



# Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

October 25, 2021

SUBJECT: Route FAU 124 (Main Street)  
Section 15-00124-00-PV (Crystal Lake)  
McHenry County  
Contract No. 61H27  
Item 089  
November 5, 2021 Letting  
Addendum B

## NOTICE TO PROSPECTIVE BIDDERS:

Attached is an addendum to the plans or proposal. This addendum involves revised and/or added material.

- 1. Revised sheets 2, 25, 26, 41 – 52, 70, 94 & 95 of the plans.**
- 2. Added sheet 95A to the plans.**
- 3. Revised pages 55 – 66 and 72 of the Special Provisions.**

Prime contractors must utilize the enclosed material when preparing their bid and must include any changes to the Schedule of Prices in their bid.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Jack A. Elston'.

Jack A. Elston, P.E.  
Bureau Chief, Design and Environment

4. Provide restrained joint type fittings compatible with pipe system utilized, as specified by the pipe manufacturer.
  - a. Mechanical joint retainer gland systems that provide locking segments shaped to pipe barrel that do not create stress points on pipe barrel.
  - b. Acceptable products:  
Meg-A-Lug System.
    - i. Series 1900 Megalug for MJ to Pipe (C-909).
    - ii. Series 1900 Harness for push on joint (C-909).
    - iii. As recommended by the manufacturer for connection to existing pipes

Polyethylene sheet: Comply with ANSI/AWWA C105/A 21.5-99:

1. Thickness: linear low-density polyethylene film (minimum 8 mils) or high-density cross laminated polyethylene film (minimum 4 mils).
2. Markings: The following information will be clearly marked on the sheet at minimum increments of 2-feet along its length:
  - a. Manufacturers name or trademark.
  - b. Year of Manufacture.
  - c. Minimum- film thickness and material type (LLDPE or HDCLPE).
  - d. Applicable range of nominal pipe diameter size(s).
  - e. Warning – Corrosion Protection – Repair any damage.

Polyethylene sheet: Comlly with ANSI/AWWA C105/A21.5:

1. Thickness: Three layers of co-extruded linear low-density polyethylene (LLDPE) fused into a single thickness of not less than 8 mils.
2. The inside surface of the polyethylene wrap to be in contact with the pipe exterior shall be infused with a blend of anti-microbial biocide to mitigate microbiologically influenced corrosion and volatile corrosion inhibitor to control galvanic corrosion.
3. Markings: The following information will be clearly marked on the sheet at minimum increments of 2 feet along its length:
  - a. Manufacturer's name or trademark.
  - b. Year of manufacture.
  - c. Minimum film thickness and material (LLDPE).
  - d. Applicable range of nominal pipe diameter size(s).
  - e. Warning – Corrosion Protection – Repair Any Damage.

Conductivity appurtenances:

1. Provide wedges of serrated silicon bronze or #10-copper cable and tapping devices specifically designed for this purpose.
2. Use devices provided by the pipe manufacturer.
3. Standard mechanical, Field-Lok, or Meg-a-lug joints do not provide conductivity.

VALVES: Provide valves with clockwise closing direction.

Gate valves:

1. Valves 4-inch to 24-inch size:
  - a. Design in accordance with AWWA C509 (cast iron body), or AWWA C515 (ductile iron body) bronze fitted, resilient wedge and seat type with non-rising stem and O-ring packing.
  - b. Provide gear operator for valves 14-inch and larger.
2. Provide ANSI Class 125 flange ends or mechanical joint ends for valves installed in vaults as indicated on the Plans.
  - a. Provide restrained type joints for all mechanical joint end valves.
  - b. Provide and install nuts and bolts matching the nuts and bolts used for fittings.
3. Valves shall have stainless steel bolts at the packing gland and bonnet.
4. Valve bodies shall be ductile iron with the name or make of manufacturer, size and working pressure plainly cast in raised letters.
5. Valves shall be manufactured in United States
6. Valves shall be equipped with 2-inch square operating nut that shall open to the left (counterclockwise) with the word "open" in 1/2-inch letters or larger and arrow (minimum 2-inches long) cast on the nut to indicate direction of opening.
7. Install in vertical position, supported on solid concrete block.
8. Acceptable valve manufacturers:
  - b. Mueller No. A2361;
  - c. American Flow Control series 2500;

VALVE VAULTS:

Precast:

1. Provide precast reinforced concrete manhole sections, bottoms, and flat top slabs complying with ASTM C478 unless otherwise indicated on the Plans.
2. Provide eccentric cone section unless otherwise indicated on the Plans.
3. Provide precast reinforced concrete monolithic or separate base.
4. Design flat slab tops for AASHTO HS20-44 wheel loading.

Concrete: Provide 4,000 psi concrete using Type I Portland Cement complying with ASTM C150.

Mortar: Mix one part Portland Cement to three parts fine aggregate.

Joints for precast sections:

1. Provide joints of either flexible watertight rubber gaskets or preformed bituminous plastic gaskets consisting of a homogeneous blend of refined hydrocarbon resins and plasticizing compound reinforced with inert mineral filler.
  - a. Acceptable preformed gasket products:
    - (1) K.T. Snyder Co., RAM-NEK.
    - (2) Concrete Sealants, Type CS-208.

Steps:

1. Provide steps with a minimum width of 12 inches and a minimum projection of 5 inches.
2. Use steps consisting of copolymer polypropylene plastic with continuous one-half inch steel reinforcement as manufactured by M.A. Industries, Inc. or cast iron steps, Neenah R-1980-I.

Frames and covers: Provide cast iron frames and covers with heavy duty, indented top with solid self-sealing lids and machined bearing surfaces, stamped with the words "CITY OF CRYSTAL LAKE" and "WATER".

1. Acceptable products:
  - a. Neenah R-1713;
  - b. East Jordan 1050 EXHD;

Flexible pipe connectors: Provide flexible rubber gasket collar for connecting pipe to the manhole.

1. Comply with ASTM C-923
2. For pipe 24 inches and smaller, use PSX gasket system by Press-Seal Gasket Corporation.
3. For pipe 30-inch and larger, use resilient gasket by A-LOK Products, Inc..

FIRE HYDRANTS:

1. Comply with AWWA C502.
2. Paint fire hydrants in red as approved by the Municipality.
3. Match the fire hydrants generally installed in the Municipality's water system.
  - a. Acceptable manufacturers:
    - (1) Mueller, Waterous (see detail UW-06 for model number)

Materials:

1. Provide compression type with a 5-1/4-inch and minimum size main valve assembly, O-ring seals, two 2-1/2-inch hose nozzles, and a 4-1/2-inch pumper nozzle with National Standard threads, a National Standard operating nut, and an above-ground break flange.

2. Provide a 6-inch auxiliary resilient seat type gate valve with restrained type joints or bituminous coated metal tie rods between the valves and the tee fittings.
  - a. Provide and install nuts, bolts, and tie rods matching the nuts and bolts used for fittings.
3. Provide valve boxes with cover marked with the word "WATER".
  - a. Bituminous coated carbon steel valve extension stems and 2-inch square operating nuts 2 inches below cover.
4. Provide valve box stabilizers on all fire hydrant auxiliary valves.
  - a. Acceptable manufacturers:
    - (1) American
    - (2) Tyler
5. Hydrants shall open counterclockwise and shall be furnished with a mechanical joint inlet.
6. All materials to be manufactured in the United States

WATER SERVICES:

1. Provide service saddles, corporation stops, curb stops, service boxes, and water service tubing. Comply with the most recent edition of AWWA C800 (or NSF/ANSI 372) for service lines and service line appurtenances.
2. Copper water service pipe shall be installed a minimum of 6'-0" deep to maximum of 8", and shall connect between the new corporation stop and the new curb stop as shown on the Drawings.
3. Curb boxes shall be installed centered in parkway or minimum 1' inside the ROW near the locations of existing curb stops and service boxes unless otherwise directed by the engineer or plans. The Contractor shall record the location of the new curb boxes from the nearest newly installed fire hydrant. Curb boxes shall be held in a truly vertical position and staked into place to ensure permanent vertical alignment of the curb box.
4. Materials:
  - a. Service lines: Type K soft temper seamless copper water tubing complying with ASTM B-88.
  - b. Corporation stops: A.Y. McDonald No. 4701, Mueller No. B-25008.
  - c. Curb stops: A.Y. McDonald No. 6104, Mueller No. B-25155.
  - d. Service boxes: Extension type with stationary rods only used if deeper than 8', A.Y. McDonald No. 5614, Mueller No. H10300.

TAPPING SLEEVES AND VALVES:

Tapping sleeves:

1. Use two-piece bolted sleeve ductile iron or stainless steel type with mechanical joints.
2. Provide joint accessories.

3. Measure existing water main outside diameter to determine proper tapping sleeve size
4. Acceptable manufacturers:
  - (1) Stainless steel: Smith Blair "665"
  - (2) Stainless steel: Cascade CST extra heavy duty.
  - (3) Stainless steel: Romac Industries "SST"
  - (4) Stainless steel: Ford "FTSS" Tapping Sleeve

Tapping valves:

1. Mueller T-2360-16
2. American flow control series 2500-1 Tapping Valve
3. Use fully ported gate valves complying with AWWA C500.
4. Use mechanical joints type, McWane Ductile F-5093.

RESTRAINED FLANGE ADAPTOR:

1. Provide a ductile iron flange adaptor dual ring system with bolt circles compatible with 125#/Class 150 bolt pattern.
  - a. Provide adaptor with individual actuated gripping wedges that utilize torque limiting screws to insure proper initial set.
  - b. Set screw "only" restraining adaptors are not acceptable.
  - c. Provide system that allows joint deflection of up to 5°.
  - d. Provide a fluoropolymer coating to the wedge and wedge assembly and powder coating to the restraint body.
2. Acceptable Manufacturers:
  - a. Series 2100 Magaflange by Ebaa Iron;

### CONSTRUCTION REQUIREMENTS

PIPE INSPECTION, HANDLING, STORAGE, AND INSTALLATION: Install in accordance with pipe manufacturer's recommendations.

Ductile iron water mains and appurtenances:

1. Comply with AWWA C-600.
2. Protect pipe and fittings by loose wrapping or tubing with polyethylene sheet.
  - a. Place polyethylene sheet around the entire circumference of the pipe, tie or tape sheet securely to prevent displacement during backfilling.
  - b. Comply with ANSI/AWWA A21.5-99/C105 regarding installation of polyethylene protection.
3. Install conductivity through joints by use of conductivity wedges or copper cable and taps.
  - a. Use two (2) wedges per joint for pipes 12 inches or smaller, and four (4) wedges per joint for pipe sizes larger than 12 inches.
  - b. Use number of copper cable connectors per joint as recommended by the pipe manufacturer.

OPERATION OF APPURTENANCES: City of Crystal Lake Public Works Department employees only shall operate any existing water distribution appurtenances (i.e. water valves, hydrants, etc.).

WATER DISRUPTIONS: A minimum forty-eight (48) hours advance notice to the Owner's Public Works Department is required for any water disruptions.

DEPTH OF PIPE COVER: Lay water mains and water service lines with a minimum depth of cover of six feet and max of 8 feet below finished grade ground level unless otherwise indicated on the Plans.

1. Where new mains cross existing mains, install new main below existing main unless otherwise indicated on the Plans.

CONNECTIONS TO EXISTING WATER MAINS:

1. Make connections to existing water mains.
2. Use non-pressure connections, except where pressure connections are shown on the Plans or required by conditions at the time of construction.
3. Make one connection at a time except as approved by the Engineer.

PIPE RESTRAINING SYSTEMS:

General:

1. Provide protection from movement of water main piping, plugs, caps, tees, valves, hydrants, and bends of 11-1/4 degrees or greater.
2. Provide concrete thrust blocks at all locations unless restrained joint type fittings are utilized.

3. Where restrained joint type fittings are called for on the Plans, but cannot be utilized, provide concrete thrust blocks.

Concrete thrust blocks:

1. Provide precast or cast-in-place concrete thrust blocking with a compressive strength of 3000 psi in 28 days.
2. Locate thrust blocking between solid ground and the fitting to be anchored.
3. Unless otherwise shown or directed by the Engineer, place the base and thrust bearing sides of thrust blocking directly against undisturbed earth.
4. Sides of thrust blocking not subject to thrust may be placed against forms.
5. Place thrust blocking so the fitting joints will be accessible for repair.
6. When conditions prevent the use of concrete thrust blocks, use restrained joints of an approved type.

Restrained type pipe, fittings, and valves:

1. Provide restrained joint pipe to distance indicated on the Plans, or not less than a minimum of two pipe lengths on each side of the valve or fitting to be restrained.
  - a. Utilization of restrained joint pipe as a substitute to concrete thrust blocking is done at the Contractor's option at no additional cost to the Owner.
  - b. Only restrained joint pipe indicated on the Plans will be paid for as a separate Pay Item.
  - c. Restraining gaskets or locking systems utilized on straight runs of push pipe are not considered as fittings, and are paid for as part of the Pay Item for restrained joint type pipe.

**SEWER CROSSING:** Separate water mains and water service lines from sanitary sewer, storm sewers, combined sewers, house sewer service connections, and drains in accordance with the "Standard Specifications for Water and Sewer Main Construction in Illinois".

Water mains:

1. Wherever water mains cross storm sewers, sanitary sewers, or sewer service connections:
  - a. Lay the water main so that its invert is at least 18 inches above the top of the sewer.
  - b. Maintain this vertical separation for that portion of the water main located within 10 feet horizontally of any sewer or drain crossed.
  - c. Center a length of water main pipe over the sewer to be crossed with joints equidistant from the sewer or drain.
2. When it is impossible to obtain the minimum 18 inches vertical separation, or when it is necessary for the water main to pass under a sewer or drain:
  - a. Construct the sewer or drain of pressure pipe, conforming to the specification for water main materials.



- b. Extend the sewer construction on each side of the crossing until the normal distance from the water main to the sewer or drain is at least 10 feet.
  - c. As an alternate, install either the water main or sewer inside a casing or carrier pipe for a distance of 10 feet measured perpendicular to the sewer on each side of the crossing.
3. Where a water main must cross under a sewer:
- a. Maintain a vertical separation of 18 inches between the invert of the sewer and the crown of the water main.
  - b. Support the sewer or drain line to prevent settling and breaking the water main.
  - c. when water main crosses below a sewer, the sewer must be constructed with water main equivalent pipe or else either pipe must be installed in a casing. The protection must extend on each side of the crossing until the normal distance from the water main to the sewer or drain is at least ten feet.

Water service lines: Comply with the requirement of water main separation.

Sewer manholes: Do not install water line through sewer manhole.

#### VALVE VAULTS:

##### General:

1. Install pipe through valve vault as shown on the Detail.
2. Make vault watertight with use of flexible manhole connectors as per the Detail.

##### Jointing:

1. Use flexible watertight gaskets for each joint.
2. Trim smooth and free from surplus gaskets.

Frames and covers: Unless otherwise shown on the Plans or as determined by the Engineer, set frames and covers:

1. In paved areas: So that the top of the solid cover will be flush with the finished pavement; or
2. In unpaved areas: To drain away from the valve vault.
3. With flexible watertight gaskets.
4. With grade rings not to exceed 8 inches.

#### FIRE HYDRANT INSTALLATION:

1. Install fire hydrants plumb with the lowest hose connection at least 18 inches but not more than 26 inches above the finished grade ground level. Set fire hydrant bases and auxiliary valves on a precast concrete blocks to provide firm support for the base.

2. Brace the bases with solid concrete blocking between the base and undisturbed trench wall to counteract the reaction thrust of water pressure at the base. Provide mechanical joint anchoring fittings or approved restrained joints.
3. Brace the fire hydrant barrels during backfilling. Do not block the drain hole in fire hydrant.
4. Place a minimum of 3/4 cubic yards of washed coarse stone per detail at and around the base for proper drainage. Cover stone with plastic before backfilling.
5. Place and compact backfill materials in 6-inch layers around the fire hydrant and auxiliary gate valve.
6. Cover new fire hydrant with black plastic bag until new system is in service.

WATER SERVICE CONNECTION:

1. Make service connections at locations shown on the Plans or determined by the Engineer at the time of construction.
2. Install water service pipe, corporation stop, curb stop, and service box as shown on the water service installation detail in the Plans.
3. Set curb stop on a precast concrete block.
4. Do not splice the water service pipe.
5. See TESTING AND INSPECTION for sequence of service line construction.

Service boxes:

1. Install service box over curb stop in a truly vertical position.
2. Set the top of box flush with the surrounding finished grade.

Direct tapping of polyethylene-encased D.I.P.:

1. Wrap two or three layers of polyethylene adhesive tape completely around the pipe to cover the tapping machine and chain mounting area.
2. Make the tap and install the corporation stop directly through the tap and polyethylene.
3. After making the direct service connection, inspect the entire circumferential area for damage and make any necessary repairs.
4. Wrap the corporation stop and a minimum distance of 3 feet of the copper service pipe with polyethylene.

TUNNELING:

1. This work applies to tree tunneling and service line installation for open-cut water main construction only.
2. Use boring auger with a diameter at least 6 inches larger than the outside diameter of the bell of the pipe to be installed.
  - a. Place a 3-inch sand cushion in the bored hole before installing the pipe.
  - b. Push the pipe carefully into place so as not to disturb the bore hole.
  - c. Fill the void space around the pipe with sand.

3. Water main may be tunneled by hydro-boring or other directional boring method in lieu of method outlined above.
  - a. Method must be approved by Engineer at pre-construction meeting.
  - b. No additional compensation will be allowed. If alternate method proves to be unsuccessful, and Contractor will complete installation as outlined above at no addition to Contract.

POLYETHYLENE WRAPPING OF DUCTILE IRON PIPE AND APPURTENANCES:

1. Comply with requirements of ANSI/AWWA C105/A21.5-99.
  - a. Place polyethylene sheet around the entire circumference of the pipe, tie or tape sheet securely to prevent displacement during backfilling.
  - b. Wrap all water mains, fittings, valves, fire hydrant leaders, fire hydrants, and service lines.
    - (1) Wrap copper service lines to a point 3 feet from center of water main.
    - (2) Do not block fire hydrant weep hole.

TESTING AND INSPECTING:

Replacement Sequence of installation: Install new water main but do not install corporation stops, services lines, curb stops, or service boxes until after: conducting pressure test, leakage test, disinfection of new water main, flush main, and acceptance for putting new main into service. Finish by installing corporation stops, service lines, curb stops and service boxes. Service lines shall be flushed until water runs clear or minimum 20 seconds. A licensed plumber shall connect the homeowner's water service to the new curb stop.

Hydrostatic tests:

1. Devise a method for disposal of waste water from hydrostatic tests, and for disinfection, as approved in advance by the Engineer.
2. Where any section of water main is provided with concrete thrust blocking for fittings, do not make hydrostatic tests until at least 5 days after installation of concrete thrust blocking, unless otherwise approved by the Engineer.

Pressure tests:

Follow testing detail UW-09

1. Subject the new water mains and service lines, including valves and fire hydrants, to a hydrostatic pressure of 150 psi.
2. Hold the test pressure for a duration of two hour without pressure loss or further pressure application. After two hours, if the pressure reading varies more than +/- 5 PSI from the initial pressure, the test fails. The leak shall be found and addressed prior to retesting.

3. Carefully examine exposed pipe, joints, fittings, and valves.
4. Replace or remake joints showing visible leakage.
5. Remove cracked pipe, defective pipe, and cracked or defective joints, fittings and valves. Replace with sound material and repeat the test until results are satisfactory.
6. Make repair and replacement without additional cost to the Contract.
7. Make up volume: If the pressure is maintained within +/- 5 PSI for the two hour test, the make-up volume shall be determined by pumping water back into the water main to reach the initial test pressure. This will normally be done by exceeding the test pressure, and using the bleed off valve to drop the pressure to the initial test pressure. Once the initial test pressure has been reached, the bleed off valve shall be opened and water that leaves the system shall be collected in the volume measuring device once the gauge reaches the final two hour test pressure, the volume of water collected shall be measured.
8. Use only solid stainless full-body repair clamps as approved by the Engineer.

Time for making test:

1. Except for joint material setting and curing time for thrust blocks, pipelines jointed with rubber gaskets, mechanical, or push-on joints, or couplings may be subjected to hydrostatic pressure, inspected, and tested for leakage any time after partial completion of backfill.
2. Perform the pressure and leakage tests satisfactorily prior to requesting the Engineer to witness the official tests.
3. Notify the Engineer at least 48 hours prior to the time of the requested official tests.
4. Depending on traffic conditions, public hazard, or other reasons, the Engineer may direct when to conduct the tests, and may order the tests to be made in relatively short sections of water mains.

PRELIMINARY FLUSHING:

1. Prior to disinfection, flush main as thoroughly as possible.
  - a. Flush main until water runs clear.
  - b. Provide a minimum flushing velocity of 2.5 feet per second in the water main.
  - c. Provide temporary valve(s), multiple fire hydrants, pipe and erosion control measures to allow adequate flushing of the water transmission system and to prevent disturbance or damage to areas at and downstream of the flushing water discharge location.
2. Coordinate time of flushing with Owner and Engineer, at least 72 hours in advance of flushing.
  - a. Do not initiate flush without Owner's permission.

**DISINFECTION:** After the water main work has been satisfactorily completed and tested, disinfect the work in accordance with AWWA C651, and "Standard Specifications for Water and Sewer Main Construction in Illinois" as modified by these specifications.

Forms of applied chlorine:

1. Apply chlorine by gas feed or solution feed chlorinator, as approved by the Owner.
  - a. Provide effective diffusion of the gas or solution into the water within the water main.
  - b. Provide means for preventing the backflow of water into the feeder.
2. Chlorine solution.
  - a. Apply solution of sodium hypochlorite into one end of the section of main to be disinfected while filling the main with water.

Requirement of chlorine:

1. Initial chlorine solution in pipe: At least 50 mg/l, but not more than 100 mg/l.
2. Retain the disinfecting solutions in the work for at least 24 hours
3. Chlorine residual after the retention period: At least 25 mg/l.

Flushing and testing:

1. Following chlorination, flush treated water thoroughly from the water mains until the chlorine concentration in the water flowing from the main is no higher than generally prevailing in the Municipality's system, or less than 1 mg/l.
2. After flushing, collect two water samples on successive days at least 24 hours apart in sterile bottles treated with sodium thiosulfate. Notify the Engineer and the Owner to witness sample collection.
3. Deliver the samples to a State approved laboratory for bacteriological analysis.
4. Should the initial disinfection result in an unsatisfactory bacterial test, repeat the chlorination procedure until satisfactory results are obtained.
5. The Owner will provide the water for initial flushing and testing only. Compensate the Owner for water used in subsequent flushing and testing.
6. Maintain pressure: immediately after the second day sample has been taken, it shall be the contractor's responsibility to install a certified water valve jumper (see UW-05) to maintain pressure on the new water main until the IEPA permit is received. After receiving the IEPA operating permit, the city of Crystal Lake shall open the valve between the new and existing water main and the water valve jumper may be removed. Water valve jumpers are available for rent at the city of Crystal Lake water department. If water in excess of the allowable leakage enters the new water main through the water valve jumper, the contractor shall locate the leak. If the new water main must be depressurized to fix a leak, the system shall be retested, rechlorinated, reflushed, and resampled.

Swabbing:

Special Provisions  
181171.40

City of Crystal Lake  
IL Route 176 (Terra Cotta Ave) and Main Street  
Section No.: 15-00124-00-PV  
County: McHenry

complete in place by open cut installation for near side services and auguring/moling (trenchless) methods for long side services. This work also includes all required fittings or adaptors necessary to connect to existing service lines, and backfilling with and compacting of trench backfill material.

Service lines shall be flushed until water runs clear or minimum 20 seconds. The contractor shall hire a licensed plumber to connect the homeowner's water service to the new curb stop.

Basis of Payment. This work will be paid for at the contract unit price each for WATER SERVICE CONNECTION (SHORT) and WATER SERVICE CONNECTION (LONG).

### **CASING PIPE, OPEN CUT**

Description. See City detail UW-14. This work consists of installing water main quality (Steel, Ductile Iron, PVC, HDPE) casing pipe in an open cut trench as shown on the Plans, as specified herein, as needed for a complete installation, and in accordance with the latest edition of the "Standard Specifications for Water and Sewer Construction in Illinois", and in accordance with the special provision for "WATER DISTRIBUTION SYSTEM," except as revised herein. This work shall include tight-sheeting where required to protect adjacent utilities, roadways, properties, or to provide protection to the public; protection, repair or replacement of utilities; fencing of work site to provide protection to public; excavation; removal and disposal of waste excavated materials; bracing; dewatering, including erosion and sedimentation control methods and devices to provide protection to the environment from all pumping operations; providing and installing casing pipe; end seals; backfilling with and compaction of excavated materials or trench backfill materials; cleanup; and finish grading.

Before beginning this work, the Contractor shall submit shop drawings to the Engineer which contain the manufacturer's data on installation procedures, casing pipe specifications, and a detailed plan of means and methods to maintain clean and safe conditions during the installation. The Contractor shall obtain approval of these shop drawings prior to beginning this work.

Method of Measurement. This work will be measured for payment in lineal feet along the centerline of the pipe, and will equal the length of the casing pipe.

Basis of Payment. This work will be paid for at the contract unit price per lineal foot for CASING PIPE, of the diameter specified. The diameter specified shall be the diameter of the casing pipe.