment for item(s) of work of this contract for which specific information necessary to develop a bid price is not available prior to bidding; the allowance shall provide adequate budget and bonding to constitute full compensation for furnishing all labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, test and reports, and for performing work defined within the allowance.

Payment to the Contractor for work on Allowance Item(s) shall represent direct costs associated with

the item. No Contractor markup shall be permitted on Allowance Item(s).

1.2.3 PAY ITEMS – BASE BID

1. Mobilization / Demobilization

A. Payment Schedule: Payment will be made for mobilization and demobilization at the Contract Lump Sum Price according to the schedule located in Section 01110 Mobilization – Demobilization

DESCRIPTION OF ITEM	**UNIT**
Mobilization / Demobilization	Lump Sum

2. Connection To Existing Force Main

A. Measurement: Payment will be at the Contract Lump Sum price bid for connection to existing force main.

B. Basis of Payment: Payment shall constitute full compensation for the complete and accepted connection to the existing force main as depicted in the plans.

DESCRIPTION OF ITEM	UNIT
Connection To Existing Force Main	Each

3,4. Plug Valve

A. Measurement: Based per each supplied and installed in accordance with the plans and specifications.

B. Basis of Payment: This item will be paid for at the contract unit price bid per each plug valve, complete in place, including reinforcement if required; which price is full compensation for all plug valves, gravel, backfilling, and disposal of surplus material; and for all material forms, equipment, tools, labor and incidentals necessary to complete the work.

DESCRIPTION OF ITEM	UNIT
12” Plug Valve	Each
18” Plug Valve	Each

5. 24” Steel Casing Bored w/ 12” Carrier Pipe

A. Measurement: Based per linear foot supplied and installed by method of boring.

B. Basis of Payment: This item will be paid at the Contract Unit Price bid per linear foot including steel casing, carrier pipe, pits, boring equipment, and all other materials and equipment necessary to install 24” steel casing by method of boring.

DESCRIPTION OF ITEM	UNIT
24” Steel Casing Bored w/ 12” Carrier Pipe	Linear Feet

6. 18” Steel Casing Open Cut w/ 12” Carrier Pipe

C. Measurement: Based per linear foot supplied and installed by method of open cut.

D. Basis of Payment: This item will be paid at the Contract Unit Price bid per linear foot including steel casing, carrier pipe, and all other materials and equipment necessary to install 24” steel casing by method of open cut.

DESCRIPTION OF ITEM	UNIT
18” Steel Casing Open Cut w/ 12” Carrier Pipe	Linear Feet

7. Combination Air Release Vacuum Valve and Vault

A. Measurement: Based per each supplied and installed in accordance with the plans and specifications.

B. Basis of Payment: This item will be paid for at the contract unit price bid per each combination air release vacuum valve, complete in place; which price is full compensation for all valves in housing; and for all materials, equipment, tools, labor and incidentals necessary to complete the work.

DESCRIPTION OF ITEM	UNIT
Combination Air Release Vacuum Valve and Vault	Each

8. Wet Well Rehabilitation

A. Measurement: Rehabilitation of the existing wet well shall be considered as a unit of work (Lump Sum)

B. Basis of Payment: Payment will be at the Contract Lump Sum Price bid for demolition, disposal cleaning, coating, excavations, drilling, cutting, equipment tools, labor and incidentals necessary to complete the work.

DESCRIPTION OF ITEM	UNIT
Wet Well Rehabilitation	Lump Sum

9. Lift Station Upgrades

C. Measurement: Payment will be at the Contract Lump Sum Price bid for the lift station upgrades delineated on the Drawings, complete and ready for use.

D. Basis of Payment: Payment will be at the Contract Lump Sum Price bid for pumps, piping, valves, electrical and controls integration, excavation, trenching, de-watering, bypassing, shoring and bracing, backfilling, concrete work, disposal of surplus materials, start-up services, factory testing, site clean-up, site restoration or for any other incidental items of work that may be required to provide an operable lift station installation.

DESCRIPTION OF ITEM	UNIT
Lift Station Upgrades	Lump Sum

10. Electrical Upgrades

E. Measurement: Payment will be at the Contract Lump Sum Price bid to upgrade existing electrical supply and supply complete and functioning controls package for duplex lift station.

F. Basis of Payment: Payment shall constitute full compensation for transformer, control panel with necessary components, level transmitter, floats, wiring, conduits, and all other items and labor necessary to provide power, startup, and operation of the lift station.

DESCRIPTION OF ITEM	UNIT
Electrical Upgrades	Lump Sum

11. Seeding, Fertilizing, and Mulching

A. Measurement: The completed and accepted seeding, fertilizing, and mulching will be measured in acres. Leguminous inoculants will not be measured nor separate payment made, but shall be considered as a part of the Contract Price bid for Seeding or Top Seeding.

B. Basis of Payment: Seeding, fertilizing, and mulching shall be paid for at the Contract Unit Price bid per acre, which price shall be full compensation for furnishing, inoculating, planting, fertilizing, mulching and maintaining the seeds until final acceptance of the Contract, for ground preparation, watering, all materials, equipment tools, labor and incidentals necessary to complete the work.

DESCRIPTION OF ITEM	UNIT
Seeding, Fertilizing, and Mulching	Acre

12. Solid Sodding

A. Measurement: Solid sodding, constructed and established as specified, complete in place and accepted, will be measured by the square yard.

B. Basis of Payment: Solid sodding, measured as prescribed above, will be paid for at the Contract Unit Price bid per square yard for solid sodding complete in place; which price shall be full compensation for all trenching out, fine grading, ground preparation, seating the solid sod to the section specified; for backfill and disposal of surplus material; for furnishing, transporting and planting the sod; for all replanting deemed necessary; for furnishing water and watering; for all plant establishment; and for all other materials, equipment, tools, labor and incidentals necessary to complete the work.

DESCRIPTION OF ITEM	UNIT
Solid Sodding	Square Yard

13. Erosion Control & SWPPP

A. Measurement: Erosion control measures preparation of SWPPP shall be considered as a unit of work (Lump Sum)

B. Basis of Payment: Payment shall constitute full compensation for the preparation, permitting, and on-site holding of storm water pollution prevention plan; silt fence, erosion checks, bales, and all other materials and work necessary to provide erosion control along perimeter of the working area.

DESCRIPTION OF ITEM	UNIT
Erosion Control & SWPPP	Lump Sum

14. Rip Rap

A. Measurement: Rip Rap shall be measured in tons, in place. No measurement will be made for any necessary excavation, backfilling and preparation of ground surface, however, the cost of this work will be included in the price paid for riprap in place. Filter fabric installed in conjunction with rip rap, if required, shall not be measured separately, but will be considered incidental and absorbed in the rip rap bid

B. Basis of Payment: Rip Rap will be paid for at the Contract Unit Price per ton of riprap in place, which price and payment shall include full compensation for furnishing all labor, materials, tools, equipment and performing all work involved in placing the rip rap. Payment will be made as:

DESCRIPTION OF ITEM	UNIT
Rip Rap	Ton

15. #610 Crushed Stone

A. Measurement: Crushed stone shall be measured for payment in cubic yards using the loose vehicular measure (LVM) method

B. Basis of Payment: Payment shall constitute full compensation for mining, hauling, stripping, grubbing, grading and preparation of site, and placing stone. Payment of the Contract Unit Price shall also constitute full compensation for the haul and disposal of surplus excavation.

DESCRIPTION OF ITEM	UNIT
#610 Crushed Stone	Cubic Yard

16. Traffic Control

A. Measurement: Maintenance of Traffic shall be considered as a unit of work (Lump Sum)

B. Basis of Payment: Maintenance of traffic shall be paid for at the Contract Lump Sum price bid for all signage, signals, markings, barriers and all other associated equipment to control and maintain access and traffic along all roadways in the work zone; and all other materials, equipment, tools labor and incidentals necessary to complete the work.

DESCRIPTION OF ITEM	UNIT
Traffic Control	Lump Sum

17. Site Restoration

A. Measurement: Site Restoration shall be considered as a unit of work (Lump Sum)

B. Basis of Payment: Site restoration shall be paid for at the Contract Lump Sum price bid for restoration to equal or better condition of improved surfaces including but not limited to: asphalt drives, concrete drives, concrete sidewalk, utilities, signage, landscaping, fencing, etc; and all other materials, equipment, tools labor and incidentals necessary to complete the work.

DESCRIPTION OF ITEM	UNIT
Site Restoration	Lump Sum

18. Miscellaneous Concrete

A. Measurement: The area of completed and accepted Cast-In-Place Concrete will be measured and computed in cubic yards.

B. Basis of Payment: This item will be paid for at the Contract Unit Price bid per cubic yard for Miscellaneous Cast-In-Place Concrete; price to be full compensation for disposal of surplus material; and for all material forms, equipment, tools, labor and incidentals necessary to complete the work.

DESCRIPTION OF ITEM	UNIT
Miscellaneous Concrete	CY

19. Miscellaneous Grout

A. Measurement: The area of completed and accepted grout will be measured and computed in cubic yards.

B. Basis of Payment: This item will be paid for at the Contract Unit Price bid per cubic yard for Miscellaneous Grout; price to be full compensation for disposal of surplus material; and for all material, equipment, tools, labor and incidentals necessary to complete the work.

DESCRIPTION OF ITEM	UNIT
Miscellaneous Grout	CY

20. Muck Excavation (FM)

A. Measurement: Excavation to remove unstable soil as authorized by the Engineer shall be measured for payment by the cubic yard (FM)

B. Basis of Payment: Muck excavation shall be paid for at the Contract Unit Price bid per cubic yard (FM). Payment shall constitute full compensation for excavation, haul, and disposal of muck.

DESCRIPTION OF ITEM	UNIT
Muck Excavation (FM)	CY

21. #57 Crushed Stone (FM)

A. Measurement: #57 crushed stone **to replace areas of muck excavation** as authorized by the Engineer shall be measured for payment by the cubic yard (FM).

B. Basis of Payment: #57 Crushed Stone shall be paid for at the Contract Unit Price bid per cubic yard (FM) Payment shall constitute full compensation for mining, mixing, hauling, placing, and compaction.

DESCRIPTION OF ITEM	UNIT
#57 Crushed Stone (FM)	CY

A1, A2, or A3 Open Cut - Force Main

A. Measurement: Based per linear foot supplied and installed in accordance with the plans and specifications

B. Basis of Payment: This item will be paid at the Contract Unit Price bid per linear foot including pipe, fittings, clearing and grubbing, pits, trenches, select backfill, warning tape and/or tracer wire, and site restoration. The unit price includes all material, shoring, equipment and labor, disposal of any debris, waste, or excess material.

DESCRIPTION OF ITEM	UNIT
12” Fusible PVC	Linear Foot
12” Restrained Joint PVC	Linear Foot
12” C900 PVC	Linear Foot

B1 or B2 Horizontal Directional Drill - Force Main

A. Measurement: Based per linear foot supplied and installed by method of directional drill.

B. Basis of Payment: This item will be paid at the Contract Unit Price bid per linear foot including all materials, and drilling equipment necessary to install 12” force main by method of directional drill.

DESCRIPTION OF ITEM	UNIT
12” Fusible PVC	Linear Foot
12” Restrained Joint PVC	Linear Foot

C1 or C2 72" Diameter Wet Well

A. Measurement: Furnishing and installing the new wet well structure shall be considered as a unit of work (Lump Sum)

B. Basis of Payment: Payment will be at the Contract Lump Sum Price bid for furnishing all materials and labor, excavation, shoring and bracing, and all other tools, equipment and incidental items of work necessary to provide new wet well.

DESCRIPTION OF ITEM	**UNIT**
Precast Concrete Wet Well	Lump Sum
Precast Polymer Wet Well	Lump Sum

END OF SECTION 01025

SECTION 02563

SEWAGE FORCE MAINS

PART 1 GENERAL

1.01 DESCRIPTION

A. General

1. The work to be performed under this section of the Specifications shall consist of furnishing labor, equipment, materials, and performing operations in connection with the excavation, pavement removal and replacement, trenching, installation and backfilling of the sanitary sewage force mains. Place, joint, and test pipe, fittings, couplings and adaptors, as shown on the Drawings and specified herein.

2. Materials installed as a part of the work shall include the pressure pipe, appurtenances, specials, bends, tees and other items such as bedding, sand, gravel, thrust blocking, etc.

1.02 SUBMITTALS

A. The Contractor shall submit manufacturer’s manuals, specifications, catalog sheets, tests and other information for pipe, fittings, valves, select bedding and backfill and other material requested for review by the Engineer for apparent conformance to these Specifications. Wherever "approved equal" appears in this Specification, material may be reviewed to determine if the proposed substitute meets the test of apparent equivalence for use in this project.

B. See Supplemental General Conditions for Submittals and Section 01330.

1.03 INSPECTION

A. When the term "inspection" is used in this Specification, it means visual observation of materials, equipment and construction methods, on an intermittent basis, to determine that the work is in conformance with the Contract Documents and the design intent. Such inspection does not constitute acceptance of the work, nor shall it be construed to relieve the Contractor in any way from his responsibility for the means and methods of construction or for safety on the construction site.

1.04 CONTRACTOR'S EQUIPMENT

A. The Contractor shall provide and maintain the equipment necessary to prosecute the work in an orderly and safe manner. The equipment shall consist of suitable units

designed or selected to perform and expedite the work and incidental items of construction.

1.05 PROTECTION OF PROPERTY

A. General

1. Existing power lines, telephone lines, trees, property corners or monuments, shrubbery, fences, water mains, gas mains, sewers, cables, conduits, ditches, embankments, roadways, and other structures in the vicinity of the work not authorized to be removed shall be supported and protected from injury by the Contractor during the construction and until completion of the work affecting them. The Contractor shall be liable for damages done to such existing facilities and structures, as herein provided, and he shall save the Owner harmless from liability or expense for injuries, damages or repairs to such facilities. No additional compensation will be allowed for any operations of the Contractor in completing the work near, over, under or around existing utilities unless otherwise specified.

B. Underground Utilities

1. The type, size, location and number of known underground utilities have been shown on the Drawings as could best be determined; however, no guarantee is made as to the true type, size, location or number of such utilities. It shall be the responsibility of the Contractor to verify the existence and location of underground utilities along the route of the work. The omission from, or the inclusion of utility locations on the Drawings is not to be considered as the nonexistence of or a definite location of existing underground utilities. The Contract unit prices bid shall provide full and complete compensation for operations necessary to complete the work in accordance with the Drawings and Specifications in working near, over, under or around existing utilities unless specified otherwise.

2. All utilities located along the force main right-of-way are to remain in place and operative during construction. At least 10 days before beginning work in the vicinity of a utility, the Contractor shall call the "ONE CALL" number and advise them as to where he proposes to start working in areas where utilities are located. The Contractor shall exercise special care when working in the vicinity of utilities to prevent damage thereto or injury to the Contractor's employees or others. Any damage to the utilities or interruptions of service occasioned by the Contractor's operations shall be repaired and the service restored promptly at his expense.

3. In the event the Contractor elects to have utilities relocated for his own convenience, he shall make his own arrangements with utility owners for the rerouting and replacement to their permanent location after completion of the work adjacent thereto. All costs associated with utility relocation for the Contractor's convenience shall be at his expense.

C. Relocation of Existing Utilities

1. The Contractor shall notify the Owner or Owners of the existing utilities, whether above the ground or underground; prior to proceeding with trench excavation whenever such trenching operations are within ten feet (10') of any existing utility.

2. In the event that during construction it is determined that underground utilities, including sanitary sewers, water mains, gas mains, telephone cables, storm sewers, etc., and above ground utility facilities require relocation, the Contractor shall notify the utility Owner well in advance of his approach to such utility so that arrangements for such relocation by the Owner or the Owners of the affected utility can be completed without delay to the Contractor's work.

3. Should a utility be damaged in the trenching operations, the Contractor shall immediately notify the Owner of the utility and the Engineer. If the damaged utility transports hazardous material, electricity, or type material carried is not known, the Contractor shall also notify appropriate Emergency Operations Agency and Law Enforcement Agency.

4. The Contractor shall not attempt to make repairs unless so authorized, in writing, by the affected utility owner. Duplicate copies of written authorization given to the Contractor to make repairs shall be filed with the Engineer and shall be so worded as to save the Owner of responsibility relative to the sufficiency of the repairs.

PART 2 PRODUCTS

2.01 PRESSURE PIPE AND APPURTENANCES

A. Fusible Polyvinyl Chloride Pipe

1. Fusible Polyvinyl Chloride, (FPVC), ASTM cell classification 12454, Fusible C900 with minimum DR 18 for 4 – 12-inch diameter; Fusible C905 with minimum DR 18 for 14 – 24-inch diameter; Fusible C905 with DR 25 for 30-inch diameter; Fusible C905 with DR 32.5 for 36-inch diameter.

2. Fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier’s written instructions for this procedure. Joint strength shall be equal to the pipe as demonstrated by testing requirements. All fusion joints shall be completed as described in this specification.

3. Submit the following PRODUCT DATA from the pipe supplier and/or fusion provider:

   a. Dimensional Checks
   b. Pipe Burst

c. Flattening
d. Extrusion Quality (Acetone Immersion)

4. Fusion joint data and fusion technician data indicating conformance with this specification and applicable standards, including written documentation regarding any intended variance from this specification and applicable standards. This will include fusion joint warranty information and recommended project specific fusion parameters, including criteria logged and recorded by data logger.

5. The following AS-RECORDED DATA is required from the contractor and/or fusion provider:

   a. Fusion report for each fusion joint performed on the project, including joints that were rejected. Submittals of the Fusion Technician's joint reports are required as requested by the Owner or Engineer. Specific requirements of the Fusion Technician's joint report shall include:

      i. Pipe Size and Dimensions
      ii. Machine Size
      iii. Fusion Technician ID
      iv. Job Identification Number
      v. Fusion Number
      vi. Fusion, Heating, and Drag Pressure Settings
      vii. Heat Plate Temperature
      viii. Time Stamp
      ix. Heating and Cool Down Time of Fusion
      x. Ambient Temperature

   b. As-recorded plan and profile data for the actual alignment of the installed pipeline.

      i. The as-recorded plan will reflect horizontal offset from the baseline and depth of cover, a maximum of every 25 feet and at all changes in direction, whichever is less.
      ii. All fittings, valves, or other appurtenances will also be referenced and shown.
      iii. This document along with tracking log sheets, should they be used, shall be provided to the Owner and/or the Engineer. Tracking log sheet data, should it be employed, shall include any and all that apply, including position, roll angle, tilt angle, depth, and hydraulic pull back force measured.
      iv. As recorded plans shall show any deviations from the original plans.

6. Fusion Process

a. Fusible PVC pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's recommendations.
b. Fusible PVC pipe will be fused by qualified fusion technicians, as documented by the pipe supplier. Training records for qualified fusion technicians shall be available to Owner or Engineer upon request.
c. Each joint fusion shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine. Joint data shall be submitted as part of the As-Recorded information, in accordance with this specification.
d. The fusible PVC pipe will be installed in a manner so as not to exceed the recommended bending radius.
e. Where fusible PVC pipe is installed by pulling in tension, the recommended Safe Pulling Force, according to the pipe supplier, will not be exceeded.
f. Only appropriately sized, and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following properties, including the following elements:
    i. HEAT PLATE - Heat plates shall be in good condition with no deep gouges or scratches within the pipe circle being fused. Plates shall be clean and free of any contamination. Heater controls shall properly function, and cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's recommendations.
    ii. CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.
    iii. GENERAL MACHINE - Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.
    iv. DATALOGGER - The current version of the pipe supplier's recommended and compatible software shall be used. Protective case shall be utilized for the hand held wireless portion of the unit. Datalogger operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.
g. Other equipment specifically required for the fusion process shall include the following:
    Pipe rollers shall be used for support of pipe to either side of the machine
    A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement and /or windy weather.
    usion machine operations and maintenance manual shall be kept with the fusion machine at all times.

Facing blades specifically designed for cutting fusible polyvinylchloride pipe.

h. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the fusion of fusible polyvinylchloride pipe. The software shall include fusible PVC pipe based dimensional data and fusible PVC pipe based interfacial pressure relationships. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician's joint report.

B. Restrained Joint Polyvinyl Chloride Pipe

1. PVC pipe with restrained joints shall meet the requirements of AWWA C900. The minimum pressure rating shall be 235 psi with a maximum dimension ratio (DR) of 18.
2. Unless otherwise specified, restrained joint polyvinyl chloride pipe lengths shall be assembled in the field using an integral, gasketed, restrained joint. The Contractor shall follow the pipe supplier's written guidelines for joining the product.
3. At a minimum, restrained joint shall be rated to provide the following pull force capabilities with a minimum safety factor of two being applied to the ultimate tensile capacity of the joint.

Nominal Size (in)	Safe Pulling Force (lbs)
4	11,200
6	24,700
8	25,800
10	42,100
12	61,800
14	80,000
16	100,000
18	130,000
20	160,000
24	195,000

4. The cartridge-loaded, restrained joint shall use a high deflection, profile gasket per ASTM F477. Standard gasket material shall be styrene-butadiene rubber (SBR). Optional, special order nitrile rubber gaskets shall be used where indicated in the construction documents. O-rings or similar gaskets shall not be allowed.
5. The assembled restrained joint shall meet the requirements of ASTM D3139.
6. The assembled restrained joint shall allow for expansion and contraction within the joint.

7. Installation guidelines from the pipe supplier shall be followed for all installations.
8. The pipe shall be installed in a manner so as not to exceed the recommended minimum bending radius.
9. Where installed by pulling in tension, the recommended safe pulling force established by the pipe supplier shall not be exceeded.

C. Polyvinyl Chloride Pipe

1. (Sizes 4" and larger): PVC pipe shall have a minimum pressure rating of 235 psi (DR 18) for pipe complying with AWWA C900 and C905.

2. (Sizes 3" and smaller): PVC pipe and fittings shall be pressure rated PVC in accordance with ASTM D2241 and ASTM D1784. Pipe shall be manufactured with an integral bell to utilize gaskets for sealing and conforming to ASTM F477. Pipe shall be a minimum of DR21 rated for 200 psi in pressure sewer applications. Pipe shall have outside diameter dimension of IPS (Iron Pipe Size).

D. Service Connection to Pressure Sewer Main:

1. PVC: For pipes smaller than 4", services shall be by integral TEE or brass saddles. Brass saddles shall be Ford Meter Box Co. style S70 or S71, or equivalent.

2. PVC: For pipes 4" and larger, services shall use brass saddle with double stainless steel straps. Saddle and straps shall be Ford Meter Box Co. style 202BS or equivalent.

3. HDPE: For pipes smaller than 4", services shall be by fused integral TEE or electrofusion saddle. For Pipe 4" and larger, services shall be electrofusion saddles.

4. Service Connection Box and Valves:
   a. Locate service connection box within 5' of property line or as shown on plans.
   b. Service connection shall incorporate an assembly consisting of a check valve, threaded PVC or brass nipple, and shutoff ball valve. Shutoff, check valve, connections, and service connection box shall meet or exceed the Owner's specification.
      (1) Shutoff ball valve shall be brass or PVC type 1, ASTM D1784 with EPDM O-rings. Valve shall have "T" type stem. End connections shall be threaded.
      (2) Check valve shall be ball type or swing type. Material will be PVC type 1, ASTM D1784 with Nitrile Rubber check ball and seal at the clean out port. Brass check valve will have metal to metal

seating and provide low pressure drop and automatic closure. End connections shall be threaded.

(3) Service connections shall have PVC or HDPE adapter on each end. Adapter shall incorporate compression connection (pack Joint) and male IP threaded connection to allow valves to be removed from the box for replacement or maintenance. All couplings shall be brass.

c. Sewer service connection box shall be sized to provide access to couplings, adapters, shutoff valve and check valve. Box shall be NDS type 1200 meter box with green colored cover.

E. Marking Tape

1. Shall be detectable underground marker tape, 2" wide, with "CAUTION SEWER" printed continuously along its length. Shall be green with silver-colored trim and lettering, or other color combination acceptable to the Engineer.

F. Tracer Wire

1. Tracer wire shall be #10 solid copper wire type THHN or THWN VW-1 600V, insulated, gasoline and oil resistant with wire taped to the top of each joint of pipe. Tracer wire housing shall be located every 1,000’ or as otherwise shown on the drawings. Tracer wire shall be extended to top of housing with sufficient slack to allow for connections. Underground connections shall be made with 3M brand DBY-6 Direct Bury Splice Kit 600V or equivalent to effectively moisture seal the conductors. The device shall be installed per manufacturer’s instructions and all applicable codes. The device shall be UL listed as a wire connector system for use with underground conductors.

2.02 ANCHORAGE

Provide anchorage as follows for all fittings subject to blowing off of the line under pressure.

A. Concrete

1. Anchorage shall be 3000 psi (28-day strength) concrete in accordance with Section 03300, “Cast-in-Place Concrete”.

B. Retainer Glands

1. Retainer glands shall be ductile iron mechanical joint set screw type, installed in accordance with manufacturer’s instructions, with set screws tightened to about 80 foot-pounds torque. Provide corrosion protection for all retainer gland material subject

to submergence, or in direct contact with earth and not encased in concrete with epoxy coating or per manufacturer's instructions.

PART 3 EXECUTION

3.01 GENERAL

A. Install force mains where shown on Drawings, in compliance with manufacturer's instructions. PVC pipe shall be installed in accordance with ASTM D-2321. Ductile iron pipe shall be installed in accordance with AWWA C-151. Unless otherwise specified by the Engineer, force main shall be installed on Class C Bedding throughout. Materials or better for select backfill and bedding, and DIP shall be installed on flat-bottom trench, Type 2 bedding, using native materials.

B. Where indicated by the Drawings, force mains shall be laid on grade to prevent air entrapment. Air release valves and air & vacuum valves shall be installed at grade changes as shown on the Drawings. When required by Drawings, grade shall be maintained by using an appropriate laser system. Placement tolerance shall be ± 1 tenth (.1) foot from the elevation shown by the laser.

3.02 CONTRACTOR'S RESPONSIBILITY

A. The Contractor shall be responsible for the condition of excavations made by him. Slides and cave ins shall be removed without extra compensation, at whatever time and under whatever circumstances that may occur. The Contractor is solely responsible for maintaining safe working conditions.

B. Installation of sheeting, shoring and bracing shall be the responsibility of the Contractor. Shoring left in place shall not entitle the Contractor to claims for extra compensation.

C. INSPECTION

1. Pipe specials and jointing materials must be inspected for conformance to these Specifications immediately prior to use. Remove from site of work, materials not conforming with these Specifications. Protect pipe against impact shocks and free fall. Keep pipe clean at all times.

3.04 JOINTING

A. Preparatory to making pipe joints, clean the surfaces of the portion of pipe to be jointed of dirt and foreign matter and then paint with factory made jointing lubricants, primers, adhesives and other materials in accordance with the pipe or joint manufacturer's recommendations.

B. As soon as possible after the joint is made and the pipe is aligned, place sufficient approved backfill material along each side of the pipe to prevent movement from line or grade. Keep trenches free of water and as dry as possible during bedding, laying and jointing.

3.05 OBSERVATION & INSPECTION

A. Do not cover any pipe joints prior to observation by the Engineer.

3.06 COVER

A. Maintain forty-two inches (42") minimum bury along force mains unless otherwise shown on Drawings or directed by the Engineer.

3.07 CARE

A. Provide temporary bulkheads at the open end of the pipe to prevent the entrance of dirt, water or foreign objects into the line during construction. Lay each section of PVC pipe upon a shaped pipe bed such that the full length of the pipe barrel bears directly on the trench bottom. Recesses should be excavated to accommodate pipe bells or joints for both PVC and DIP materials.

3.08 HYDROSTATIC TEST

A. After the pipe is laid and the line flushed, it shall be filled with water, with care being exercised to expel all air from the pipe. During the test period pipe, valves, fittings, and joints shall be examined carefully for defects. Observed leaks or defective pipe shall be satisfactorily repaired or replaced, at the expense of the Contractor, and the test repeated until the section tested is within the limits specified. The entire system or parts thereof shall be tested under hydrostatic pressure of 150 psi, for a period of 4 hours, if covered. Repairs shall be made using approved materials and new replacement fittings, specials, or gaskets where leakages occur.

B. Leakage shall be measured by an approved calibrated meter through which the water required to maintain test pressure shall be pumped. Testing shall be performed in the presence of the Engineer, or his authorized representative and the Engineer shall be notified at least 24 hours in advance of the start of the test.

C. The Contractor shall furnish the pump, pipe connections, fittings, gauges, meters, and necessary apparatus and shall furnish all labor and work required to make the tests. Costs of testing shall be borne by the Contractor and testing operations shall remain in operation until approved by the Engineer. Allowable leakage shall not exceed 10 gallons per 24 hours per inch of diameter per mile of pipe, at the specified test pressure.

3.09 CLEAN-UP

A. The job site shall be maintained in a neat, and sanitary manner during construction. As portions of the work are completed, excess excavation, bricks, concrete, pipe and other materials shall be removed and disposed of by the Contractor in a manner acceptable to the Engineer.

3.10 SEPARATION FROM WATER LINES

A. There shall be a ten (10) foot horizontal separation between sanitary sewer mains and parallel water mains, and an eighteen (18) inch vertical separation between the bottom of a water line crossing over the top of a sewer mains. In instances where such separation is not possible, special precautions, as determined by the Engineer, shall be taken by the Contractor to prevent contamination of waterworks facilities.

3.11 CROSSINGS

A. All utility, railroad or highway crossings shall be constructed in accordance with the applicable permits issued for such crossings.

3.12 PROVING

A. The force mains shall be proved by "pigging" in accordance with the recommendations of the polyfoam pig manufacturer. Contractor shall supply the material and labor to successfully complete the test.

3.13 SITE PREPARATION

A. The Contractor shall prepare, on a timely basis, rights-of-way, easements and sites indicated on the Drawings for construction of the wastewater improvements. The work shall include clearing and grubbing, removal of structures and obstructions, and the removal of permanent surfaces and landscaping items designated to be restored upon completion of the installation.

B. Clearing and grubbing shall conform to the requirements specified in Section 02111 and shall include the removal of trees, roots, vegetation, structures and obstructions unless separate pay items are specifically provided for on the Bid Form. The completion of clearing and grubbing shall leave the site clear and free from undesirable obstructions, ready for trench excavation.

C. The removal of permanent surfaces and the subsequent restoration of the surfaces shall be as set forth below and in other sections herein where applicable.

3.14 SELECTED STRIPPING

A. In landscaped, agricultural or cultivatable areas, the top twelve inches (12") of the ground shall be stripped and stockpiled for subsequent replacement after backfilling the pipe trench. The Contractor shall strip an area that will include the open limits of the trench plus the area that will be used to stockpile all suitable backfill material from the trench excavation. The stripped material shall be stockpiled in an area that will not hinder or endanger the construction process. The location and manner of stockpiling shall be reviewed by the Engineer.

3.15 EXCAVATION AND TRENCHING

A. Excavation of every description and of whatever substances encountered shall be performed to the depths indicated on the Drawings or as otherwise specified. Excavation shall be done by open cut from the surface except when tunneling or boring is specified or directed in writing by the Engineer. Trench width shall be kept as narrow as practical to provide a safe working area and to minimize excavation, and shall be maintained in strict compliance with OSHA regulations.

B. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. Excavated materials not required or not suitable for backfill shall be removed and wasted as directed by the Engineer. Grading shall be done, as necessary, to prevent surface water from flowing into trenches or other excavations. Water accumulating therein shall be removed by pumping or by other approved methods. Temporary sheeting and shoring shall be used where necessary for the protection of the work and for the safety of the personnel.

C. Trenches for force main pipe and other appurtenances shall be of only such width as necessary for proper laying of the pipe. The net width of the trench at and below the top of the pipe shall be at least the pipe O.D. plus twelve inches but not more than the pipe O.D. plus twenty-four inches. The width of the trench above this level may be as wide as necessary for sheeting, bracing, shoring or for proper safe performance of the work.

D. The sides of the trench shall be maintained in strict compliance with OSHA regulations.

E. The bottom of the trench shall be carefully graded, formed and aligned according to these Specifications. The bottom of the trench shall be hollowed under each pipe joint to conform to the shape of the pipe, and holes shall be cut for the bells, allowing the body of the pipe a uniform contact and support throughout its entire length.

F. The Contractor shall leave a minimum 2-foot berm width on each side of the trench between the trench and the excavated earth, to allow the free passage of workmen, the

Engineer's representative and to permit work in a safe, expeditious and satisfactory manner.

G. No more than three hundred (300) feet of trench shall be opened in advance of the completed sewer, nor shall more than one hundred (100) feet be left unfilled except by permission from the Engineer. In special cases, the Engineer, when so requested by the Contractor, may waive the distance restriction to which the trench may be opened by notifying the Contractor in writing.

3.16 SHEETING, SHORING AND BRACING

A. Sheeting, shoring, and bracing shall be furnished, placed and maintained by the Contractor as may be required to support the sides of the excavation. The Contractor shall be fully responsible for the sufficiency of such supports to prevent movement which can injure or delay the work or endanger or cause damage to adjacent pavements, buildings or other structures, channels and drainage structures, or create undue hazards to workmen. Where in the opinion of the Engineer, damage is likely to result from withdrawing sheeting, the sheeting shall be left in place. The material and installation requirements for sheeting, shoring and bracing shall be in accordance with applicable sections of the Mississippi Standard Specifications for Road and Bridge Construction, latest edition.

B. Sheeting, shoring and bracing which are not ordered by the Engineer to be left in place shall be removed in such manner as not to endanger the constructed sewer or other structures, utilities or property. Voids left or caused by the withdrawal of sheeting shall be immediately refilled with sand by tamping with tools specifically adapted to the purpose, or by watering, or otherwise as may be directed.

3.17 EXCAVATED MATERIAL

A. Excavated material from trench and structure excavation suitable for backfill shall be placed compactly on the sides of the excavation and kept up so as not to endanger the work and be of as little inconvenience as possible to the public travel and abutting property, and so that free access is maintained to fire hydrants and water valves in the vicinity of the work. Material encountered in the excavation which, in the opinion of the Engineer, is not suitable for use in the work, shall be removed and wasted as directed and shall not be stockpiled along the side of the excavation.

B. The disposal of surplus and unsuitable excavation shall be the responsibility of the Contractor at his own expense. Surplus and unsuitable material not to be used in the construction of the project shall not be left on the right-of-way or easement of the project, nor adjacent thereto, except by written permission of the affected property owner.

3.18 JOINTING DISSIMILAR PIPES

A. Suitable water-tight adaptor couplings, acceptable to the Engineer, shall be used for connecting dissimilar pipes. Straps shall be stainless steel. No separate payment for adaptor couplings will be made.

3.19 CONCRETE BLOCKING

A. Prior to placing concrete, inspect the pipe and fittings for alignment and rigidity.

B. Pour concrete blocking before pressure testing and arrange it so that the pipes and fitting joints shall be accessible for repair.

C. Blocking shall not be placed until all fittings and forms have been inspected. Bearing areas shall be as indicated on the plans.

D. Handle all concrete in such a manner to avoid segregation, separation or loss of ingredients, or the displacement of the pipe.

E. Concrete blocking shall be placed on undisturbed soil.

F. Place concrete in continuous horizontal layers not exceeding 24". Place each layer so that the previously placed layer is still plastic.

3.20 BACKFILLING

A. Excavate trenches to the lines indicated and detailed on the drawings. The trench subgrade shall consist of firm, stable, non-organic, debris-free soil. Bedding material shall be placed on the subgrade throughout, as detailed on the drawings, and compacted to 90% standard Procter maximum dry density (ASTM D 698). Hand excavate the base material to provide uniform and continuous bearing and support of the pipe between bell holes, with ample bell holes at each joint to facilitate proper jointing and to permit bells from bearing on the base material. Contractor shall furnish at his expense and use multiple rock/bedding boxes to keep aggregate clean and free of soil and debris. Aggregate mixed with soil and debris shall not be allowed for pipe bedding material.

B. In locations where trench excavation exposes unsuitable material, as classified by these specifications, or in the judgment of the Engineer, the subgrade shall be undercut as directed by Engineer for the full design width of the trench and backfilled with aggregate material CR 610 as detailed on the Construction Drawings and specified in Paragraph 2.02.l of this section. Such undercutting and undercut bedding material will be compensated in accordance with the requirement of Part 4, hereafter. Granular bedding and trench excavated backfill material in the pipe envelope will not be considered for payment.

C. Backfill shall consist of stockpiled excavated material placed as indicated on the detail shown in the construction drawings. As pipe is laid and suitably bedded, trenches and excavation shall be promptly backfilled to a level one-foot above the top of the pipe in relatively thin lifts and compacted to a minimum of 90% Standard Proctor Maximum Dry Density (ASTM D 698).

D. From one foot above the top of the pipe, backfill shall be placed in 8" lifts and compacted as specified hereinbefore. Backfill shall be placed and tamped equally and thoroughly along each side of the pipe in a manner to avoid displacement of or damage to the pipe.

E. Tamping

1. The backfill shall be placed in equal thickness lifts, each lift being thoroughly compacted to the density specified. Each lift of the backfill material shall have proper moisture content to permit compaction to this density.

a. After the pipe has been laid and backfilled to one foot above the top of the pipe, the Contractor's testing laboratory shall conduct one density test each lift and for every 500 linear feet or as directed by the Engineer. Backfill failing density test shall be reworked by the Contractor until the specified test results are achieved.

b. In areas where restoration work is required, the backfill above the one (1) foot cover level shall be compacted to the subgrade level or as directed and maintained to eliminate voids and future settlement. Special compaction procedures involving 95% density on 6" lifts are required at such locations and at other locations shown on the Drawings.

c. Landscape and cultivatable areas shall be restored by the replacement of the stockpiled topsoil stripping to a depth of at least twelve inches (12").

F. Marking Tape

1. Marking tape shall be placed continuously along the force mains above the center of the pipe and to a depth of not less than 18 inches.

G. Tracer Wire

1. Tracer wire shall be placed on the top of the force mains pipe and securely taped to every joint of pipe.

H. Fiberglass Utility Markers

1. Fiberglass Utility Markers shall be installed at sufficient depth at locations indicated on the Plans.

3.21 TEMPORARY SURFACES OVER TRENCHES

A. Whenever the wastewater improvements are constructed under traveled roadways, driveways, sidewalks or other traveled surfaces, a temporary surface shall be placed over the top of the trench as soon as possible after placement and compaction of the backfill has been satisfactorily completed.

B. The top of the temporary surface shall be smooth and meet the grade of the adjacent undisturbed surface. The temporary surface shall be maintained at the Contractor's expense until final restoration of the street surface is completed as specified. No permanent restoration of street surface shall be initiated until authorized by the Engineer. The temporary surfacing shall be required over the entire width of the trench.

3.22 REPLACEMENT OF PERMANENT SURFACES, STRUCTURES AND PROPERTY

A. General

1. The Contractor shall restore all permanent type pavements, sidewalks, driveways, curbs, gutters, shrubbery, fences, poles, storm drainage and other property and surface structures removed or disturbed during or as a result of construction operations to a condition which is equal in appearance and quality to the condition that existed before the work began. The surface of improvements shall be constructed of the same material and match in appearance the surface of the improvement which was removed. Where select granular trench backfill is used, the restoration shall be made as soon as possible after compaction of the backfill has been completed.

B. Earthwork

1. Earthwork required for this work shall be in accordance with Section 02200, "Earthwork".

C. Trench Width – Improved Surface Areas

1. Whenever the wastewater improvements are to be located along or across an improved surface, the width of the trench shall be held as nearly as possible to the maximum width specified below. Where brick or concrete pavement, sidewalk, driveway or curbing is cut, the width of the cut shall exceed the actual width of the top of the trench by twelve inches (12") on each side or a total of two feet (2'). Exposed surfaces of Portland cement or asphaltic concrete shall be cut with a pavement saw before breaking. Care shall be taken in cutting to ensure that a straight joint is sawed.

NORMAL SEWER PIPE DIAMETER (INCHES)	MAXIMUM TRENCH WIDTH (FEET)	MAXIMUM WIDTH OF PERMANENT SURFACE AND CURB & GUTTER REMOVAL (FEET)
12 or less	5.00	7.00
15	5.00	7.00
18	5.00	7.00
16	5.00	7.00
21	6.00	8.00
24	6.00	8.00
27	7.00	9.00
30	7.00	9.00
36	7.50	9.50

3.23 RESTORATION OF LANDSCAPED AREAS

A. Sod, shrubbery, decorative planting and other landscape items shall be replanted, replaced or restored in the manner removed.

B. Should new construction be required to replace damaged or unsalvageable items, then the Contractor shall furnish all labor, materials, equipment, tools, and incidentals set forth in the applicable Sections of these Specifications.

3.24 MAINTENANCE AND REPLACEMENT OF EXISTING FACILITIES

A. The Contractor shall maintain all existing travelways along the pipeline. 5Where the pipeline is in or crosses travelways, the surface shall be restored as quickly as practical after backfilling the trench. The disturbed travelways shall be maintained at the Contractor's expense until settlement has subsided.

B. The Contractor shall restore all permanent fences, storm drainage facilities and other permanent items to their original condition at his expense. Fences removed shall be replaced "in-kind" at the Contractor's expense.

3.25 MAINTENANCE OF SITE

A. The Contractor shall prevent, control and correct dust nuisance or muddy conditions developing on roadways as a result of his operation. No payment for maintenance of the site shall be made but shall be considered as a subsidiary obligation of the Contractor.

3.26 FINAL CLEAN-UP

A. After backfilling of the trenches is complete, the Contractor shall dispose of surplus material, dirt and rubbish from the site. Surplus dirt shall be disposed of in Contractor furnished and approved disposal areas or in on site areas as directed by the Engineer.

B. After work is completed, the Contractor shall remove tools and other equipment used by him, leaving the entire site free, clear and in clean condition.

END OF SECTION 02563

SECTION 09885

MANHOLE LINING SYSTEM

PART 1. GENERAL

1.1 SCOPE

A. This section describes the methods, procedures, materials, and equipment required to line new and existing manholes and other wastewater structures. The completed system will provide a corrosion and infiltration resistant liner to rehabilitate deteriorated manholes and prevent further deterioration from hydrogen sulfide and other corrosive gases and acids within the wastewater system.

1.2 REFERENCES

A. The following standards are hereby incorporated into these specifications by reference:
   1. ASTM D638 – Tensile Properties of Plastics
   2. ASTM D790 – Flexural Properties of Un-reinforced and Reinforced Plastics
   3. ASTM D695 – Compressive Strength of Rigid Plastics
   4. ASTM D4541 – Pull-off Strength of Coatings Using a Portable Adhesion Tester
   5. ASTM D2584 – Volatile Matter Content
   6. ASTM D2240 – Durometer Hardness, Type D
   7. ASTM D1653 – Water Vapor Transmission of Organic Coating Films
   8. ASTM D543 – Resistance of Plastics to Chemical Reagents
   9. ASTM C297 – Flatwise Tensile Strength of Sandwich Constructions.
   10. ASTM – The published standards of the American Society for Testing and Materials, West Conshohocken, PA.
   11. NACE – The published standards of the National Association of Corrosion Engineers (NACE International), Houston, TX.

1.3 SUBMITTALS

A. All submittals shall be submitted in accordance with the applicable portions of these specifications.

B. The Contractor shall submit the following information to the Engineer for approval prior to beginning the installation of the protective coating.

   1. Manufacturer’s data sheets for the coating materials
   2. Third party test results verifying the physical properties of the coating materials meet or exceed the requirements of these specifications.
   3. Applicator’s procedures for preparing the surface of the structure and installing the coating system.
   4. Documentation that the Applicator of the coating has been trained and certified by the Manufacturer and meets the experience requirements of these specifications.

1.4 QUALITY ASSURANCE

A. The manufacturer and/or installer of the liner system shall be a company that specializes in the design, manufacture, or installation of corrosion protection systems for concrete sanitary sewer structures. Installer shall be trained in leak repair, surface preparation, and corrosion materials application on manholes and other concrete sanitary sewer structures.

B. To ensure total responsibility, all materials and installation shall be furnished and coordinated with/by one supplier/installer who assumes all responsibility for the final product.

C. The manufacturer of the lining system shall provide a verifiable list of references that documents the successful installation of the product in a minimum of 750,000 square feet of sanitary sewer structures.

PART 2 PRODUCTS

2.1 INTERIOR SURFACING SYSTEM

A. 100% Solids Epoxy

1. The coating system shall be a spray-applied 100% solids epoxy monolithic surfacing system for use in coating new or existing manholes, wet wells, lift stations, treatment plants, and other structures. The following products have been pre-approved for use on this project.

   A. Structure Guard by Quadex, LLC
   B. ARC S1HB by A.W. Chesterson Co.
   C. Or Approved Equal

2. In order to be considered as an equal, a 100% Solids Epoxy product must have the following minimum physical characteristics as measured by the applicable ASTM Standards referenced herein.

   A. Minimum Compressive Strength 13,000 psi
   B. Minimum Tensile Strength 8,500 psi
   C. Minimum Flexural Strength 12,000 psi
   D. Minimum Bond Strength 500 psi
   E. Minimum corrosion resistance suitable for environments pH of 0.5 or higher.

3. Portland Cement Underlayment Products

   A. The following products have been pre-approved for use on this project.

      1. QM-1s Restore by Quadex
      2. MS-2 A by the Strong Company, Inc.

   B. Portland Cement Underlayment

1. A Portland Cement based, single component, high strength, fiber reinforced, shrinkage compensated cement mortar enhanced with a monocrystalline quartz aggregate.

2. Typical Physical Properties
   i. Compressive Strength, PSI >9000
   ii. Freeze-Thaw No visible damage after 300 cycles
   iii. Shrinkage 0% @ 28 days

4. The minimum coating thickness shall be as shown in the following table:

Type of Structure	Condition	Minimum Thickness	
		Portland Cement Underlayment	100% Solids Epoxy
Precast Manhole	New	--	80 mil
Precast Manhole with Force Main Discharge	New	--	125 mil
Precast Manhole	Existing	--	125 mil
Brick Manhole	Existing	¾"	80 mil
Lift Station Precast Wet Well	New		125 mil
Lift Station Precast Wet Well	Existing	¾"	200 mil

B. Geopolymer Lining Material

1. All Geopolymer lining materials shall be specifically designed for the infiltration and inflow rehabilitation of wastewater structures. Liner materials shall be inorganic alumino-silicate amorphous polymers, micro-fiber reinfored, shrinkage compensated, and enhanced with chemical admixtures and siliceous aggregates.

2. Liner materials shall be mixed per manufacturer's written specifications and applied using equipment specifically designed for either low-pressure spray or centrifugal spin casting application of geopolymer mortars.

3. All geopolymer liner materials must be capable of a placement thickness of ½" to 2" in a one pass monolithic application.

4. Materials must resist corrosion when placed in an environment capable of producing a maximum substrate of pH level of 3.0.

5. Thickness Requirement: liner thickness shall be as specified on the drawings.

6. Approved material shall exhibit the following 28-day minimum physical properties:

a. Compressive Strength (ASTM C39 & C109) > 8,000 psi
b. Flexural Strength (ASTM C78 &C293) > 800 psi
c. Bond Strength (ASTM C882) > 3,000 psi

PART 3 EXECUTION

3.1 INSTALLER QUALIFICATIONS

A. All products must be installed by an Installer that has been trained and certified by the manufacturer.
B. The Installer must provide verifiable documentation of the above certification and the successful installation of 250,000 square feet of the product in sanitary sewer structures.

3.2 QUALITY ASSURANCE

A. Applicator shall initiate and enforce quality control procedures consistent with applicable ASTM standards.
B. Applicator shall use an adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts. These workmen shall be completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
C. Applicator shall use approved specialty equipment adequate in size, capacity and number sufficient to accomplish the work of this Section in a timely manner.

3.3 SAFETY

A. Applicator shall perform his work in a manner to protect the health and safety of all workmen and the public.
B. All work shall be in accordance with standard industry safety practices.

C. All work, including entry into confined spaces shall be performed in strict compliance with current OSHA regulations.

3.4 PRE-COAT INSPECTION

A. The applicator's vehicles and equipment must be able to access the structures to be coated under their own power.
B. Active flows shall be dammed, plugged or diverted as required to ensure that the liquid flow is maintained below the surfaces to be coated.
C. Installation of the protective coating shall not commence on any surfaces containing freshly poured concrete until the concrete substrate has properly cured, Cure time shall not be less than 28 days.

3.5 SURFACE PREPARATION

A. Applicator shall inspect all surfaces specified to receive the surfacing system prior to surface preparation. Applicator shall promptly notify Owner of any noticeable disparity in the surfaces that may interfere with the proper preparation or application of the monolithic surfacing system.
B. All concrete that is not sound or has been damaged by chemical exposure shall be restored to a sound concrete surface. All contaminants including all oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants shall be removed.
C. Surfaces to receive protective coating shall be cleaned to produce a sound concrete or masonry surface with adequate profile and porosity to provide a strong bond between the monolithic surfacing system and the substrate. Surface preparation methods shall be based upon the conditions of the substrate and the requirements of the monolithic surfacing system to be applied, but as a minimum, shall be in accordance with the procedures listed below.

    1. Clean all surfaces with high pressure water to remove all loose or contaminated debris. Other equipment and methods may be required to remove all unsound material.
    2. When all loose, contaminated, and unsound debris has been removed, the surface shall be etched with a solution of 20% muratic acid to clean and open the pores of the substrate.
    3. The surface shall be washed again and the wash water shall contain a dilute solution of chlorine to diminish microbiological bacteria growth and to kill any bacteria residing on the surface.
    4. The surface shall be tested with litmus paper at various points throughout the structure to ensure that the pH is within acceptable limits (not to exceed 8.5). If the surface does not meet the pH requirements, the above steps shall be repeated until the surface pH is within acceptable limits. All tests results will be retained for review by the Engineer.
    5. Active water infiltration shall be stopped by using a cementitious water plug that is compatible and suitable for top coating with the specified monolithic surfacing system.
    6. If pre-installation inspection reveals infiltration (defined as visible and consistent movement of water) though the wall of the structure, a collapse in an area of the wall, a bench that needs to be rebuilt/repaired, a necessity for sandblasting (if necessary after surface preparation as described in

specification) or anything that will require more than typical preparation of the structure, the contractor will advise the Owner's representative. Such extra work will be approved in writing between the Owner and the contractor prior to the commencement of the work and shall be considered as a separate pay item.

D. APPLICATION

1. The interior surfacing system shall be continuously bonded to all brick, mortar, concrete, chemical sealant, grout, pipe and other surfaces inside the manhole according to ASTM C882 testing and therefore shall be designed for hydrostatic loading.
2. The cured surfacing shall be monolithic with proper sealing connections to all un-surfaced areas and shall be placed and cured in conformance with the recommendations of the monolithic surfacing system manufacturer.
3. When cured, the system shall form a continuous, tight-fitting, hard, impermeable surfacing that is suitable for sewer system service and chemically resistant to any chemicals, bacteria or vapors normally found in domestic sewage.
4. The system shall effectively seal the interior surfaces of the manhole and prevent any penetration or leakage of groundwater infiltration.
5. The system shall be compatible with the thermal conditions of the existing sewer manhole surfaces.
6. Heated, plural component, specially designed equipment for use in the spray or spin-cast application of the specified system approved for use by the monolithic surfacing system manufacturer.
7. Application procedures shall conform to the recommendations of the interior surfacing system manufacturer, including material handling, mixing, and environmental controls during application, safety, and equipment.
8. The equipment shall be specially designated to accurately ratio and apply the specified materials and shall be regularly maintained and in proper working order.
9. The specified materials must be applied by an approved installer of the monolithic surfacing system.
10. The walls and bench of the structure shall be lined with the monolithic surfacing system to provide a thickness as previously specified based on the condition of the existing structure. The cured surfacing shall be monolithic with proper sealing connections to all un-surfaced areas and shall be placed and cured in accordance with the recommendations of the monolithic surfacing system manufacturer.
11. Specially designed spray and/or spin-cast application equipment shall be used to apply each coat of the system.

E. QUALITY ASSURANCE

1. Applicator shall initiate and enforce quality control procedures consistent with applicable ASTM standards.
2. Applicator shall use an adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts. These workmen shall be completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

3. Applicator shall use approved specialty equipment adequate in size, capacity and number sufficient to accomplish the work of this Section in a timely manner.

F. TESTING AND INSPECTION

1. During application a wet film thickness gage, such as those available through Paul N. Gardner Company, Inc. meeting ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used to ensure a monolithic coating and uniform thickness during application.
2. The Engineer and Applicator shall make a final visual inspection. Any deficiencies in the finished system shall be marked and repaired according to the procedures set forth herein by Applicator.

END OF SECTION 09885

Section 011300
SUBMERSIBLE PUMP

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install submersible sewage pumping units equipped complete, as shown on the drawings and as specified herein.

B. All necessary and desirable accessory equipment and auxiliaries whether specifically mentioned in this specification or not shall be furnished and installed as required for an installation incorporating the highest standards for this type of service. Also included shall be supervisory services during installation and field testing of each unit and instructing the regular operating personnel in the proper care, operation and maintenance of the equipment.

C. The Contractor shall require the submersible pump manufacture to coordinate his design with the supplier of the variable frequency drives.

1.02 RELATED WORK

Specified elsewhere:

Painting – Section 09900

1.03 SUBMITTALS

A. Submittals shall include the following:

1. Certified shop and erection drawings showing all inportant details of construction, dimensions and anchor bolt locations.

2. Descriptive literature bulletins and/or catalogs of the equipment.

3. Data on the characteristics and performance of the pumps. Data shall include guaranteed performance curves, based on actual shop tests of duplicate units, which show that they meet the specified requirements for head, capacity, efficiency, allowable NPSHR, allowable suction lift and horsepower. Curves shall be submitted on 8-1/2 in by 11 in sheets.

4. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the detail specifications.

5. Total weight of pumping unit including the weight of the single largest part.

6. A statement indicating bearing life.

9. Complete description of the surface preparation and shop prime painting.

B. Design Data

1. Manufacturer's certified rating curves, to satisfy the specified design conditions, showing pump characteristics of discharge, head, brake horsepower, efficiency and guaranteed net positive suction head required (NPSHR). Curves shall show the full-recommended range of performance and include shut-off head. This information shall be prepared specifically for the pump proposed. Catalog sheets showing a family of curves will not be acceptable.

C. Test Reports

1. Certified motor test data.

2. Tabulated data for the drive motors including rated HP, full load RPM, power factor and efficiency curves at 1/2, 3/4 and full load, service factor and KW input, including when the pump is at its design point. Submit a certified statement from the motor manufacturer that the motors are capable of continuous operation on the power supply from the variable frequency drives to be furnished without affecting their design life for bearings or windings.

3. Description of pump factory test procedures and equipment and a copy of final report when available.

D. Operation and Maintenance Data

1. Complete operating and maintenance instructions shall be furnished for all equipment included under these specifications as provided in Section 01730. The maintenance instructions shall include trouble shooting data and full preventative maintenance schedules and complete spare parts lists with ordering information.

1.04 REFERENCE STANDARDS

A. Design, manufacturing and assembly of elements of the equipment herein specified shall be in accordance with, but not limited to, published standards of the following, as applicable:

1. American Gear Manufacturers Association (AGMA)

2. American Institute of Steel Construction (AISC)

3. American Iron and Steel Institute (AISI)

4. American Society of Mechanical Engineers (ASME)

5. American National Standards Institute (ANSI)

6. American Society for Testing and Materials (ASTM)

7. American Welding Society (AWS)

8. Anti-Friction Bearing Manufacturers Association (AFBMA)

9. Hydraulic Institute Standards (current edition)

10. Institute of Electrical and Electronics Engineers (IEEE)

11. National Electrical Code (NEC)

12. National Electrical Manufacturers Association (NEMA)

13. Occupational Safety and Health Administration (OSHA)

14. Steel Structures Painting Council (SSPC)

15. Underwriters Laboratories, Inc. (UL)

1.05 QUALITY ASSURANCE

A. The Contractor and manufacturer shall assume responsibility for the satisfactory installation and operation of the entire pumping system including pumps, and controls as specified.

B. The equipment covered by these specifications is intended to be standard pumping equipment of proven ability as manufactured by concerns having extensive experience in the production of such equipment. Units specified herein shall be furnished by a single manufacturer. The equipment furnished shall be designed, constructed and installed to operate satisfactorily when installed as shown on the drawings.

C. Pumps shall be manufactured in accordance with the Hydraulic Institute Standards, except where otherwise specified herein.

D. Multiple pumps of the same type to be furnished under this Section shall be the products of a single manufacturer. All pumps shall be designed for 24-hour continuos operation.

E. The rated horsepower of the drive unit shall be such that the unit will not be overloaded nor the service factor reduced when the pump is operated at any point on the pump's capacity curve. If, due to the slope of the pump's performance, a drive unit of greater horsepower than specified is required to meet this condition, the pump will be not be considered for approval.

F. The pumps and motors shall be designed and built for 24 hour continuous service at any and all points within the required range of operation, without overheating, without cavitation, and without excessive vibration or strain. All parts shall be so designed and proportioned as to have liberal strength, stability and stiffness and to be especially constructed to meet the specified requirements. Ample room and facilities shall be provided for inspection, repairs and adjustments.

1.06 SYSTEM DESCRIPTION

A. All of the equipment included herein is intended to be standard for submersible, 24-hour continuos operation use in wastewater treatment.

1. <u>Tisdale Pump Station</u>

Number of Pumps: 2

Configuration: Submersible

Single Pump Design Capacity and Head: 1,000 gpm @ 90 feet TDH

Minimum Efficiency at Design Capacity: 70%

Pump Speed at Design Capacity: 1,800 rpm maximum

Constant Speed

Minimum Motor Hp: 50 HP

Motor Type: Submersible

Pump Discharge Elbow Size: 8”

Electrical Service: 3 phase, 460 volts

Minimum Solid Size: 3 inches

1.07 MAINTENANCE

A. Furnish all special tools and test equipment required for the proper servicing of all equipment. All such tools and test equipment shall be furnished in a suitable steel tool chest complete with lock and duplicate keys.

B. All spare parts shall be properly protected for long periods of storage and packed in containers that are clearly identified with indelible markings as to contents.

C. Furnish the following spare parts for each size pump.

	<u>Quantity</u>	<u>Item</u>
1.	1	impeller lock nut
2.	1 set per pump	radial and thrust bearings
3.	1 set per pump	pump casing gaskets

4.	1	mechanical seal, upper and lower
5.	1	o-ring set

1.08 DELIVERY, STORAGE AND HANDLING

A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the unit and equipment are ready for operation.

B. All equipment and parts must be properly protected against any damage during shipment. Store equipment in accordance with the manufacturer's instruction.

C. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.

D. The finished surfaces of all exposed flanges shall be protected by wooden or equivalent blank flanges, strongly built and securely bolted thereto.

E. Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.

F. No shipment shall be made until approved by the Engineer in writing.

1.09 PATENTS AND LICENSES

A. The Contractor shall be responsible for all patents or licenses that exist on the Equipment that may be provided.

B. The Contractor and the equipment manufacture shall assume all cost of patent fees or licenses for the equipment or process; and shall safeguard and save harmless the Parish/Engineer from all damages, judgements, claims and expenses arising from license fees, or claimed infringement of any letter, patents, or patent rights, or fees for the use of equipment or process, structural feature or arrangement of any component parts of the installation; and the bid price shall be deemed to include payment of any such patent fees, licenses or other cost pertaining thereto.

1.10. WARRANTY

A. The equipment shall be warranted for a period of 5 years.

PART 2: PRODUCTS

2.01 GENERAL

A. Manufacturers: Flygt, Fairbanks or Approved Equal.

C. The pumping units shall all be supplied by one manufacturer and shall be complete including pumps, motors, controls, base elbows, guide rails, lifting system and appurtenances such as, but not limited to, couplings, guards and gauges.

D. The pumps, motors, drives and controls shall be designed and built for 24-hour continuous service at any and all points within the required range of operation, without overheating, without cavitation, and without excessive vibration or strain. All parts shall be so designed and proportioned as to have liberal strength, stability and stiffness and to be especially constructed to meet the Specifications. Ample room and facilities shall be provided for inspection, repairs and adjustment.

E. All necessary foundation bolts, nuts and washers shall be furnished and shall be Type 316 stainless steel.

F. Each major piece of equipment shall be furnished with a stainless steel nameplate (with embossed data) securely mounted to the body of the equipment. As a minimum, the nameplate for the pumps shall include the manufacturer's name and model number, serial number, rated flow capacity, head, speed and all other pertinent data. As a minimum, nameplates for motors shall include the manufacturer's name and model number, serial number, horsepower, speed, input voltage, amps, number of cycles and power and service factors.

G. All electrical materials and equipment shall be Underwriters Laboratories Inc. listed, and NEMA rated and shall otherwise be equal to that supplied under section 16, where applicable.

2.02 CONDITIONS OF OPERATION

A. Each pump shall be designed for the conditions of service tabulated in the attached table.

Where total head (TH) is referred to in conjunction with the specified discharge requirements, it shall be understood to consist of the sum of the pressure head plus the velocity head, in feet, at the discharge nozzle of the pump minus the pressure head and the velocity head at the suction nozzle of the pump. The efficiency of the pump shall be understood to be based upon total head as just defined.

The pumps shall operate throughout the entire operating range, within the vibration limits specified in Paragraph 1.05F.

2.03 PUMP CONSTRUCTION

A. Impeller

The impeller shall be balanced non-clogging type made of close-grained cast iron conforming to ASTM A48 CL30. The enclosed impeller shall be of one piece; single suction, enclosed two blades radial flow design with well-rounded leading vanes and then tapered toward the trailing edge for a circular flow pattern. The waterways through the impeller will have extremely smooth contours, devoid of sharp corners so as to prevent rags or stringy, fibrous material from catching or clogging. The impeller is to be balanced and secured to the shaft by means of a bolt, washer, and key. The arrangement shall be such that the impeller cannot be loosened from torque in either forward or reverse rotation. The impeller shall be supplied with stainless steel wear ring, 300-350 BHN. Wiper vanes on the back impeller shroud are not allowed. Screw and vortex type impellers are not allowed.

B. Volute

The volute shall be matched to the impeller and made of close-grained cast iron conforming to ASTM A48 Class 30. The volute is to be of one-piece circular constant flow, equalizing pressure tangential design with smooth fluid passages large enough to pass any size solid that can pass through the impeller. The volute shall be centerline flanged discharge. The casing shall be hydrostatically tested to 1.5 times the design head or 1.25 times the shutoff head, whichever is greater. The volute shall be equipped with stainless steel wear ring, 410-484 BHN. A sliding bracket assembly shall be part of the pumping unit contructed so that when lowered to the discharge base/elbow, the knifing action of the vertical metal-to-metal seal provides a self-cleaning, non-clogging, non-sparking UL Listed explosion-proof assembly.

C. Backhead

A separately cast close-grained cast iron back head conforming to ASTM A48 Class 30 shall be provided.

D. Pump Shaft / Seal Arrangement

The pump shaft shall be 416 Stainless Steel of sufficient diameter to carry the maximum loads imposed and to prevent vibration and fatigue. The shaft shall be accurately machined along its entire length and precision ground at bearing locations. Radial bearings and thrust bearing shall be grease lubricated designed to carry the hydraulic radial loads encountered in the service conditions. Bearing shall be designed for a nominal L10 life of 70,000 hrs. per AFBMA at best efficiency point.

Pump(s) shall be provided with two separate tandem-mounted mechanical seals to prevent the pumped liquid from entering the rotor/stator cavity area to ensure reliability of operation. The upper and lower seals are mounted to rotate in the same direction.

The upper seal shall be immersed in an oil bath and seals the oil chamber and the motor housing. The lower seal mating surfaces are to be immersed in the oil bath sealing the pump volute and the oil chamber. Each seal shall be held in contact by its own spring system and require neither maintenance nor adjustment, but shall be easily inspected and replacable. The inner seals shall be installed using a snap ring o the polymeric body and positive locator machined in the ID of polymeric body. Outer seals shall be positively driven via a stainless steel lock collar clamped to the body of the bellows. All O-rings shall be high temperature FKM O-rings.

Two moisture detection probes shall be installed so that they will detect moisture in either the seal or stator cavity measuring resistivity between the probes. They shall be wired internally to the control calbe connection at the top of the motor. Float type devices located in the rotor/stator area or single probe-to-ground moisture detectors measuring continuity are not acceptable. O-ring sealed inspection plugs shall be provided in the mechanical seal oil chamber for ease of inspection, draining, and filling of oil.

E. Guide Rail / Bracket

Two stainless steel rails shall be provided to guide the pump when being raised or lowered in the sump and mount on the discharge base/elbow. Single rail or cable guide systems are not acceptable.

The rails shall align the pump with the discharge elbow as it is lowered into place.

A ductile iron upper rail bracket shall be furnished to support and align the rails at the top of the sump. For all rail lengths greater than 20 feet, a stainless steel intermediate guide bracket shall be included.

F. Lifting Chain

Each pumping unit shall be provided with a stainless steel lifting chain, and be of sufficient length to extend from the pump to the top of the wet well. The access frame shall provide a hook to attach the chain when not in use. The lifting chain shall be stainless steel, sized according to the pump weight.

G. Fits and Hardware

The volute casing, back head, and frame shall be manufactured with concentric shoulder fits to assure accurate alignment. All machine bolts, nuts, and cap screws shall be stainless steel.

2.04 PUMP DRIVE SYSTEM

A. Each submersible solids handling pump shall be driven by a completely sealed, electric submersible squirrel cage induction inverter rated motor. The motor nameplate horsepower rating shall not be exceeded by the brake horsepower requirements of the specified head and capacity requirements.

B. The submersible motor shall be U.L. Listed for class 1, Division 1, Group C & D explosion proof location as defined by the National Electric Code. All electrical components shall be housed in an air-filled, cast iron, watertight enclosure that is sealed by the use of O-rings and shall have rabbet joints with an extra overlap. Motor shall have class F insulation. Each motor shall be supplied with a Kellum Cable Grip to hold the motor control cable suspended to a bracket mounted at the top of the wetwell.

C. The stator winding and lead shall be insulated for continuous duty in 40 C rise liquids. The motor shall be designed for continuous duty capable of minimum of ten (10) starts per hour. The motor shaft shall be 416 stainless steel; the rotor to be dynamically balanced to meet NEMA vibration limits; all hardware to be stainless steel. Cable leads are to allow the connection of a cable to the motor, to be accomplished in the field without soldering cable. All leads are to be sealed and designed to prevent cable wicking to conduit box located on top of the motor. Individual wires shall have the insulation removed and epoxy potted to prevent wicking into the motor area. Grommets or similar systems are not allowed.

D. Each pump shall be provided with a tandem mechanical rotation shaft seal system. The upper seal shall be hydraulically balanced incorporating non clogging polymeric body acting as a spring mechanism with high grade carbon vs. 99.5 % ceramic faces lapped to within 3 helium light bands. The seal shall be installed using a snap ring on the polymeric

body and a positive locator machined in the ID of the polymeric body. All O-rings shall be high temperature FKM O-rings. The lower seal shall be of similar construction with the faces materials being silicon carbide vs. tungsten carbide lapped to within 3 helium light bands.

2.05 SHOP TESTS

A. Each pump shall have a non-witnessed factory test prior to their shipment from place of manufacture.

1. A complete test report for each pump, including certified characteristic curves of the pump, consisting of at least all information required in Paragraph 1.05, except for NPSH testing, and certified copies of the hydrostatic test report, shall be submitted and approved by the Engineer before the pumps are shipped.

B. Each pump being furnished under these specifications shall be factory tested in accordance with the latest edition of the Hydraulic Institute Standards. Certified copies of the Hydrostatic Test Report shall be supplied prior to conducting a pump performance test. Notification of such test and a list of test equipment and procedures shall be furnished to the Engineer at least ten working days before the schedule test date.

1. Each pump shall be tested and data recorded at its operating conditions of service as listed in Paragraph 2.02. And, the pumps shall be tested and data recorded at shut-off head. Sufficient test point readings shall be made to establish complete head flow capacity, efficiency and brake horsepower curves for each pump.

2. All gauges and other test instruments shall be calibrated within 30 days of the scheduled test and certified calibration data shall be provided. All Venturi flow meters shall be calibrated within two years of the scheduled test and certified calibration data shall be provided.

C. Pump motor tests shall be submitted for approval by Engineer prior to shipping.

2.06 SURFACE PREPARATION AND SHOP PRIME PAINTING

A. Each piece of equipment in the pumping system including pump, motor and gear shall be prepared shop-primed. The shop primer shall be compatible with the finished paint. Field painting is included in Section 09910.

3.01 PREPARATION

A. Coordinate with other trades, equipment and systems to the fullest extent possible.

B. Take all necessary measurements in the field to determine the exact dimensions for all work and the required sizes of all equipment under this contract. All pertinent data and dimensions shall be verified.

3.02 INSTALLATION

A. Installation shall be in strict accordance with the manufacturer's instructions and recommendations in the locations shown on the Drawings. Anchor bolts shall be set in accordance with the manufacturer's recommendations and setting plans.

B. Qualified supervisory services, including manufacturers' engineering representatives, shall be provided for a minimum of 2 man-days to insure that the work is done in a manner fully approved by the respective equipment manufacturer. The pump manufacturer's representatives shall specifically supervise the installation and alignment of the pump with the driver, the grouting, and the alignment of the connection piping and the installation of the field-installed mechanical seal. If there are difficulties in the start-up or operation of the equipment due to the manufacturer's design or fabrication, additional service shall be provided at no cost to the Owner. Services of the manufacturer's representatives and training shall be provided when the first pump is started, with follow-up visits upon start-up of each subsequent pump.

C. Connection of piping to pumps shall be done in presence of the Engineer. All piping connections to the pump shall be done without bending and/or twisting the piping to mate with the pump flange connections.

D. A certificate from each equipment manufacturer shall be submitted stating that the installation of his/her equipment is satisfactory, that the equipment is ready for operation and that the operating personnel have been suitably instructed in the operation, lubrication and care of each unit.

3.03 FIELD TESTS

A. In the presence of the Engineer, such tests as necessary to indicate that the pumps, motors, and variable speed drives generally conform to the efficiencies and operating conditions specified shall be performed. A ten-day operating period of the pumps will be required before acceptance. If a pump performance does not meet the Specifications, corrective measures shall be taken or the pump shall be removed and replaced with a pump which satisfies the conditions specified All test procedures shall be in accordance with Hydraulic Institute Standards certified results of tests shall be submitted. Provide, calibrate and install all temporary gauges and meters, shall make necessary tapped holes in the pipes, and install all temporary piping and wiring required for the field acceptance tests. Written test procedures shall be submitted to the Engineer for approval 30 days prior to testing.

SECTION 400519

DUCTILE IRON PROCESS PIPE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ductile-iron pipe.
2. Ductile-iron, malleable-iron, and cast-iron fittings.
3. Accessories.

1.2 REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
2. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings.
4. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. AWWA C115 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
6. AWWA C150 - Thickness Design of Ductile-Iron Pipe.
7. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast.
8. AWWA C153 - Ductile-Iron Compact Fittings.

B. ASME International:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
2. ASME B31.3 - Process Piping.

C. ASTM International:

1. ASTM A48 - Standard Specification for Gray Iron Castings.

D. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

E. Society for Protective Coatings:

1. SSPC SP 6 - Commercial Blast Cleaning.

1.3 COORDINATION

A. Coordinate Work of this Section with piping and equipment connections specified in other Sections and indicated on Drawings.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer information regarding pipe and fittings.

B. Shop Drawings: Indicate layout of piping systems including equipment, critical dimensions, sizes, and materials lists.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

F. Qualifications Statements:

1. Submit qualifications for manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of piping, valves, and other appurtenances, connections, and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

A. Permanently mark each length of pipe with manufacturer's name or trademark and indicate conformance to standards.

B. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years' documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Inspection: Accept materials on-Site in manufacturer's original packaging and inspect for damage.

B. Store materials according to manufacturer instructions.

C. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Protect piping and appurtenances by storing off ground.
3. Provide additional protection according to manufacturer instructions.

1.9 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 DUCTILE IRON PIPE AND FITTINGS

A. Piping:

1. Comply with AWWA C151.
2. Pressure Rating: As indicated on piping schedule.

B. Fittings:

1. Material: AWWA C153, ductile iron.
2. Pressure Rating: Equal to, or greater than that of connected piping.
3. Mechanical Joints:
   a. Comply with AWWA C153 and AWWA C111.
   b. Glands: Ductile iron with asphaltic coating.
   c. Push-on Joints: Comply with AWWA C111.
4. Restrained Joints: Comply with AWWA C111.
5. Flanged Fittings: Comply with AWWA C110.

C. Outside Coating:

1. Buried Service:
   a. Type: Asphaltic.
   b. Thickness: 0.04 inch.
2. Exposed Service: Shop coat primer required for coating system indicated on piping schedule.

2.2 ACCESSORIES

A. Jackets:

1. Description:
   a. Material: Polyethylene.
   b. Comply with AWWA C105.

B. Gaskets: Rubber.

C. Special Interior Lining:

1. Amine-Cured Epoxy Lining:

   a. Potable Water Service:
      1) Comply with AWWA C116 and NSF 61.
      2) Minimum Total Thickness: 16 mils
      3) Maximum Per-Coat Thickness: 6 mils

   b. Wastewater Service:

      1) Novaloc Epoxy
      2) Minimum Total Thickness: 40 mils
      3) HAPS Concentration: 0 percent
      4) Coal Tar Concentration: 0 percent
      5) Ceramic Spheres: 20 percent by volume, minimum
      6) Approved Products:
         a) Permox CTF, Permite Corporation
         b) 431 PL, Tnemec Corporation

2.3 SOURCE QUALITY CONTROL

A. Provide shop inspection and testing of completed assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field dimensions are as indicated on Drawings.

B. Inspect existing flanges for nonstandard bolt hole configurations or design and verify that new pipe and flange mate properly.

3.2 PREPARATION

A. Thoroughly clean pipe and fittings before installation.

B. Surface Preparation:

1. Clean surfaces to remove loose rust, mill scale, and other foreign substances by power wire brushing.
2. Touch up shop-primed surfaces with primer for coating system noted on pipe schedule.
3. Solvent-clean surfaces that are not shop primed.

3.3 INSTALLATION

A. Exposed Service Piping:

1. According to ASME B31.3.
2. Run piping straight along alignment as indicated on Drawings with minimum number of joints.

B. Fittings:

1. According to manufacturer instructions.
2. Clean gasket seats thoroughly and wipe gaskets clean prior to installation.
3. Tighten bolts progressively, drawing up bolts on opposite sides until bolts are uniformly tight; use torque wrench to tighten bolts to manufacturer instructions.
4. Provide required upstream and downstream clearances from devices as indicated on Drawings.

C. Make taps to ductile iron piping only with service saddle, tapping boss of a fitting or valve body, or equipment casting.

D. Install piping with sufficient slopes for venting or draining liquids and condensate to low points.

E. Dielectric Fittings: Provide between dissimilar metals.

F. Field Cuts: According to pipe manufacturer instructions.

G. Finish primed surfaces according to pipe schedule.

3.4 FIELD QUALITY CONTROL

A. Inspection:

1. Inspect for damage to pipe lining or coating and for other defects that may be detrimental as determined by Engineer.
2. Repair damaged piping or provide new, undamaged pipe.
3. After installation, inspect for proper supports and interferences.

B. Pressure Testing:

1. Test Pressure: As specified in piping schedule.

2. Conduct hydrostatic test for minimum two (2) hours.

3. Filling:
   a. Fill section to be tested with water slowly and expel air from piping at high points.

b. Install corporation cocks at high points.
c. Close air vents and corporation cocks after air is expelled.
d. Raise pressure to specified test pressure.

4. Observe joints, fittings, and valves under test.

5. Remove and renew cracked pipe, joints, fittings, and valves showing visible leakage and retest.

6. Leakage:
   a. Correct visible deficiencies and continue testing at same test pressure for additional two (2) hours to determine leakage rate.
   b. Maintain pressure within ± 5 psi of test pressure.
   c. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.
   d. Compute maximum allowable leakage by following formula:

      1) L = SD x sqrt(P)/C.
      2) L = testing allowance in gph.
      3) S = length of pipe tested in feet.
      4) D = nominal diameter of pipe in inches.
      5) P = average test pressure during hydrostatic test in psig.
      6) C = 148,000.
      7) If pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

   e. If test indicates leakage greater than allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits.
   f. Correct visible leaks regardless of quantity of leakage.

3.5 CLEANING

A. Keep pipe interior clean as installation progresses.

B. After installation, clean pipe interior of soil, grit, and other debris.

END OF SECTION 400519

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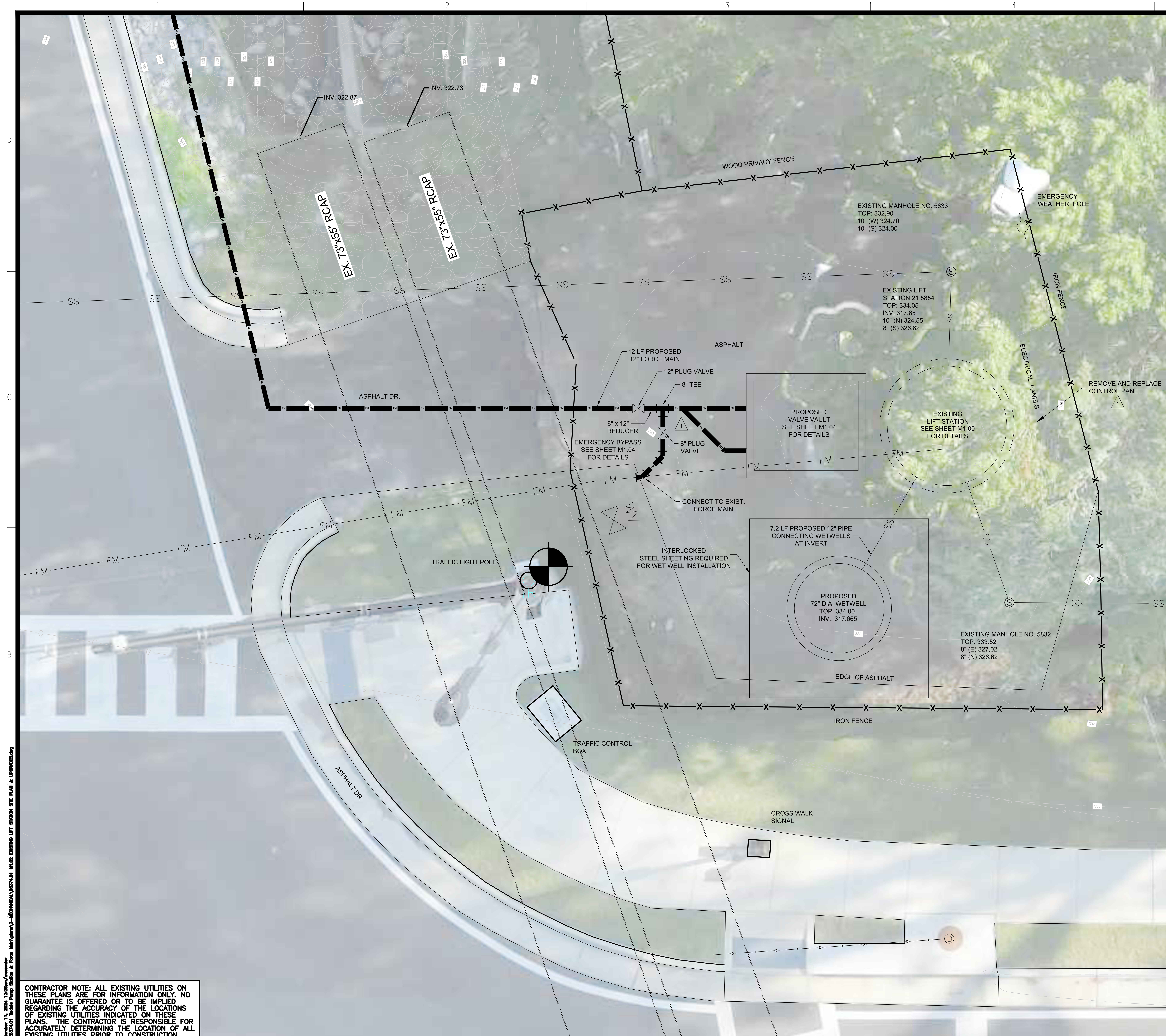

GENERAL NOTES: (1)

1. SHEETED PIT FOR WET WELL INSTALLATION TO BE DESIGNED AND STAMPED BY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MISSISSIPPI.
2. EXISTING FENCE SHALL BE REMOVED AND SALVAGED TO OWNER. NEW WOODEN FENCE SHALL BE CONSTRUCTED TO MATCH ADJACENT FENCING.PROVIDE DOUBLE SWING GATE OF MATCHING WIDTH W/ LOCK.
3. ALL MATERIALS AND WORK INSIDE PERIMETER OF LIFT STATION FENCE SHALL BE PAID FOR AS LIFT STATION UPGRADES.
4. BURIED PIPING INSIDE PERIMETER OF LIFT STATION SHALL BE DUCTILE IRON W/ MECHANICAL JOINTS; PIPING IN VALVE VAULT SHALL BE DUCTILE IRON W/FLANGED FITTINGS; PIPING IN WET WELL SHALL BE SCH. 304 STAINLESS STEEL.

ELECTRICAL NOTES (1)

1. UPDATE EXISTING ELECTRICAL SUPPLY FROM 230V TO 460V FOR NEW PUMPS; REMOVE AND REPLACE EXISTING CONTROL PANEL.
2. ALL JUNCTION BOXES, CABINETS, EXPOSED CONDUIT FITTINGS AND SUPPORTS SHALL BE 304 STAINLESS STEEL. CONDUIT BELOW GRADE SHALL BE PVC.
3. PROVIDE MOUNTING SUPPORTS AS REQUIRED FOR ALL CONDUIT, FITTINGS, CABINETS AND BOXES.
4. COORDINATE THE EXACT LOCATION OF WET WELL PENETRATIONS AND JUNCTION BOXES ON THE WET WELL WITH THE PUMP AND EQUIPMENT INSTALLER OR CIVIL ENGINEER.
5. PROVIDE A NEMA 4X JUNCTION BOX FOR THE LEVEL TRANSDUCER AND FLOAT SWITCH CABLES AND WIRING. PROVIDE TERMINAL STRIPS AS REQUIRED.
6. PROVIDE A NEMA 4X JUNCTION BOX FOR THE PUMP FEEDER AND CABLE, SIZE AS REQUIRED, PROVIDE LUGS AND TERMINAL STRIP AS REQUIRED.
7. THE ALARMS AND FUNCTIONS FOR THE PUMP STATION SHALL BE FULLY INTEGRATED INTO THE OWNER'S EXISTING SCADA SYSTEM.

PROPOSED 72" DIA. WET WELL (1)

1. PRECAST WET WELL SHALL INCLUDE FLAT SLAB TOP W/ ALUMINUM ACCESS HATCH AND FALL PROTECTION.
2. PRECAST WET WELL SHALL INCLUDE PRECAST BASE SECTION MIN. 12" THICKNESS W/ EXTENDED BASE MIN. 6".

CONTRACTOR NOTE: ALL EXISTING UTILITIES ON THESE PLANS ARE FOR INFORMATION ONLY. NO GUARANTEE IS OFFERED OR TO BE IMPLIED REGARDING THE ACCURACY OF THE LOCATIONS OF EXISTING UTILITIES INDICATED ON THESE PLANS. THE CONTRACTOR IS RESPONSIBLE FOR ACCURATELY DETERMINING THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

NORTH

0 3 6

SCALE: 1" = 3'

REVISIONS:

1	REV. 09-24	ADD EMERGENCY BYPASS, NOTES & CTRL PANEL

PROJECT #:	26374.01
DATE:	JUNE 2024
DRAWN BY:	JLC
DESIGNER:	JNM
CHECKED BY:	DMT

Pickering
Pickering Firm, Inc.
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2001 Airport Drive, Suite 201
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CITY OF MADISON
TISDALE PUMP STATION & FORCE MAIN
Madison, Mississippi

SEAL:

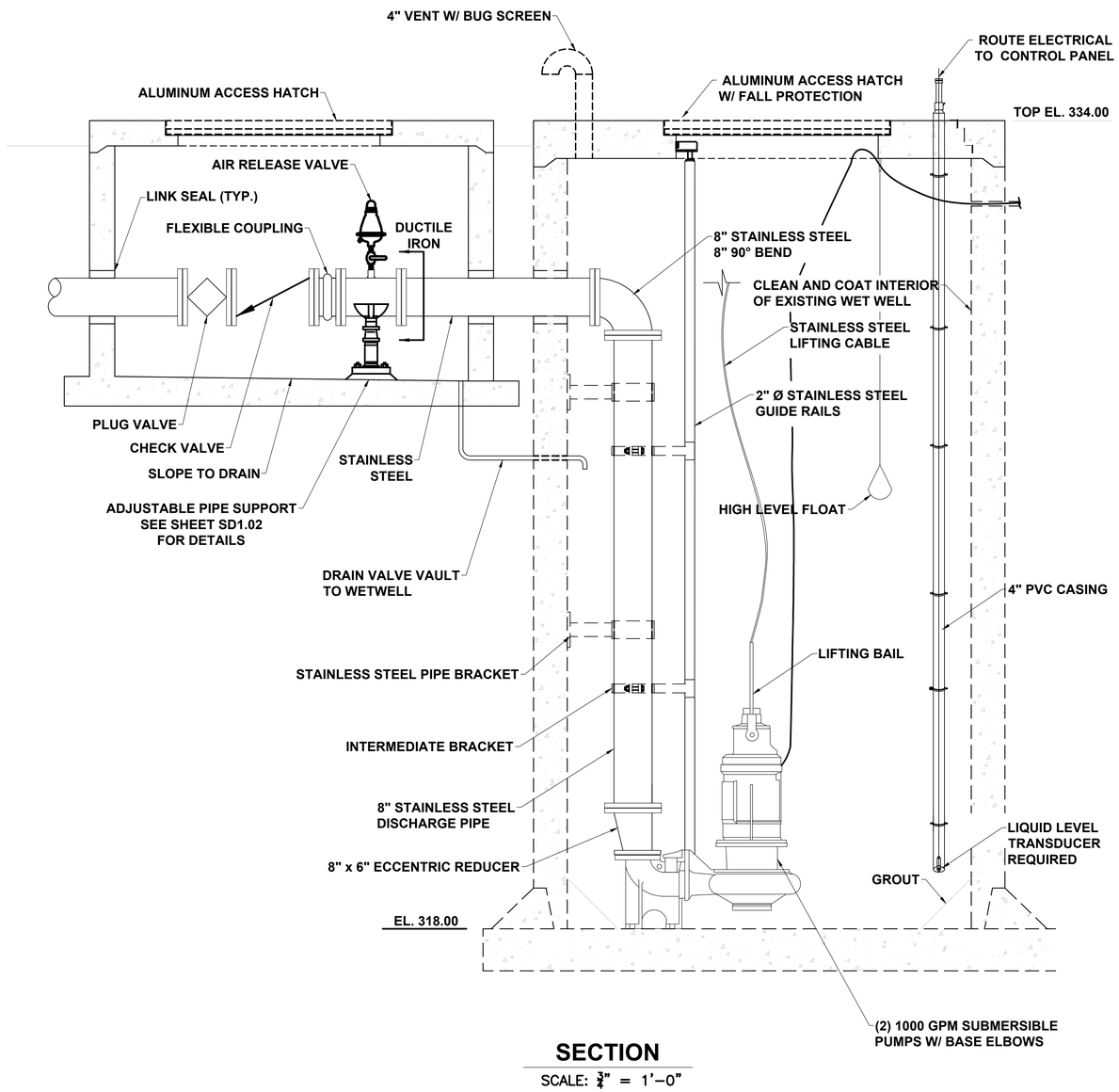
JONATHAN NORMAN MCLEOD
LICENSED PROFESSIONAL ENGINEER
31440
STATE OF MISSISSIPPI
8/14/24

SHEET NUMBER:

M1.02

DESCRIPTION:

EXISTING LIFT STATION SITE PLAN & UPGRADES

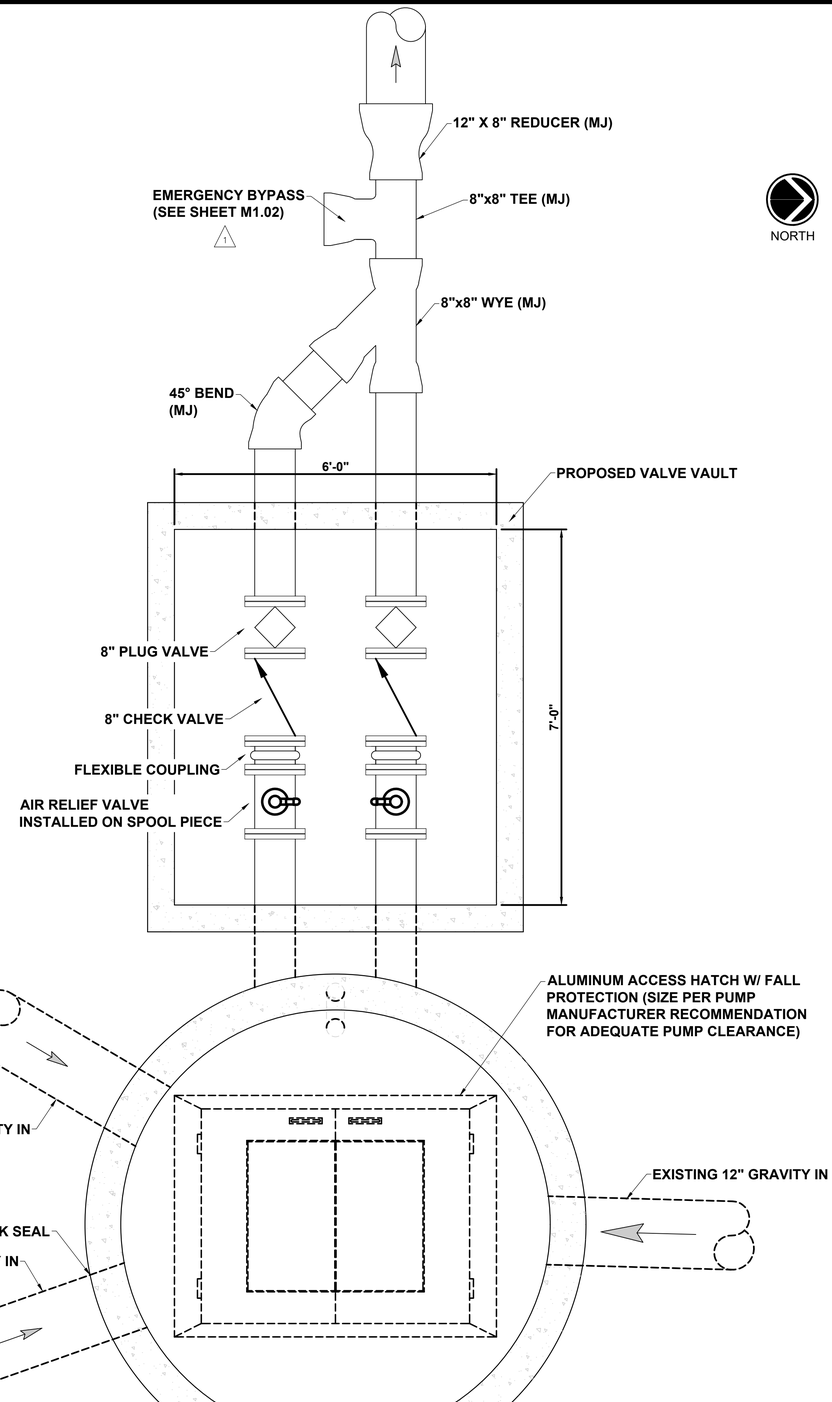


SECTION

SCALE: ¾" = 1'–0"

NOTE:
EXISTING WET WELL SHALL BE CLEANED AND COATED IN ACCORDANCE W/ SPEC SECTION 09885-2, WITH GEOPOLYMER LINER; 1 1/2" THICKNESS.

SCALE: ¾" = 1'–0"



NORTH

PUMP STATION REHAB

SCALE: ¾" = 1'–0"

NOTE:
EXISTING WET WELL SHALL BE CLEANED AND COATED IN ACCORDANCE W/ SPEC SECTION 09885-2, WITH GEOPOLYMER LINER; 1 1/2" THICKNESS.

SCALE: ¾" = 1'–0"

REVISIONS:

1	REV. 09–24	ADD EMERGENCY BYPASS

PROJECT #:	26374.01
DATE:	JUNE 2024
DRAWN BY:	JLC
DESIGNER:	JNM
CHECKED BY:	DMT

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CITY OF MADISON
TISDALE PUMP STATION & FORCE MAIN
Madison, Mississippi

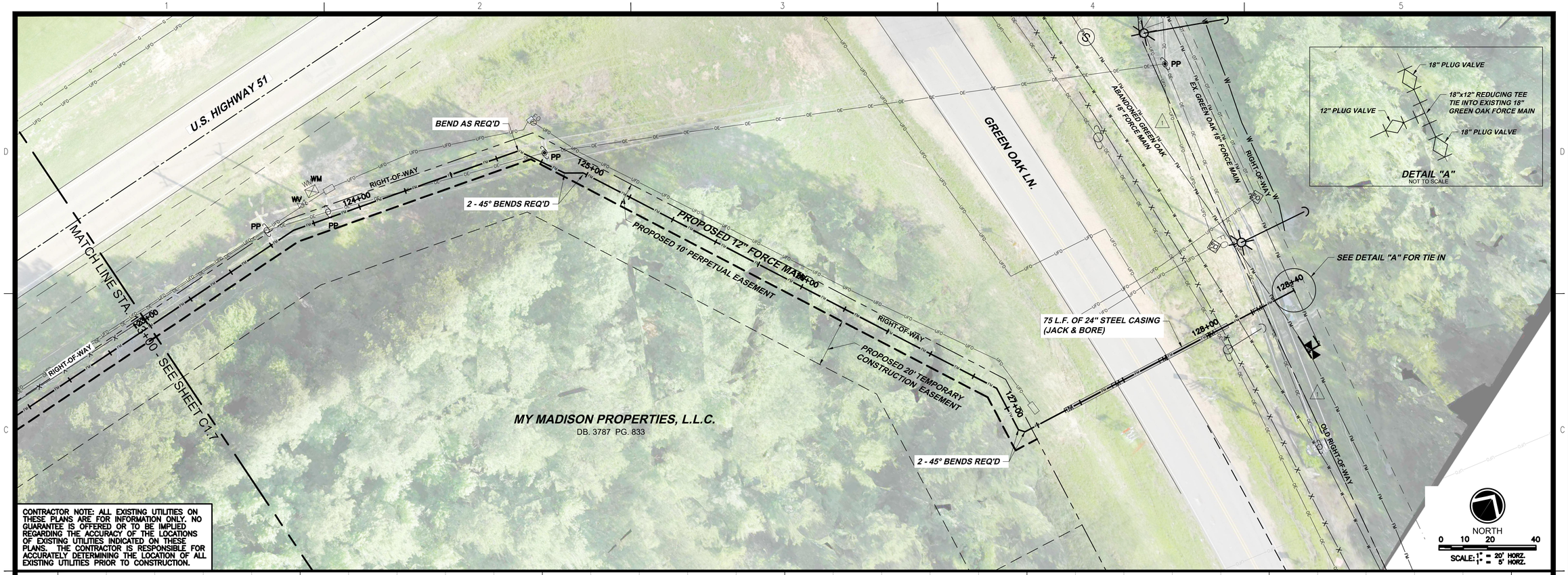
SEAL:

8/14/24

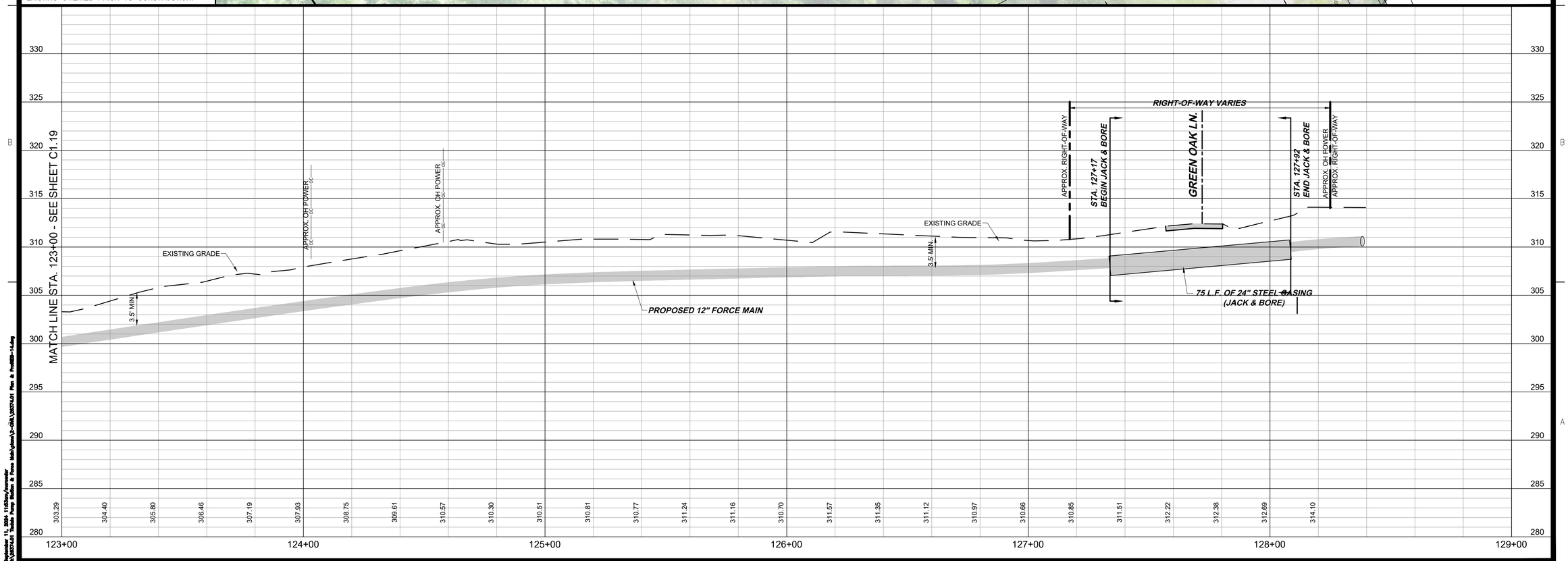
SHEET NUMBER:

M1.04

DESCRIPTION:
PROPOSED LIFT STATION REHABILITATION



CONTRACTOR NOTE: ALL EXISTING UTILITIES ON THESE PLANS ARE FOR INFORMATION ONLY. NO GUARANTEE IS OFFERED OR TO BE IMPLIED REGARDING THE ACCURACY OF THE LOCATIONS OF EXISTING UTILITIES INDICATED ON THESE PLANS. THE CONTRACTOR IS RESPONSIBLE FOR ACCURATELY DETERMINING THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.



REVISIONS:

1	REV. 09-24	ADD TOPOGRAPHIC INFORMATION

PROJECT #:	26374.01
DATE:	JUNE 2024
DRAWN BY:	JLC
DESIGNER:	JNM
CHECKED BY:	DMT

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CITY OF MADISON
TISDALE PUMP STATION & FORCE MAIN
Madison, Mississippi

SEAL:

JONATHAN NORMAN MCLEOD
LICENSED PROFESSIONAL ENGINEER
31440
STATE OF MISSISSIPPI
8/14/24

SHEET NUMBER:

C1.20

DESCRIPTION:

PLAN & PROFILE
STA. 123+00 - STA. 128+23

September 11, 2024 11:03am/mcmeeller
J:\26374.01 Tisdale Pump Station & Force Main\Layouts\X--26A\26374.01 Plan & Profile-14.dwg