

SECTION 00900

ADDENDUM NO. 2

TO PROSPECTIVE BIDDERS UNDER
 Purrysburg Road Water Line – Phase 1
 Beaufort Jasper Water Sewer Authority (BJWSA)
 Okatie, South Carolina

RECEIPT OF THIS ADDENDUM MUST BE ACKNOWLEDGED IN THE
 SPACE PROVIDED IN THE BID FORM IN SECTION 00410

Addendum Item	Page or Drawing	Location and Description of Change
PART A - BIDDING AND CONTRACT REQUIREMENTS		
1.	00020-1	Project Manual Section 00020, Invitation to Bid; REVISE the first sentence of the first paragraph to, “Sealed bids for the construction of the Purrysburg Road Water Line Project will be received by the Owner, Beaufort-Jasper Water and Sewer Authority, 6 Snake Road, Okatie, SC 29909 until 2:00 pm Thursday, February 16, 2012.”
2.	00410-4	Project Manual Section 00410, Bid Form, Article 5 - Basis of Bid REPLACE the Article with the one provided in Attachment 1 of this Addendum.
3.	00423-1	Project Manual Section 00423, Certification of Bidder’s Experience and Qualifications, REVISE the first bullet in the 3 rd paragraph to the following: <ul style="list-style-type: none"> • Within the past 15 years, has self-performed the installation of 100,000 feet of 16-inch or larger diameter water or sewer pipeline; 30,000 feet of which is 30-inches or larger – <u>Complete the project experience summary table in Attachment C.</u>
4.	00423-7	Project Manual Section 00423, Certification of Bidder’s Experience and Qualifications, Attachment C, Project Experience Summary, REVISE the first sentence to read, “ In the table below, indicate projects within the past 15 years that the Bidder has self-performed the installation of 100,000 feet of 16-inch or larger diameter water or sewer pipeline; 30,000 feet of which is 30-inches or larger.”

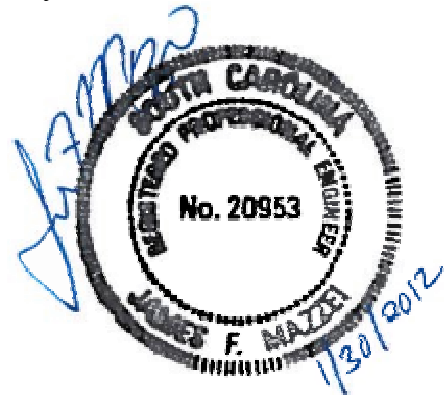
PART B - TECHNICAL SPECIFICATIONS

5.	01025-11	<p>Project Manual Section 01025, Measurement and Payment, ADD the following paragraph:</p> <p style="padding-left: 40px;">“1.32 Installation of Steel Casing Via Pipe Ramming</p> <p style="padding-left: 80px;">A. Measurement: The bid item for installing steel casing via pipe ramming includes all work necessary for the installation of a steel casing at the size indicated. The work shall include site preparation, pit excavation, shoring, sheeting and bracing, installing the casing as specified in Section 02451 and on the Drawings, restoration, clean-up and testing. The basis for measurement shall be linear feet, to the nearest whole number, measured along a horizontal plane from the face of the casing to the face of the casing. Installation of the carrier pipe shall be paid separately.</p> <p style="padding-left: 80px;">B. Payment: Payment for installing steel casing via pipe ramming shall be made at the quantity authorized, in linear feet, for the specified casing diameter at the unit price indicated on the Bid.”</p>
6.	02200-10	<p>Project Manual 02200, Earthwork, Item 3.04, Earthwork for Pipelines and Conduits, REVISE the first sentence in Paragraph 3.04.C.3.b. to the following:</p> <p style="padding-left: 40px;">“Improved Areas: Unless otherwise specified, select granular backfill (Class A1) shall be used under all paved and unpaved roadways.”</p>
7.	02200-11	<p>Project Manual 02200, Earthwork, Item 3.04, Earthwork for Pipelines and Conduits, REVISE the first and second sentences in Paragraph 3.04.C.3.c. to the following:</p> <p style="padding-left: 40px;">“Unimproved Areas: Class C1 backfill shall be used for all trenches in pastureland, cultivated land, undeveloped land, easements, and for other unimproved areas where specified. Class C1 backfill may be used in unimproved public rights-of-way (i.e. not a roadway).”</p>
8.	02451	<p>ADD Section 02451, Pipe Ramming, to the Project Manual. This section is included as Attachment 2 to this Addendum. Include this section in the table of contents and on the Division 2 list of specifications.</p>
9.	BJWSA Technical Specs	<p>BJWSA Standard Specifications, Chapter 2, Earthwork, Item 2.3, Clearing and Grubbing; REVISE Paragraph C.1 to the following:</p> <p style="padding-left: 40px;">“The Contractor shall haul off and properly dispose all trees cut down.”</p>

PART C - DRAWINGS		
10.	000-C-001	Drawing Number 000-C-001, Detail G, Asphalt Pavement Replacement, ADD the following note: “Detail for High Volume Roadway applies to Purrysburg Road (S-27-34) on Drawing Numbers 100-C-005 and 100-C-009. Detail for Low Volume Roadway applies to driveways, non-SCDOT roadways, and parking lots.”
11.	200-C-001	Drawing Number 200-C-001, REVISE the call out for the casing installation under the storm water canal to “Install 100 feet of 48-inch steel casing via pipe ramming.” The approximate ends of the casing will be at Station 2+36 and 3+36. The location of the fittings and valves immediately north and south of the casing installation shall be moved relative to the ends of the casing in order to accommodate the additional casing length. The contractor shall be responsible for final field determination the launch and retrieval pit locations, which shall be part of the pre-work submittal per Section 02451.
12.	300-C-008	Drawing Number 300-C-008, REVISE the call out for Station 103+32 to indicate a 36”x8” Tee, MJ.
13.	400-C-004	Drawing Number 400-C-004, REVISE the call out for Station 53+89 to, “Tie new 36” water main to existing 12” water main.”

This addendum shall be incorporated into and made a part of the project manual. The deadline for submitting questions is 12:00 p.m. on Monday February 13, 2012.

END OF SECTION



ARTICLE 1 – BASIS OF BID

5.01 Bid items 1 through 48 include all work set forth under the contract necessary to construct the Project. Bid prices shall be as specified in Section 01025. The total amount bid shall be determined by the addition of all price items.

Abbreviations used in the Bid Schedule are defined as follows:

LF--linear feet	TN—ton	LS--lump sum
CY--cubic yards	EA--each	SY--square yards
RJ--restrained joint	MJ--mechanical joint	CL—class
CA--cash allowance	DR--dimension ratio	RJ – restrained joint
fPVC—fusible PVC	HV--high volume	LV--low volume
HDD—horizontal directional drill		

Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

UNIT PRICE ITEMS

Item No.	Quantity	Unit	Description	Unit price	Extended total price
1	42,510	LF	36" DIP Water Main, CL 150		
2	13,520	LF	36" DIP Water Main, CL 150, RJ		
3	1,250	LF	36" DIP Water Main, CL 150, RJ, In Casing		
4	1,285	LF	36" fPVC Water Main Installed via HDD		
5	40	LF	18" DIP Water Main, CL 250, RJ		
6	90	LF	12" DIP Water Main, CL 350, RJ		
7	70	LF	8" DIP Water Main, CL 350, RJ		
8	50	LF	6" DIP Water Main, CL 350, RJ		
9	50	LF	6" DIP Water Main, CL 350, RJ, In Casing		
10	130	LF	6" DIP Hydrant Lead, CL 350, RJ		
11	20	LF	2" HDPE Water Line, IPS, D-3035, DR9		
12	2	EA	Fittings: 36" DIP, MJ Bend		
13	71	EA	Fittings: 36" DIP, RJ Bend		
14	25	EA	Fittings: 36" DIP, RJ x MJ Tee		
15	3	EA	Fittings: 36" DIP, RJ Plug		
16	12	EA	Fittings: 36" DIP, MJ Sleeve		
17	4	EA	Fittings: 18" DIP, MJ Plug		
18	4	EA	Fittings: 12" DIP, MJ Bend		

Item No.	Quantity	Unit	Description	Unit price	Extended total price
19	2	EA	Fittings: 8" DIP, MJ Bend		
20	16	EA	Fittings: 8"x6" DIP, MJ Reducer		
21	2	EA	Fittings: 6" DIP, MJ Bend		
22	30	EA	36" Butterfly Valve w/ Box		
23	4	EA	18" Butterfly Valve w/ Box		
24	14	EA	8" Gate Valve w/ Box		
25	1	EA	2" Gate Valve w/ Box		
26	2	EA	8" x 8" Tapping Sleeve & Valve		
27	1	EA	6" x 6" Tapping Sleeve & Valve		
28	1	EA	36" x 2" Tapping Saddle		
29	13	EA	2" Air Release Valve		
30	3	EA	12" Blow Off Assembly		
31	14	EA	Fire Hydrant		
32	10	EA	Relocate Existing Fire Hydrant		
33	1160	LF	Bore & Jack 48" Steel Casing		
34	50	LF	Bore & Jack 12" Steel Casing		
35	100	LF	Install 48" Steel Casing via Pipe Ramming		
36	1,025	LF	Remove & Replace Asphalt Pavement (HV)		
37	1,750	LF	Remove & Replace Asphalt Pavement (LV)		
38	1,000	LF	Remove & Replace Gravel Roadway		
39	3,200	SY	Resurface Asphalt Pavement		
40	350	CY	Flowable Fill		
41	500	TN	Trench Stabilization		

Subtotal items 1 through 41

\$

LUMP SUM ITEMS

Item No.	Unit	Description	Total price
42	LS	Mobilization (not to exceed 5% of total bid)	
43	LS	Erosion & Sedimentation Control	
44	CA	Construction Verification Surveying Cash Allowance	\$ 20,000.00
45	CA	Soils & Materials Testing Cash Allowance	\$ 20,000.00
46	CA	Subsurface Utility Engineering Cash Allowance	\$ 20,000.00
47	CA	Existing Utility Relocation Cash Allowance	\$ 100,000.00
48	CA	Contingency Cash Allowance	\$ 100,000.00

Subtotal items 42 through 48 \$ _____

TOTAL BID FOR ALL LUMP SUM AND UNIT PRICE ITEMS

_____ Dollars \$ _____

Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

All specified cash allowances are included in the price(s) set forth above and have been computed in accordance with Paragraph 11.02 of the General Conditions.

SECTION 02451

PIPE RAMMING

PART 1 – GENERAL

1.01 DESCRIPTION

A. SCOPE:

This section specifies installing steel casing by the pipe ramming method. For the purpose of this Section, pipe ramming is defined as the trenchless installation of a casing by pushing the casing pipe using a pneumatically powered driving device, within which a carrier pipe that be installed for the conveyance of water.

The Contractor shall provide all equipment, labor, materials and services required to complete the work specified in this Section.

B. DEFINITIONS:

Pipe Ramming: A non-steerable system of forming a bore by driving an open-ended casing using a percussive hammer from a pit and only displacing the wall thickness of the casing. The soil will remain in the casing until the bore has been completed and then may be removed by water, auguring, jet-cutting or compressed air.

Drive/Launch Pit: A pit used for "launching" a trenchless technology excavation tool.

Launch Seal: A mechanical seal, usually comprised of a rubber flange that is mounted to the wall of the drive pit. The flange seal is distended by the pipe as it passes through creating a seal to prevent groundwater or lubrication inflow into the pit during ramming operations.

Locator: An electronic instrument used to determine the position of the leading edge of the pipe.

Reception/Exit Shaft/Pit: Excavation into which trenchless technology equipment is driven and recovered following the installation of the product pipe.

Reinstatement: The backfilling, compaction and resurfacing of any excavation in order to restore the surface and underlying structure to enable it to perform its original function.

Retrieval Seal: A mechanical seal usually comprised of a rubber flange that is distended by the pipe. It is similar to the launch seal but used during the holing-out operation, and serves to keep water from infiltrating into the reception pit.

Sliplining: Insertion of new pipe by pushing it into the existing pipe.

C. OPERATING CONDITIONS:

Work is to be completed in accordance with the Contract Documents.

If person entry is required, provide adequate ventilation. Design ventilating system to include such factors as the volume required to furnish fresh air and the volume to remove dust and vapor.

Provide adequate lighting for the nature of the activity being conducted by workers. Separate both power and lighting circuits and thoroughly insulate. The lighting voltage shall not exceed 120 VAC protected by a ground fault circuit interrupter.

1.02 QUALITY ASSURANCE

A. CODES AND STANDARDS:

This section contains references to the following Codes and Standards. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the Codes and Standards, the requirements of this section shall prevail.

ASTM – American Society for Testing and Materials
AWS – American Welding Society
SCDOT – South Carolina Department of Transportation

B. QUALITY CONTROL:

The Engineer will witness field tests specified in this section.

Perform field tests and provide labor, equipment, and incidentals required for testing. Produce evidence, when required, that each item of work has been constructed properly in accordance with the drawings and specifications.

Each straight run of casing pipe shall be checked for gross deficiencies by holding a light in the casing; it shall show a practically full circle of light through the casing when viewed from the adjoining end of line.

Contractor shall establish and maintain quality control for operations under this section to assure compliance with contract requirements and maintain records of his quality control for materials, equipment, and construction operations including but not limited to the following:

1. Check pipe for conformance to approved certified tests, and ensure that there is no mid seam welds or if there are they be certified as 100% penetration weld.
2. Check pipe for proper storage and handling.

3. Discuss and review pipe installation procedure with Engineer to include placing of pipe, joint preparation and application of each pipe used.
4. Check for proper depth and grade for pipe.
5. Check method of joining pipes.
6. Check the pipe for proper alignment.

1.03 DESIGN REQUIREMENTS

Design casing pipe for leakproof construction. The casing length shall be as shown on the Drawings. The Contractor may extend the casing length if approved by the Engineer at no additional cost to the Owner.

1.04 QUALIFICATIONS

The pipe ramming contractor must have successfully completed four pipe ramming projects, or installed over 1000 feet of steel casing in grade bore/difficult soil situations within North America in the last five years using pipe ramming equipment and materials of the type that meet the minimum requirements of the job specification.

The project superintendent shall have at least three years of pipe ramming experience and shall have worked on at least two projects in similar ground conditions using equipment similar to the equipment required for this project. The operator shall have at least two years of pipe ramming experience and shall have worked on at least one pipe ramming project using the same equipment required for this project.

Unless otherwise directed by the Engineer, a representative from the pneumatic pipe pushing equipment shall be on-site to review the setup prior to commencing pipe ramming, and during the pipe ramming activities.

1.05 SUBMITTALS

The following submittals shall be provided in accordance with Section 01300:

1. Submit for approval complete working drawings showing details of the proposed method of construction and the sequence of operations to be performed during construction. Show the method of pipe ramming, including the ramming system to be used, location of working pits including method of excavation, shoring and bracing appurtenance installation, and dewatering techniques that are proposed to be used. These submittals shall include:
 - a. A detailed description of the pipe ramming procedure including construction techniques to provide the access required to install pipe in conformance with Contract Documents.

- b. Manufacturer's literature describing in detail the pipe ramming system to be used. Include a detailed description of projects on which this system has been successfully used including the names, addresses and telephone numbers of owner's representatives for these projects as well as length, diameter, and pipe material used.
- c. Calculations and drawings indicating limits of access pits and any ground support to be utilized.
- d. Methods of spoils disposal.
- e. A groundwater stabilization scheme covering the excavations for starter and receiver pits. Verify this plan to stabilize anticipated unstable soil conditions. Such verifications shall include all calculations and detail drawings for methods of controlling groundwater.
- f. Certification by the pipe ramming manufacturer of the thrust, condition, and operational characteristics of all equipment to be used for installing the specified casing pipe. The equipment shall employ a spoil removal system. The system shall include a safeguard to prevent caving beyond the outside diameters of the pipe.
- g. Working Drawings, including the following pages:
 - 1) Layout of pipe ramming and ancillary equipment at each pit location.
 - 2) Shop drawings including configuration of cutter head shoe and overcut.
 - 3) Spoil removal system details.
 - 4) Pipe lubrication system details.
 - 5) Grade and alignment control system details.
 - 6) Groundwater control provisions.
- h. Details of mucking system and soil disposal methods.
- i. Calculations demonstrating that the pipe selected has been designed to support the maximum anticipated earth loads and superimposed live loads, both static and dynamic, which may be imposed on the pipe. Determine the additional stresses imposed on the pipe during

ramming operations and upgrade the quality and strength of the pipe and pipe joints to extent necessary to withstand the additional stresses imposed by the ramming operation. The details shall be submitted for approval.

- j. Complete information on Contractor's safety plan for personnel conducting the ramming operations and appurtenance installation. The plan shall include provisions for lighting and electrical safeguards, if applicable.
 - k. Keep and maintain at the construction site a complete set of field drawings for recording as built conditions. It shall have marked or noted there on all field information, properly dated, recording as built conditions. This set of drawings shall be kept up to date.
 - l. Casing pipe certification of compliance.
 - m. Casing pipe jointing method and details.
 - n. All contractor submittals requiring structural design shall be signed by a professional civil or structural engineer registered in the State of South Carolina.
 - o. Written documentation summarizing the qualifications of the project, superintendent, operators, and site safety representative.
2. Record actual locations of casing, carrier pipe, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities. Submit a log of the ramming operations consisting of the following:
- a. The position of the pipe in relation to the design line and grade.
 - b. The date, the starting time, and the finish time.
 - c. Inclination.
 - d. Advance rates.
 - e. Hammer strokes per minute.
 - f. Operating pressure.
 - g. Muck quantities removed.

3. Submit a separate hand log tracking pipe lubricant used in gallons, its viscosity, and pumping pressure. Log shall be submitted daily.
4. The Engineer will base the review of submitted details and data with consideration of requirements for the completed work, utilities, and the possibility of unnecessary details in the execution of the work to be constructed under this contract.
5. Equipment and installation methods shall be adequate to preserve quality of pipe.

1.06 COORDINATIONS

Convene a pre-installation meeting with the Owner, Engineer, Contractor, SCDOT district engineer a minimum of two weeks prior to commencing work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

Accept system components on site in manufacturer's original containers or configuration. The Contractor shall periodically inspect for damage.

Use wooden shipping braces between layers of stacked pipe. Stack piping lengths no more than 3 layers high.

Support casing and carrier pipes with nylon slings during handling.

1.08 ENVIRONMENTAL REQUIREMENTS

Conduct operations so as not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

Perform and maintain erosion, sedimentation and dust control in accordance with Section 02270.

PART 2 – PRODUCTS

2.01 CASING PIPE MATERIALS

Steel casing pipe shall meet the requirements of ASTM A53/A53M, Grade B, 35,000 psi minimum yield strength with full circumference welded joints in accordance with AWS D1.1 to withstand excavation forces.

The steel casing pipe shall have a minimum wall thickness as shown in the following tables and on the Drawings. These thicknesses are the minimum, and may need to be increased depending on actual site conditions that may impact forces exerted on the pipe. The Contractor may opt to use a steel casing pipe with a larger wall thickness if approved by the Engineer and at no additional cost to the Owner.

Carrier Pipe Diameter (in)	Casing Pipe Diameter (in)	Casing Pipe Wall Thickness (in)
6	12	0.2500
8	16	0.3125
10	16	0.3125
12	20	0.3750
16	26	0.4375
18	30	0.5000
20	30	0.5000
24	36	0.5625
30	42	0.5625
36	48	0.6250
42	54	0.7500

All steel casing pipe shall be square cut with beveled ends for welding.

Steel casing pipe shall have a roundness such that the difference between the major and minor outside diameters shall not exceed 1% of the specified nominal outside diameter or 0.25 inch, whichever is less.

Steel casing shall have an outside circumference which is within 1% of the nominal circumference which in within 0.50 inch, whichever is less.

Steel casing pipe shall have a minimum allowable straightness deviation in any 10 foot length of 1/8 inch.

2.02 CARRIER PIPE MATERIALS

Water and wastewater distribution system piping shall be as specified in Section 15062 and the BJWSA Technical Specifications.

2.03 GROUT AND COVER MATERIALS

Soil backfill for trench approaches and pits to finish grade shall be as specified in Section 02200.

Seal pipe ends using end seals constructed of 1/8" thick neoprene rubber with 1/2" thick T304 stainless steel bandings and 100% non-magnetic worm gear mechanisms. Casing end seals shall be Advance Products & Systems, Inc. Model AW.

2.04 ACCESSORIES

A. CASING SPACERS:

Casing spacers shall be a two-piece shell fabricated from T-304 stainless steel of a minimum 14 gauge thickness. Each shell section shall be lined with a 0.090-inch thick, ribbed PVC extrusion with a retaining section overlapping the edges of the shell. Bearing surfaces (runners) shall be attached to support sections at positions to properly support the carrier pipe with the casing. The runners shall be mechanically bolted to the riser. Risers shall be made of T-304 stainless steel of a maximum 10 gauge. All risers shall be welded to the shell. Casing spacers shall be manufactured by Cascade Waterworks Manufacturing Company.

B. SETTLEMENT MARKERS:

In paved areas, surface settlement markers shall be p.k. nails. Outside paved areas, wooden hubs shall be used as surface settlement markers.

2.05 PNEUMATIC PIPE PUSHER

Pneumatic pipe pusher/driving device selected shall be a mono-bloc design with rear cushion and Teflon slide seals, no bolts or threaded connections; specifically designed for installing pipe from a drive pit through the geological materials as described in the Geotechnical Report.

Patented soil removal system (soil port - partial removal with cone or adaptor) shall be capable of being operated in a manner which will prevent loss of ground during installation.

The amount of overcut shall be compatible with the soil conditions, stiffness characteristics of selected pipe, and joint system at the designed maximum ramming loads.

Line and grade shall include, as a minimum, the capability to report the operating parameters listed in Item 1.05.2

The pneumatic pipe pusher shall be manufactured by TT Technologies, Inc.

PART 3 – EXECUTION

3.01 EXAMINATION

The Contractor shall verify existing conditions before starting work. Verify connection to existing piping system, size, location, and invert elevations are in accordance with the Drawings.

The Contractor shall be responsible for interpreting subsurface investigation reports, determining the site soil conditions and investigating the site prior to Bid. The Contractor shall be responsible for obtaining permits and permissions for conducting site investigations. The Contractor shall not be entitled to additional compensation if rock and/or water is encountered.

3.02 PREPARATION

The Contractor shall identify required lines, levels, contours, and datum locations. Establish elevations of casing with not less than 4-feet of cover.

The Contractor shall locate, identify, and protect utilities indicated to remain from damage. Utility companies shall be notified to locate existing utilities.

Plant life, lawns, and other features remaining as portion of final landscaping shall be protected during the execution of work.

The Contractor shall protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

The Contractor shall notify the Engineer in the event of utility conflicts and when minimum separation from existing utilities is not possible.

3.03 DEWATERING

The Contractor shall intercept and divert surface drainage precipitation and groundwater away from excavation through use of dikes, curb walls, ditches, pipes, sumps or other means.

Develop a substantially dry sub-grade for prosecution of subsequent operations.

Comply with South Carolina Department of Health and Environmental Control requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

Dewatering operations shall be in accordance with Section 02140.

3.04 PROTECTION OF EXISTING FACILITIES

The Contractor shall comply with all permits obtained to conduct the work. This shall include prior coordination with highway or railroad personnel.

Access shall be maintained to existing buildings, roadways, and other facilities requiring access. Modify installation as necessary to maintain access.

Excavated materials and equipment shall not be stored in side rights-of-way without prior permission from the necessary agency.

Casing installation shall not interfere or create hazardous conditions within roadways. Ground stabilization shall be performed to minimize loss of ground at the pits or around the face of the casing. The Contractor shall be responsible for any settlement resulting from the casing installation activities, at no additional cost to the Owner.

Excavation, trenching and shoring operations shall be conducted in accordance with current Occupational Safety and Health Act (OSHA) regulations, and ANSI A10.16. No blasting will be conducted.

Unless otherwise directed by the Engineer, settlement markers shall be placed at 25 foot intervals along the centerline of the casing when outside of paved areas and at 15 foot intervals when inside paved areas. Each centerline marker shall have markers offset 15 feet on each side. When set, the settlement markers shall be tied to construction benchmarks and shall not be disturbed during construction activities.

Measurements to the settlement markers, to the nearest one-thousandth foot, shall be made at regular intervals during construction. If the measurement indicates settlement or heaving in excess of 1-inch, the Contractor shall cease work, and consult the Engineer, highway district engineer, to determine the best method for corrective action. Corrective action shall be conducted immediately, prior to resuming casing installation, and at no additional cost to the Owner.

3.05 LAUNCH AND RECEPTION PITS

Excavate pits in accordance with installation plan, shop drawings and as site conditions require. The contractor shall properly support all excavations and to prevent movement of the soil, pavement, utilities or structures outside of the excavation. All pits shall conform to applicable Local Safety Standards, OSHA Standards, trenching and shoring standards. If at any time the method be used by the contractor for supporting any material or structure adjacent to any excavation is not safe in the opinion of the Engineer or applicable Federal, State or local inspection authorities, the Engineer may direct the Contractor to provide additional bracing and support necessary to furnish the added degree of safety required. The contractor shall provide such added bracing and support by such method approved by the Engineer as he may elect to use but the taking of such added precautions shall in no way relieve the contractor of his sole final responsibility for the safety of lives, work and structures. The use of such additional bracing and support shall be without additional cost to the authority. The absence of an order from the Engineer for the aforementioned additional bracing shall in no way relieve the contractor of his sole and final responsibility.

The pits shall be generally rectangular in shape, with adequate space for the equipment and operating personnel. Construct pits to accommodate the installation of pipe casing and ramming device. Install seals in the pit walls as required to control ground movement where the casings enter and exit the ground. Sides shall be shored with sheeting or trench boxes as needed.

Ensure casing entrance face is as near perpendicular to alignment as conditions permit.

All work of excavating shoring and bracing, and pipe ramming shall be so executed that settlement is minimized, the in-place casing shall have full bearing against earth, and no voids or pockets are left in any portion of the work.

Dewatering measures and excavation supports shall be installed as required. Keep floor of pit dry during the execution of work.

The floor of the pit shall be firm and stabilized, establishing a solid foundation for which to work. If necessary, over-excavate the floor and place a base of gravel or concrete as stabilization material.

3.06 CONTROL OF LINE AND GRADE

The Engineer will establish the baseline and benchmarks indicated on the plans. The Contractor shall check these baselines and benchmarks at the beginning of the contract period and report any error or discrepancies to the Engineer.

Use these baselines and benchmarks to furnish and maintain all reference lines and grades for the pipe installation. Use these lines and grades to establish the exact starting location of the pipe.

Submit to the Engineer a copy of field notes used to establish all lines and grades; however, the Contractor remains fully responsible for the accuracy of his work and the correction of it, as required.

The excavation and run of pipe rammed shall be controlled such that the deviation from grade is below the design grade.

After installation of the pipe, provide the Engineer with access to both casing ends for visual inspection of the line and grade of the completed casing.

3.07 PIPE RAMMING

No work shall commence on the pipe ramming phase until the design and construction procedure has been approved in writing by the Engineer. The Contractor shall be responsible for the performance of the equipment and methods selected for this phase. The Engineer's approval signifies only that the construction process is compatible with the overall objectives of the project.

Each pipe section shall be rammed forward as the excavation progresses in such a way to provide complete and adequate ground support at all times. Lubrication shall be applied to the external surface of the pipe to reduce skin friction. A hammer frame shall be positioned to develop a uniform distribution of ramming forces around the periphery of the pipe. Special care shall be taken by the contractor to insure that the launch seal is properly designed and constructed.

Special care should be taken when setting the pipe guard rails in the pit to ensure correctness of the alignment.

The Contractor is responsible for monitoring ground movements associated with the work and making suitable changes in the construction methods to control ground movements and prevent damage or detrimental movement to the work and adjacent structures and pavements.

Permissible tolerances with respect to settlement of ground surface and alignment of pipe shall not be exceeded.

The soil transportation method shall be capable of handling and removing material identified in the geotechnical report. All excavated material from the pipe ramming and pit construction shall be disposed of off-site by the contractor.

A lubrication system shall be provided that injects an approved lubricant on the inside and outside of the pipe to lower the friction developed on the sides of the pipe during ramming. Spacing of lubricant points shall be at the Contractor's option with approval from the Engineer.

The overcut on the pipe shall not exceed 1 inch without the approval of the Engineer. The annular space created by the overcut shall be filled with a lubricant that has been proved suitable for the local soil conditions.

Segment lengths for the casing pipe shall be as long as practical, based on field conditions. Joints between pipe segments shall be fully welded in accordance with AWS standard practices and procedures.

3.08 SPOIL REMOVAL

Spoils shall be removed once the casing has been installed, and the reception pit excavated. The Contractor may choose the method for removing the spoils (i.e. water, auguring, jet-cutting, compressed air, or hand mining).

The contractor is directed to the geotechnical report. Regardless of the spoil material encountered and the method of spoil removal, no separate or additional payment shall be made to the Contractor for spoil removal.

If the Contractor chooses to remove the spoil within the casing pipe by hand mining, the Contractor must meet the following minimum requirements for hand mining:

1. The Contractor must provide a positive means for supplying fresh air constantly to the face of the casing pipe and shield area.
2. The Contractor must provide constant two-way communication between the personnel in the casing and the launch or reception pit.
3. The Contractor must provide adequate lighting within the casing. Lighting fixtures should be explosion proof and protected from moisture.
4. No gasoline or diesel powered equipment shall be allowed inside the casing pipe. Excavation tools must be pneumatic or hydraulic powered.
5. The Contractor must conduct all operations in strict accordance with the requirements of the U.S. Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (Public Law-91-596).

3.08 CARRIER PIPE INSTALLATION

After the casing pipe has been installed, the alignment and elevations shall be verified and submitted to the Engineer for approval, prior to the installation of the carrier pipe.

The carrier pipe shall be installed centered within the casing pipe, and shall be supported by casing spacers, centered on 10-foot intervals and as shown on the Drawings.

The Contractor shall exercise care to prevent damage to pipe joints when carrier pipe is placed in casing.

Support the pipeline within casing so no external loads are transmitted to carrier pipe. Attach supports to barrel of carrier pipe; do not rest carrier pipe on bells. A minimum clearance of 1 inch shall be maintained between the pipe bell and casing pipe.

The ends of the casing shall be sealed by installing casing end seals.

****END OF SECTION****

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