PROJECT SPECIAL PROVISIONS
Utility Construction

Design Engineer’s
Company Letterhead

And address

 (Seal)

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| --- |
| DOCUMENT NOT CONSIDERED FINALUNLESS ALL SIGNATURES COMPLETED |

 Revise the 2012 Standard Specifications as follows:

Page 10-58, Sub-article 1036-1 General
add the following sentence:

All materials in contact with potable water shall be in conformance with Section 1417 of the Safe Drinking Water Act.

Page 15-1, Sub-article 1500-2 Cooperation with the Utility Owner, paragraph 2:
add the following sentences:

The utility owner is the xxxxxxxx. The contact person is xxxxxxxx and he can be reached by phone at xxxxxxxxxx.

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service
add the following sentence:

Obtain approval from the NCDENR-Public Water Supply Section prior to placing a new water line into service. Use backflow prevention assemblies for temporary connections to isolate new water lines from existing water line.

Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization
change the allowable leakage formula to:

$$W=LD\sqrt{P}÷148,000$$

Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization, sixth paragraph:
Replace the paragraph with the following:

Sterilize water lines in accordance with Section 1003 of The Rules Governing Public Water supply and AWWA C651 Section 4.4.3, the Continuous Feed Method. Provide a chlorine solution with between 50 parts per million and 100 parts per million in the initial feed. If the chlorine level drops below 10 parts per million during a 24 hour period, then flush, refill with fresh chlorine solution, and repeat for 24 hours. Provide certified bacteriological and contaminant test results from a state-approved or state-certified laboratory. Operate all valves and controls to assure thorough sterilization.

Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization, seventh paragraph:
delete the words “may be performed concurrently or consecutively.”
and replace with “shall be performed consecutively.”

Page 15-7, sub-article 1515-2 Materials,
replace paragraph beginning “Double check valves…” with the following:

Double Check valves (DCV) and Reduced Pressure Zone principal (RPZ) backflow prevention assemblies shall be listed on the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research list of approved backflow devices.

Page 15-7, Article 1510-4 MEASUREMENT AND PAYMENT, add the following paragraph after line 7:

The quantity of *Ductile Iron Water Pipe Fittings* will be measured and paid per pound based on the published weights for ductile iron fittings, exclusive of the weights of any accessories, as listed in the “DI Fittings Weight Chart” located at the NCDOT Utilities web site. If the Contractor elects to use compact ductile iron water pipe fittings, measurement will be based on the weight of standard size ductile iron water pipe fittings. Any fitting not listed will be measured based on the published weights for ductile iron fittings listed in ANSI/AWWA C-110/A21.10. This is limited to pressure pipe 4 inches or larger.

Page 15-7, Article 1510-4 MEASUREMENT AND PAYMENT, add the following pay item:

|  |  |
| --- | --- |
| Pay Item | Pay Unit |
| Ductile Iron Water Pipe Fittings | Pound |

Page 15-9, Article 1515-4 MEASUREMENT AND PAYMENT, line 28, delete “fittings”.

Page 15-11, Sub-article 1520-3(A)(2) Testing, line 5,
replace the second paragraph with the following:

Test all 24" and smaller gravity sewer lines for leakage using infiltration, exfiltration, or air test. Perform visual inspection on gravity sewer lines larger than 24". Perform line and grade testing and deflection testing on all gravity sewer lines.

Page 15-13, Article 1520-4 MEASUREMENT AND PAYMENT, add the following paragraph after line 2:

The quantity of *Ductile Iron Sewer Pipe Fittings* will be measured and paid per pound based on the published weights for ductile iron fittings, exclusive of the weights of any accessories, as listed in the “DI Fittings Weight Chart” located at the NCDOT Utilities web site. If the Contractor elects to use compact ductile iron sewer pipe fittings, measurement will be based on the weight of standard size ductile iron sewer pipe fittings. Any fitting not listed will be measured based on the published weights for ductile iron fittings listed in ANSI/AWWA C-110/A21.10. This is limited to pressure pipe 4 inches or larger.

Page 15-13, Article 1510-4 MEASUREMENT AND PAYMENT, add the following pay item:

|  |  |
| --- | --- |
| Pay Item | Pay Unit |
| Ductile Iron Sewer Pipe Fittings | Pound |

Page 15-18, Section 1550 TRENCHLESS INSTALLATION OF UTILITIES: Replace this section with the following:

SECTION 1550

TRENCHLESS INSTALLATION OF UTILITIES

1550-1 DESCRIPTION

Install pipe using a trenchless method. Pipe refers to the specified pipe, which may be the primary carrier pipe or an encasement pipe. Shoring means the earth support system used for installing the pipe. The terms for encasement, casing, encasement pipe and casing pipe are interchangeable.

An engineer licensed by the State of North Carolina shall design the method and certify the work will not damage the roadway above or endanger the roadway user.

1550-2 MATERIAL

Refer to Division 10.

|  |  |  |
| --- | --- | --- |
| Item |  | Section |
| Concrete | 1000 |
| Encasement Pipe | 1540 |
| Flowable Fill | 1000-6 |
| Structural Timber | 1082 |
| Structural Steel | 1072 |
| Treated Timber | 1082-3 |

Use pipe joints that are modified to suit the installation method. Provide engineering calculations for piping and shoring. Submit material certifications and obtain approval from the Department’s Engineer before installation.

Use steel or concrete liner plates. Steel tunnel liner plates shall meet Sections 16 and 25 in *AASHTO LRFD Bridge Design Specifications*. Concrete liner plates shall meet AASHTO specifications.

Drilling fluids consist of water, bentonite and polymer additives.

Other materials will be considered with adequate design and quality control.

1550-3 CONSTRUCTION METHODS

1. General

Apply Section 1505 for excavation, trenching, pipe laying and backfill.

Install the pipe to the lines and grades shown in the plans. Use workers that are skilled in the method of construction. Construct with good workmanship by skilled workers along with proper safety precautions.

Locate ends of trenchless construction and pits beyond the vehicle recovery area of the roadway. The vehicle recovery area may be reduced using acceptable traffic control methods.

1. Design

Contract plans will show a trenchless method including but not limited to length, profile and bore pit locations based on available information. The Contractor’s design shall confirm this method is appropriate for the field conditions and for the specified pipe. Subsurface information in the vicinity of the trenchless installation may be available in accordance with Section 102-7.

Assess soil conditions expected during trenchless operations.

Design the method to minimize the vertical movement of the pipe or the completed roadway section. Use methods of construction and installation that will not disturb the soils outside of the immediate vicinity of the pipeline or pits.

Before construction, provide detailed plans for the method of installation certified by an engineer licensed by the State of North Carolina. Provide certified calculations demonstrating the method of installation as safe and of minimal risk. Provide certified calculations of the structural adequacy of all materials. The design shall meet *AASHTO LRFD Bridge Design Specifications*. An engineer licensed by the State of North Carolina shall certify changes or modifications to the designed method as needed for actual field conditions.

1. Water Control

Provide groundwater control and removal as appropriate for the method of excavation and installation. Remove the groundwater using an engineered dewatering system provided in the design submittal. Keep surface waters out of the excavation and pits.

1. Shoring

Provide temporary or permanent shoring, as needed. Provide temporary shoring to maintain the hole or pit excavation for the duration of the work. Casing pipe 24 inches and larger, tunnel liner, and shoring that is not certified for permanent use is considered temporary. Fill the annular space between the specified pipe and temporary shoring. Provide permanent shoring when desired or specified to maintain the open hole for an indefinite time. Permanent shoring requires certification of durability and a design life of 100+ years.

Fill all voids around the excavation and shoring with structural fill material as work progresses.

Either work continuously (24 hours/day and 7 days/week) on the operations from the time the excavation begins through the filling of voids or use an engineered system for shoring the excavation during work stoppage.

1. Pre-Construction Meeting

The Contractor shall conduct a pre-construction meeting with the Department’s Engineer to review the proposed method for installation of the pipe. Conduct the meeting at least 48 hours before beginning installation. The meeting shall consist of, but is not limited to:

* 1. Presentation of the construction methods for understanding by all involved,
	2. Presentation of methods for filling any potential voids around the pipe,
	3. Demonstrating that appropriate equipment and materials are on site,
	4. Providing a progress schedule, and
	5. Demonstrating ability to react to failures or roadway settlement or heave.

1550-4 TRENCHLESS METHODS

1. Bore and Jack

For bore holes up to 6 inches in diameter in stable ground, the hole may be augured and the pipe pushed or jacked through the cleaned out hole. For bore holes greater than 6 inches, provide continuous support of the hole by simultaneously jacking the pipe or casing into the hole.

Use equipment suitably sized and designed to simultaneously bore or drill the soil or rock while pushing or jacking pipe on a controlled grade. Position the cutter head within one diameter of the leading edge of the pipe. In cohesive, dense and dry soils and rock, position the cutter head in front of the leading edge. In non-cohesive or loose soils, position the cutter head inside the pipe.

Dry bore only, do not use jetting or wet boring methods. Use drilling fluids only on the outside of pipe for lubrication or hole stabilization.

Minimize over bore, match cutter diameter to the outside diameter of the encasement pipe. Limit overbore to the O.D. + 2 inches.

Provide steering controls as necessary to maintain line and grade.

If conditions allow and with the approval of the Engineer, the Contractor may elect to use the pipe ramming method in lieu of bore and jack. Payment for the pipe ramming method will be paid as bore and jack.

1. Directional Drilling

For drilled holes up to 6 inches in diameter in stable ground, the hole may be drilled and reamed followed by pulling the pipe into the hole within 8 hours. For drilled holes greater than 6 inches, simultaneously pull the pipe or casing into the hole as reaming occurs

When under pavement or within a one horizontal to one vertical distance from pavement, maintain the depth of cover in Table 1550-1.

|  |
| --- |
| TABLE 1550-1DEPTH OF COVER FOR DIRECTIONAL DRILLING  |
| Drilled Hole Diameter | Minimum Depth of Cover |
| 2" to 6" | 6 ft |
| > 6" to 15" | 12 times the hole diameter |
| > 15" to 36" | 15 ft |

Begin bores at locations that allow transitioning the bore to meet the above depths.

Use drilling fluids as appropriate for the type soils. Pump drilling fluids only while drilling or reaming. Monitor flow rates to match the amount leaving the bore hole. Do not increase pressure or flow to free stuck drillheads, reamers or piping.

Limit drilled or reamed holes to 1.5 x O.D. for pipe 12 inches or less and O.D. + 6 inches for pipes larger than 12 inches.

1. Tunneling

Tunnel using hand mining, mechanical excavation, tunnel boring machine (TBM), microtunneling, or other accepted tunneling method. Use tunnel shields or fore poling along with benched excavation and breast boarding as appropriate for the field conditions. Alternatively, the Contractor’s engineer may certify that the soils are
self-supporting of the dead and live loads and design tunneling methods as appropriate.

Provide active support to the tunnel walls. Shore tunnel walls using liner plates, steel ribs with lagging or other engineered method or by jacking piping into place.

Limit over excavation to 2 inches larger than the liner or shield. Grout the external voids as work progresses and as specified by the Contractor’s engineer.

1. Pipe Ramming

Use pipe ramming only where soils are homogeneous and free of rock, boulders, stumps and debris. Do not use in the vicinity of quick or liquefiable soils.

Steel bands 1/2 inch thick are allowed on the outside of the leading edge of the pipe or casing to oversize the hole to reduce friction. Steel bands 1/2 inch thick may be used on the inside to compact the spoil and to prevent plugging.

Install at the following minimum depth of cover.

|  |
| --- |
| TABLE 1550-2DEPTH OF COVER FOR PIPE RAMMING |
| Pipe or Casing Diameter | Minimum Depth of Cover |
| 2" to 6" | 4 ft |
| > 6" to 14" | 6 pipe diameters |
| >14" to 72" | 8 ft |

Contain spoil within the casing during ramming. After completion, use compressed air or augers to remove the spoil. Clean the interior using a pig. Provide appropriate safety devises. Limit air pressure to less than the rating of the pipe or casing.

Use lubricants and surfactants as needed and ensure vibration induced consolidation of soils does not result in settlement greater than 0.02 feet.

1. Other Methods

Other methods will be considered on a case by case basis when thoroughly engineered.

1. Lubrication and Drilling Fluids

Use drilling fluids for lubrication. Do not use water alone.

1550-5 QUALITY CONTROL

The Contractor, at no cost to the Department, shall replace or repair damaged or defective installations. The method to be used shall be designed by the Contractor’s engineer and approved by the Engineer.

1. Ground Movement

Before excavation, establish control points for measuring vertical movement of the road at 10 feet intervals along the centerline and 10 feet each side of the pipeline. A land surveyor licensed in the State of North Carolina shall monitor these points daily until construction is complete.

Cease trenchless operations when measured movement exceeds 0.02 feet. Determine cause of settlement and repair as necessary. Modify trenchless methods as needed.

1. Leakage

Limit leakage through tunnel walls to minor seepage. All leaks in pipes, casing or other permanent shoring shall be sealed.

1. Roundness

Provide permanent shoring maintaining at least 95% of nominal diameter in all directions.

1. External Voids

Fill all external voids greater than 2 inches high or 2 feet wide. Fill with flowable fill, grout or Class II or III select material.

1550-6 MEASUREMENT AND PAYMENT

*Bore and Jack of \_\_\_”* will be measured and paid in linear feet. Measurement will be made horizontally to the nearest tenth of a linear foot.

*Directional Drilling of \_\_\_”* will be measured and paid in linear feet. Measurement will be made horizontally to the nearest tenth of a linear foot.

*Tunneling of \_\_\_”* will be measured and paid in linear feet. Measurement will be made horizontally to the nearest tenth of a linear foot.

Measurement will be made along utility pipes with required trenchless installation. Payment for trenchless installation will be made as additional compensation for utility piping with contract pay items of the various sizes. No additional payment will be made for access pits or shoring required for the installation. Shoring required for the maintenance of traffic or the protection of building or other structures, on or off the right of way, shall be paid under *Temporary Shoring*. No payment will be made for abandoning defective installations.

Payment will be made under:

|  |  |  |
| --- | --- | --- |
| Pay Item |  | Pay Unit |
| Bore and Jack of \_\_\_” | Linear Foot |
| Directional Drilling of \_\_\_” | Linear Foot |
| Tunneling of \_\_\_” | Linear Foot |
|  |  |
|  |  |
|  |  |

{Follow the below format for Special Pay Items and reference relevant section of the Standard Specifications, if appropriate. Include complete description of the work, unit of measurement, and pay item. The pay item must exactly match the plans and estimate. Delete examples if not modified for use.}

{Special Pay Item Example #1}

Page 10-60; Section 1040. The Contractor’s attention is directed to this section. Two separate water vaults exist and are separated by a distance of approx. 165’. These vaults serve the business located on Parcel 13. The proposed roadway grading requires the existing masonry enclosure wall elevations to be adjusted.

Measurement and Payment:

Payment for raising masonry wall elevations shall be per each water vault, and paid for under the contract price for “Adjust water vault lid”. Such price and payments will be full compensation for all labor, materials, excavation, backfilling and any incidentals necessary to complete the work, reinstall lids, as required. Adjustment to the water vault wall elevations will be measured and paid for under the contract item “Adjust Water Vault Lid”.

|  |  |
| --- | --- |
| Pay Item | Pay Unit |
| Adjust Water Vault Lid | Each |

{Special Pay Item Example #2}

Page 15-8; Section 1515-3(F).  The Contractor’s attention is directed to this section.

Measurement and Payment:

Payment for 3” combination air release valve shall be per each valve, and paid for under the contract price for “3” Combination Air Release Valve”.  Such price and payments will be full compensation for all labor, materials, excavation, backfilling and any incidentals necessary to complete the work, as required.

|  |  |
| --- | --- |
| Pay Item | Pay Unit |
| 3” Combination Air Release Valve | Each |