PART 1 - GENERAL

1.1 SCOPE OF WORK
   A. Comply with ConnDOT Form 817, Article 9.75.01

1.2 REFERENCES
   A. ConnDOT Form 817

1.3 SUBMITTALS
   A. None Required

PART 2 - PRODUCTS

2.1 MOBILIZATION
   A. No products required.

PART 3 - EXECUTION

3.1 MOBILIZATION
   A. Comply with ConnDOT Form 817, Article 9.75.

PART 4 - METHOD OF MEASUREMENT

A. This item shall be measured individually, under the bid item for “Mobilization”.

PART 5 - BASIS OF PAYMENT

A. This item shall be paid individually, under the Contractor’s lump sum bid price for “Mobilization”.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE OF WORK
   A. Comply with ConnDOT Form 817, Article 2.10.01. This work shall also include implementation of the project’s approved soil erosion and sediment control plan, but shall not include the cost of installing and maintaining certain soil erosion and sediment control measures included in other sections of the technical specifications.

1.2 REFERENCES
   A. ConnDOT Form 817

1.3 SUBMITTALS
   A. None required.

1.4 PROJECT / SITE CONDITIONS
   A. Maintain an on-site copy of any local, state, or federal land-use permits that apply to this project. Adhere to permit conditions, as required.

1.5 SEQUENCING / SCHEDULING
   A. Review the project’s approved soil erosion and sediment control plan and review soil erosion and sediment control measures (as installed) with the Inspector prior to commencement of construction items.

PART 2 - PRODUCTS

2.1 NONE.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHOD
A. Comply with ConnDOT Form 817, Article 2.10.03.

B. Comply with the project’s approved soil erosion and sediment control plan and any conditions imposed on the project through local, state, and federal land-use permits.

**PART 4 - METHOD OF MEASUREMENT**

A. This item shall be measured individually, under the bid item for “Water Pollution Control (Soil Erosion)”.

**PART 5 - BASIS OF PAYMENT**

A. This item shall be paid for in the Contractor’s lump sum bid price for the “Water Pollution Control (Soil Erosion)”.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE OF WORK
   A. Comply with ConnDOT Form 817, Article 2.19.01.

1.2 REFERENCES
   A. ConnDOT Form 817

1.3 SUBMITTALS
   A. None required.

PART 2 - PRODUCTS

2.1 SEDIMENTATION CONTROL SYSTEMS
   A. Comply with ConnDOT Form 817, Article 2.19.02

PART 3 - EXECUTION

3.1 CONSTRUCTION METHOD
   A. Comply with ConnDOT Form 817, Article 2.19.03.

PART 4 - METHOD OF MEASUREMENT

   A. This item shall be measured individually, under the bid item for “Sedimentation Control Systems”.

PART 5 - BASIS OF PAYMENT

   A. This item shall be paid for in the Contractor’s lump sum bid price for the “Sedimentation Control Systems”.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE OF WORK
   A. Comply with ConnDOT Form 817, Article 2.05.01, as it pertains to the removal of:
      B. Rock in definite ledge formation
      C. Boulders, portions of boulders, cement-masonry structures or concrete structures, each discrete object a minimum of one cubic yard or more in volume. Removal of Portland cement concrete pavement or base, if encountered, shall be measured as a separate item.

1.2 REFERENCES
   A. ConnDOT Form 817

1.3 SUBMITTALS
   A. None.

1.4 PROJECT / SITE CONDITIONS
   A. Notify the Inspector immediately when the need for rock-in-trench excavation arises.

1.5 SEQUENCING
   A. Notify the Inspector immediately when the need for rock-in-trench excavation arises.

PART 2 - PRODUCTS

2.1 ROCK-IN-TRENCH EXCAVATION
   A. No products required.

PART 3 - EXECUTION
ROCK EXCAVATION

3.1 CONSTRUCTION METHOD

A. Comply with ConnDOT Form 817, Article 2.05.03.

B. All rock excavation shall be accomplished by mechanical removal or by blasting.

PART 4 - METHOD OF MEASUREMENT

A. Rock-in-trench excavation shall be measured as the actual volume measured in the field, within the contract limits shown on the plans, and approved by the Engineer.

PART 5 - BASIS OF PAYMENT

A. Rock-in-trench excavation shall be paid for as the alternate item unit price for “Rock-In-Trench Excavation”.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Furnish borrow material, as necessary, to replace bedrock, unsuitable soil and/or contaminated soil removed from during construction.

B. Comply with ConnDOT Form 817, Article 2.18.01.

1.2 REFERENCES

A. ConnDOT Form 817

1.3 SUBMITTALS

A. Provide a gradation test from a certified material testing laboratory for a representative sample of borrow material.

1.4 PROJECT / SITE CONDITIONS

A. Notify the Inspector and Engineer immediately if the need for borrow material arises. Do not import borrow material to replace bedrock or unsuitable soil until the Engineer approves of this item in writing.

1.5 SEQUENCING

A. Notify the Inspector and Engineer immediately if the need for borrow material arises. Do not import borrow material to replace bedrock or unsuitable soil until the Engineer approves of this item in writing.

PART 2 - PRODUCTS

2.1 BORROW

A. Comply with ConnDOT Form 817, Article 2.07.02
PART 3 - EXECUTION

3.1 CONSTRUCTION METHOD

A. Comply with ConnDOT Form 817, Article 2.07.03.

PART 4 - METHOD OF MEASUREMENT

A. Borrow excavation shall be measured as the actual volume measured in the field, and approved by the Engineer.

PART 5 - BASIS OF PAYMENT

A. Borrow excavation shall be paid for as the alternate item unit price for “Compacted Gravel Fill”.

END OF SECTION
EXCAVATION

02-220-1

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Provide all labor, tools, materials, equipment and incidentals required to perform the work called for in this Section of the Specifications, including, but not necessarily limited to, the following:

B. The Contractor shall make all earth excavations and rock excavations, including removal of existing pavements, road base, curbs, walks, and abandoned pipes and structures encountered in the construction of the utilities, services, appurtenances, structures, roadway and the Storm Water Basin as required for the proper completion of the work included under this Contract, and shall dispose of all unsuitable excavated materials as specified herein.

C. The excavation shall include stripping topsoil, saw cutting of pavements and sidewalks, removal, handling, stockpiling and disposal of any and all materials encountered within the limits of the work, and shall include all pumping, bailing, draining, sheeting, shoring, cofferdaming and protection therefore.

PART 2 - SUBMITTALS:

2.1 DESIGN DRAWINGS

A. Prepare and submit the following design drawings. All design drawings shall be signed and sealed by an engineer registered in the State of Connecticut:

1. Excavation Plan - The excavation plan shall outline the methods and procedures that the Contractor will employ to successfully stabilize excavations, as required to construct the work.

2. Excavation Dewatering Plan - The excavation dewatering plan shall outline the methods and procedures that the Contractor will employ to successfully dewater excavation and dispose of the dewatering wastewater, including measures for erosion control and sediment removal.

   a. The Contractor shall submit separate Excavation Plans and Excavation Dewatering Plans for:
      1) Roadway/Drainage Piping construction
2) Stormwater Basin construction.

2.2 MATERIALS:

A. "Earth" shall consist of all materials, with the exception of rock, removed as indicated or directed from within the excavation limit lines.

B. "Rock" shall consist of definite ledge formation, boulders or portions of boulders, cement masonry structures, concrete structures, Portland cement concrete pavement or base, each discrete object a minimum of 1 cubic yard or more in volume, removed as indicated or directed from within the excavation limits.

PART 3 - EXECUTION

3.1 EXECUTION:

A. Roadway excavation shall conform to Section 2.02 of Form 816. It shall include removal of existing pavement, base and sub-base, portions of driveways including pavement and base, with limits shown on the plans.

B. Structure excavation shall conform to Section 2.03 of Form 816.

C. Excavation – earth and rock, required for installation of the removal of existing storm drainage structures and piping, construction of new storm drainage structures and piping, new water mains, services and appurtenances, and other utilities will not be measured under this section, but under Sections 02-266 Water Distribution System, and 02-700 Storm Drainage system.

D. Pavement, driveways, curbs and sidewalks shall be cut as required with a pneumatic tool or saw, removed, and disposed of by the Contractor.

E. If the bottom of any excavation is taken out beyond the limits indicated or prescribed, the resulting void shall be backfilled at the Contractor's expense with thoroughly compacted, suitable backfill material as described in Section 02-240, Compacted Gravel Fill.

F. All suitable material removed in making the excavation shall be used for backfill where required. All surplus or unsuitable material shall be removed and disposed of by the Contractor. Suitable material is specified under Section 02-240, Compacted Gravel Fill.
G. If material unsuitable for subgrade in the roadways, at the Storm Water Basin, or in other locations on the site (in the opinion of the Engineer) is found at or below the grade to which excavation would normally be carried, the Contractor shall remove such material to the required width and depth and replace it with thoroughly Compacted Gravel Fill as directed. The Contractor will be compensated for this Compacted Gravel Fill under section 02-240.

H. For Stormwater Basin Construction, all topsoil shall be removed and stockpiled as shown on the plans. Refer to Section 02-910 Grass Surface Restoration for compensation for excavation and stockpiling of topsoil for re-use.

I. The Contractor shall note that there may be other existing utilities in close proximity to the work. These utilities have been indicated on the drawings, but the completeness or accuracy of the information given is not guaranteed. It is the Contractor's responsibility to make himself aware of these locations and to contact Call-Before-You-Dig prior to any excavation.

J. As the excavation approaches pipes, conduits or other underground structures, digging by machinery shall be discontinued and the excavation shall be done by means of hand tools. Such manual excavation, when incidental to normal excavation, shall be included in the work to be done under items involving normal excavation.

K. Where determination of the exact location of pipe or other underground structure is necessary for doing the work properly, the Contractor may be required to excavate test pits to determine such locations, at no extra cost to the Owner.

L. Until final acceptance of the work, the Contractor shall pump out, or otherwise remove and dispose of as fast as it may collect, any water or other liquids which may be found or may accumulate in the excavations. Perform this in full conformance with their approved Excavation Dewatering Plan.

M. There shall be upon the work at all times during the construction proper and approved machinery of sufficient capacity (including spare units kept ready for immediate use in case of breakdowns) to meet the maximum requirements for the removal of the water or other liquids and their disposal in such a manner as not to withdraw sand or cement from the concrete and so as not to interfere with the proper laying of pipe and/or masonry, or the prosecution of work under this or other contract, nor endanger existing structures.

N. All existing walks, pipes, conduits, poles, wires, fences, stairways, curbings, property line markers, walls, buildings and other structures which do not, in the opinion of the Engineer, require to be changed in location, shall be carefully supported and protected from injury by the Contractor without additional compensation, and in case of injury,
they shall be restored by him without compensation therefor, to as good condition as that in which they were found.

O. Tree roots shall not be mutilated, nor shall they be cut, except by permission of the Engineer. When permitted to cut tree roots, the ends shall be cut off smooth, without splitting or shattering. The trunks of the trees shall be carefully protected from damage, and if unavoidable damage occurs, the injured portions shall be neatly trimmed and covered with an application of grafting wax or other approved preparation. Power driven excavation machinery shall be handled with care to prevent damage to shade trees, particularly to overhanging branches, and branches shall not be cut off except by special permission of the Engineer.

P. The Contractor shall, at his own expense, dig up, handle, protect and properly reset hedges, small trees, shrubbery, signs, posts, guard rails, curbing other than bituminous and the like along the line of or adjacent to the work, and shall take all reasonable care in this work not to disturb any object that can be saved in its existing condition.

PART 4 - METHOD OF MEASUREMENT

A. This item shall not be measured individually, but instead shall be measured as part of the contract unit price for the water main, water service connection, fire hydrant assemblies, drainage structures, and drainage piping.

B. This item shall not be measured individually, but instead shall be measured as part of the contract unit price for “Base and Subbase”, and “Storm Water Basin”.

PART 5 - BASIS OF PAYMENT

A. This item shall not be paid for individually, but instead shall be paid as part of the contract unit price for the water main, water service connection, fire hydrant assemblies, drainage structures, and drainage piping.

B. This item shall not be paid for individually, but instead shall be paid as part of the contract unit price for “Base and Subbase”, and “Storm Water Basin”.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Comply with ConnDOT Form 817, Article 2.14.01, Compacted Granular Fill.

B. Provide all labor, tools, materials, equipment and incidentals required to perform the work called for in this Section of the Specifications, including, but not necessarily limited to, the following:

1. The placement and compaction of granular fill for use as:
   a. Base material beneath pads, floors, tanks, drainage structures, and other structures on-site.
   b. Structure backfill as designated on the construction drawings.
   c. Trench backfill, once all suitable material that was excavated has been previously utilized.
   d. In other areas as designated on the Contract drawings, in these Contract specifications or as directed by the Engineer.

PART 2 - MATERIALS

2.1 COMPACTED GRAVEL

A. Gravel shall conform to the requirements of Article M.02.02, Form 817. Admixture and surface protective materials used to prevent the gravel from freezing, must meet the approval of the Engineer.

B. Compacted Granular Fill used as pavement base, shall conform to M.02.03 of Form 817, Grading A, except that the top course shall conform to Grading "C" M.02.03.

C. Compacted Granular Fill used as trench backfill shall conform to M.02.01 of Form 817.

D. Compacted Granular Fill used under drainage structures shall be 3/4" trap rock, crushed stone, or screened gravel conforming to M.02.05 of Form 817.

PART 3 - EXECUTION
3.1 CONSTRUCTION METHOD

A. Submit one gallon sample of gravel fill material, certified sieve sample of gravel fill material, proctor test results from a certified testing lab, along with location of proposed source to Engineer for approval.

B. Construction involving compacted gravel fill shall be in accordance with Section 2.14.03, Form 817.

C. Gravel fill shall be compacted in no greater than 12" lifts.

D. The Contractor shall compact gravel fill until the dry density for each layer is not less than 95 percent of the dry density achieved by AASHTO T180, Method D. A minimum of one compaction test is required for each structure. Where compaction tests fail, the Contractor shall be required to recompact the soil or remove the soil and replace with more suitable material. Notify the Engineer a minimum of three days prior to requiring compaction testing. All compaction testing shall be conducted by and paid for by the Contractor.

PART 4 - METHOD OF MEASUREMENT

A. This item shall be measured as the cubic yard of compact gravel fill, measured in place, ordered by the Engineer, installed by the Contractor, and accepted by the Owner.

PART 5 - BASIS OF PAYMENT

A. This item shall be paid for at the contract unit price for “Compacted Granular Fill”.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Provide all labor, tools, materials, equipment and incidentals required to perform the work called for in this Section of the Specifications, including, but not necessarily limited to, the following:

B. Install sand bedding and backfill for water mains.

C. Install backfill material for trench backfill and other areas as required to produce desired grades.

D. Install compacted processed aggregate base material as top surface along woods road above water main.

PART 2 - MATERIALS

2.1 WATER MAINS AND STORM DRAINAGE

A. Sand for pipe bedding and backfill: Comply with ConnDOT Form 817, Article M.08.03.01 – bedding sand, provided that 95% standard proctor compaction under pavement areas can be achieved. For instances of high ground water in the trench, the Engineer may allow No. 6 Stone conforming to M.01.01 in lieu of sand.

B. Sand shall be the fine granular material naturally produced by the disintegration of rock and shall be sufficiently free of organic material, mica, loam, clay and other deleterious substances. In case visual inspection of the sand indicates that it is too coarse, the following gradation shall determine its acceptability:

<table>
<thead>
<tr>
<th>SIEVE SIZE</th>
<th>PERCENT PASSING SIEVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8 inch</td>
<td>100</td>
</tr>
<tr>
<td>#4</td>
<td>95-100</td>
</tr>
<tr>
<td>#8</td>
<td>80-100</td>
</tr>
<tr>
<td>#16</td>
<td>50-85</td>
</tr>
<tr>
<td>#30</td>
<td>25-60</td>
</tr>
<tr>
<td>#50</td>
<td>10-30</td>
</tr>
<tr>
<td>#100</td>
<td>2-10</td>
</tr>
</tbody>
</table>
C. All imported material used for trench backfill shall conform to Section M.02.01 - Granular Fill, of Form 817.

D. The nature of the materials will govern both their acceptability for backfill and the methods best suited for their placement and compaction in the backfill. In general, material used for backfilling trenches and excavations around structures shall be suitable material which was removed in the course of making the construction excavations complying with Section M.02.01 – Granular Fill, of Form 817. The source and quality of all materials brought in from off-site must be approved by the Owner, prior to delivery.

E. No stone or rock fragment larger than 12 inches in greatest dimension shall be placed in the backfill, nor shall large masses of backfill material be dropped into the trench in such a manner as to endanger the pipeline. Pieces of bituminous pavement shall be excluded from the backfill.

PART 3 - EXECUTION

A. As soon as practicable after the pipes have been laid or the structures have been built and are structurally adequate to support the loads, including construction loads to which they will be subjected, the backfilling shall be started and thereafter it shall proceed until completion.

1. Zone Around Pipe: The space between the pipe and bottom side of the trench shall be packed full by hand shovel with sand. In placing the material, care shall be taken that stones do not strike the pipe. The backfill under the pipe shall be thoroughly compacted using curved tamping bars. Sand backfill at the sides and up to the top of the pipe shall be compacted using approved hand tampers. Sand backfill up to a level of 1 foot above the top of the pipe shall be placed in 6-inch layers, leveled along the length and width of the trench, and thoroughly compacted using approved tampers. No sand shall be placed above the top of the pipe until sand under and at the sides of the pipe has been compacted. Care shall be taken in the use of mechanical or other tampers not to injure or move the pipe, or to cause the pipe to be supported unevenly.

2. Remainder of Trench: The remainder of the trench above the zone around the pipe may be placed in one layer, provided it is compacted by means of a hoe-pack to achieve a 95% modified proctor density. If a hoe-pack is not used, the backfill shall be spread in layers not exceeding twelve (12) inches in depth prior to compaction. Each layer shall be carefully and thoroughly tamped with approved tools in such a manner as to prevent settlement after the backfill has been completed and to achieve a 95% modified proctor density. Compaction tests (initially to verify proper compaction, then one per 200 feet thereafter, and/or
required by the Inspector) will be required to verify that proper compaction is achieved. Compaction tests will be conducted by the Contractor.

PART 4 - METHOD OF MEASUREMENT

A. This item, excluding processed aggregate base for woods road restoration, shall not be measured individually, but instead shall be measured as part of the contract unit price for the water main, water service connection, or fire hydrant assemblies.

B. “Processed aggregate base” shall be measured within the payment limits shown on the drawings, and will be the cubic yards of compacted processed aggregate base material placed on site, and accepted by the Owner.

PART 5 - BASIS OF PAYMENT

A. This item shall not be paid for individually, but instead shall be paid as part of the contract unit price for the water main, water service connection, or fire hydrant assemblies.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Provide all plant, materials, supplies, power, machinery, equipment, tools, superintendence, labor, overhead, profit, insurance, bonds, permits, shop drawings, design services (where required), and other services and accessories required to furnish and install the work of this Section, complete and in place.

B. The work of this Section includes:

1. Selective clearing and thinning of trees, brush, shrubbery, etc. Comply with ConnDOT Form 817, Article 9.52.01.
2. Construction staking of all water mains and appurtenances in this Section. Comply with ConnDOT Form 817, Article 9.80.01.
3. Trench excavation and backfill, excluding rock-in-trench excavation, but including removal and disposal of existing water mains and valves, miscellaneous pipes and other obstructions, existing pavement, curbs, and walks, etc. Comply with ConnDOT Form 817, Article 2.05.01.
4. Design, installation, maintenance, operation, and protection of all pumping, bailing, draining, sheeting, shoring, and cofferdams necessary to successfully construct the work.
5. The removal, handling, protection, and resetting of hedges, small trees, shrubbery, signs, posts, guide rails, mail boxes, and the like.
6. The bracing of utility poles in close proximity to the excavation.
7. Furnish and install water main pipe bedding.
8. Furnish and install new water mains, tapping sleeves and tapping valves, gate valves, restrained joints, tees (excluding hydrant tees), bends, reducers, end caps, thrust blocks, cutting and capping of existing mains, insulation, magnetic indicating tape, and all other related fittings and work.
9. Flush and disinfect new water mains and appurtenances.
10. Provide combined pressure and leakage tests on the new water main and appurtenances.

1.2 RELATED DOCUMENTS

A. The publications listed below form a part of this specification to the extent referenced. These publications are referred to in the text by the basic designation only.
WATER DISTRIBUTION SYSTEM

<table>
<thead>
<tr>
<th>Basic Designation</th>
<th>Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSI/AWWA</td>
<td>ANSI/AWWA Standards, latest edition, including all revisions and addenda.</td>
</tr>
<tr>
<td>ConnDOT Form 817</td>
<td>State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction, Form 817 – 2016; including all latest revisions and addenda.</td>
</tr>
<tr>
<td>NSF-61</td>
<td>National Sanitary Foundation – Standard 61</td>
</tr>
</tbody>
</table>

1.3 SUBMITTALS

A. Shop Drawings

1. Prepare and submit shop drawings for the following items:
   a. Trench dewatering system components.
   b. Pressure and leakage testing system components.

B. Product Data

1. Procure and Submit product data for the following items:
   a. Ductile iron pipe
   b. Mechanical joint fittings, including but not limited to tees, bends, reducers, solid sleeves, end caps, and other related fittings.
   c. Polyethylene encasement
   d. Rubber gaskets for push-on joints
   e. Field-Lok™ gaskets, if proposed for use
   f. Tapping sleeves and tapping valves
   g. Gate valves
   h. Mechanical thrust restraint for push-on joint and mechanical joint pipe
   i. Rigid board insulation
   j. Lubricant (Pipe Soap)

C. Samples

1. Procure and submit samples for the following items:
   a. Gradation test from a certified material testing laboratory for water main bedding material.

D. Design Drawings

1. Prepare and submit the following design drawings. All design drawings shall be signed and sealed by an engineer registered in the State of Connecticut:
a. Excavation Plan - The excavation plan shall outline the methods and procedures that the Contractor will employ to successfully stabilize excavations, as required to construct the work.

b. Trench Dewatering Plan - The trench dewatering plan shall outline the methods and procedures that the Contractor will employ to successfully dewater trenches and dispose of the dewatering wastewater, including measures for erosion control and sediment removal.

E. Product Test Data:

1. Submit product test data to the Engineer for the following items. All tests shall be conducted by a qualified material testing laboratory and sealed by a licensed professional engineer in the State of Connecticut.
2. Gradation test for water main bedding material.

F. Contractor Permits

1. Submit copies of the following Contractor-acquired permits to the Engineer:
   a. All permits required by Federal, State, and Local authorities.

G. Miscellaneous Items

1. Prepare and submit the following miscellaneous items to the Engineer:
   a. Potable water test results for each segment of water main tested.
   b. Pressure and leakage test results for each segment of water main tested.

1.4 PROJECT CONDITIONS

A. Coordinate the trench dewatering plan with the requirements outlined in the project’s Soil Erosion and Sediment Control Plan and in any conditions set forth in the project’s landuse permits.

1.5 SEQUENCING

A. Provide written notice of all planned shutdowns to all effected customers, the Owner, and Engineer at least 24 hours prior to commencement of shutdown.

B. Disinfect, flush, and conduct potable water tests before commencement of pressure and leakage testing.

C. Coordinate sequencing of flushing, disinfection, and pressure and leakage testing with the Engineer.
PART 2 - PRODUCTS

2.1 TRENCH EXCAVATION
   A. Furnish appropriate equipment and products (as approved by the Engineer) for treatment and disposal of trench dewatering wastewater.
   B. Furnish materials and products required for safe and effective bracing and shoring of the trench excavation.

2.2 WATER MAIN BEDDING
   A. Comply with ConnDOT Form 817, Article M.03.01 - Item 2 (FINE AGGREGATE).

2.3 DUCTILE IRON PIPE
   A. Pipe for water mains shall be ductile iron, meeting all requirements of ANSI/AWWA C151/A21.51.

   1. Acceptable Manufacturers include:
      a. U. S. Pipe
      b. McWane Ductile
      c. Clow Corporation
   2. Pipe thickness shall meet all requirements of AWWA C150/A21.50 – Class 52.
   3. All piping shall be cement-lined (double-thickness) with seal coat inside and out in accordance with AWWA C104/A21.4.
   4. All pipe joints (unless otherwise specified on the plans or these specifications), shall be push-on joints, employing a single rubber gasket, to affect a watertight seal. The push-on joint shall be the “Tyton” joint pipe, as manufactured by U.S. Pipe or equivalent.
   5. Rubber gasket joints shall conform to AWWA C111/A21.11.
   6. All interior applied coatings, field lubricants used to make joints, etc. shall meet NSF Standard 61.

   B. Use Dresser Style 38 or equivalent couplings for joining plain ends of cast iron or ductile iron pipes in non thrust-restraint zones.

2.4 DUCTILE IRON FITTINGS
   A. Fittings for water mains shall be the ductile iron compact mechanical joint fittings, meeting all requirements of AWWA C153/A21.53.
1. Fittings include but may not be limited to all tees, bends, reducers, end caps, and plugs.
2. Fittings shall have pressure rating at least 350 PSI, or an equivalent pressure rating to that of the pipe, whichever is greater.
3. All fittings shall be cement lined (double thickness), with seal coat inside and out, in accordance with AWWA C104/A21.4

2.5 GATE VALVES (12-INCH DIAMETER AND SMALLER)

A. Use resilient seated, iron body, bronze mounted resilient wedge, “O-ring” seal, with mechanical joint ends and non-rising inside screw for underground valves, conforming to the requirements of AWWA C509.

1. Valves 12 inches and smaller shall be designed for a working pressure of 200 pounds per square inch.
2. Valves shall have a clear waterway equal to the full nominal diameter of the valve.
3. Valves shall open to the left. Verify with owner prior to ordering.
4. Provide stationary rods for all valves.
5. Acceptable manufacturers include:
   a. Muller
   b. Kennedy
   c. Clow
   d. M & H

2.6 THRUST RESTRAINT

A. Primary Thrust Restraint – Ductile Iron Pipelines:

1. For restraint of mechanical joints at all ductile iron fittings and gate valves, use Megalug Series 1100 mechanical joint restraint by EBAA Iron Co. or equivalent product. Mechanical joint restraint shall be capable of withstanding a sustained pressure of 150 PSI and intermittent pressure of 300 PSI within the water mains.
2. For restraint of push-on joints within thrust-restraint zones, use Megalug Series 1700 joint restraint by EBAA Iron Co. or equivalent product. Push-on joint restraint shall be capable of withstanding a sustained pressure of 150 PSI and intermittent pressure of 300 PSI within the water mains.

B. Redundant Thrust Restraint (All Pipelines > 2-inch Diameter)

1. Use pre-cast concrete thrust blocks of the size and shape indicated on the Contract Drawings to provide redundant thrust restraint at horizontal or vertical bends and tees. Pre-cast concrete blocks shall comply with ConnDOT Form 814 – Article
M.08.02 – Item 2 “Concrete Building Brick for Catch Basins, Manholes, or Drop Inlets”.

2.7 PIPE JOINT PROTECTION

A. Use “Mueller Series 200 Bell Joint Repair Clamps” or equivalent, where indicated on the Contract Drawings or where directed by the Engineer, to protect pipe joints in close proximity to sanitary sewer manholes.

2.8 COPPER WATER AND HDPE PIPE AND COUPLINGS

A. Copper Water Mains: Use soft, annealed, seamless copper tubing, conforming to ASTM B88, Type K.

B. Couplings: Use appropriate, compression couplings conforming to ANSI Standard B16.26 to join lengths of new pipe and to join new pipe to existing, small-diameter water mains.

C. Polyethylene water lines: conform to AWWA C-901, 200 psi pressure rated. Provide full coils wherever possible, to minimize joints. Provide brass inserts and double pipe clamps at all joints.

2.9 BALL VALVES (2-inches and smaller)

A. Comply with AWWA Standards C600 and C800

2.10 RIGID FOAM INSULATION

A. Use rigid foam insulation of the sizes and types indicated on the Contract Drawings or as directed by the Engineer to protect water mains from potential freezing conditions. Rigid foam insulation shall possess the following characteristics:

1. Rigid closed-cell, expanded polystyrene board.
2. 1.5-inch thick extruded board
3. Comply with FS-HH-I-524, Type II, Class B.
4. Compressive strength: 30 psi.
5. Water adsorption: 1.0 perm per inch maximum.
6. Thermal conductivity: (K-value at 75° F) – 0.2.
B. All insulation, jacketing, and related materials to be utilized in conjunction with this project shall conform to the Contract Drawings and Specifications and must be submitted to the Engineer for approval prior to use.

2.11 UNDERGROUND WARNING TAPE

A. Underground warning tape shall be durable magnetic indicating tape, designed to withstand underground exposure, blue in color, and printed with an appropriate warning message.

2.12 DISINFECTION AND FLUSHING

A. Provide all tools, power, materials, and chemicals necessary to disinfect, test, flush, and de-chlorinate the water main and appurtenances, in conformance with AWWA Standards C600 and C651 and Standards stated in Section 19-13-B102 of Regulations of Connecticut State Agencies.

2.13 PRESSURE TESTING

A. Provide all tools, materials, test plugs, caps, pumps, pipe connections, water meter, pressure gauges, and other equipment required to perform pressure and leakage testing in conformance with AWWA Standard C600.

B. The gauge used in the pressure and leakage testing apparatus shall be a minimum of 4-inches in diameter and pressure increments shall not exceed 2 P.S.I.

PART 3 - EXECUTION

3.1 TRENCH EXCAVATION

A. This item does not include rock-in-trench excavation.

B. Comply with ConnDOT Form 817, Article 2.05.03.

C. Clear and thin trees, brush, and shrubbery, as necessary to construct the work. Comply with ConnDOT Form 817, Article 9.52.03.

D. Stake out all construction items. Comply with ConnDOT Form 817, Article 9.80.03.
E. Remove and dispose of existing water mains and valves, miscellaneous pipes, other obstructions, and existing pavement, curbs, and walks, as necessary, to construct the work.

F. Design, install, maintain, operate and protect all pumping, bailing, draining, sheeting, shoring, and cofferdam facilities necessary to construct the work.

G. Remove, handle, protect, and reset hedges, small trees, shrubbery, signs, posts, guide rails, mail boxes, and other site improvements, as necessary to construct the work.

H. Brace utility poles in close proximity to the excavation, as necessary, to construct the work.

3.2 WATER MAIN BEDDING

A. Comply with ConnDOT Form 817, Article 6.51.03. Use Type II installation procedures.
   1. Delete the dimensions referred to in Article 6.51.03 and replace with the dimensions shown on the Contract Drawings.
   2. Delete references to “culverts” and replace with references to “water main pipe”.

3.3 DUCTILE IRON PIPE

A. Comply with AWWA Standard C600.

B. Flush and disinfect all ductile iron pipes constructed under this Contract in accordance with requirements outlined elsewhere in this specification.

C. Conduct pressure and leakage tests on all ductile iron pipes constructed under this Contract in accordance with requirements outlined elsewhere in this specification.

D. Cut, cap, and restrain existing water mains where indicated on the Contract Drawings.

3.4 DUCTILE IRON FITTINGS

A. Comply with AWWA Standard C600

B. Restrain mechanical joints at all fittings as described elsewhere in this specification.

3.5 GATE VALVES (12 INCHES AND SMALLER)
A. Comply with AWWA Standards C600, C500-Appendix A, and C509 Appendix A.

B. Restraint mechanical joints at gate valves as described elsewhere in this specification

3.6 THRUST RESTRAINT

A. Primary Thrust Restraint – Ductile Iron Pipelines:
   1. Install mechanical joint restraint on all ductile iron fittings and gate valves in strict compliance with manufacturer’s instructions.
   2. Install restraint harnesses on push-on joints within thrust-restraint zones in strict compliance with manufacturer’s instructions.

B. Redundant Thrust Restraint (All Pipelines > 2-inch Diameter)
   1. Use pre-cast concrete thrust blocks of the size and shape indicated on the Contract Drawings to provide redundant thrust restraint at horizontal or vertical bends and tees.
   2. Place all thrust blocks firmly between the fitting and trench wall, in an alignment that coincides with the direction of thrust.

3.7 PIPE JOINT PROTECTION

A. Furnish and install bell joint repair clamps where indicated on the Contract Drawings or directed by the Engineer.

B. Install bell joint repair clamps in strict compliance with manufacturer’s instructions.

3.8 BALL VALVES (2 INCHES AND SMALLER)

A. Comply with AWWA Standards C600 and C800.

3.9 RIGID FOAM INSULATION

A. Contact the Engineer immediately for insulation instructions if field conditions warrant substandard cover.

B. Furnish and install rigid foam insulation as directed by the Engineer

3.10 UNDERGROUND WARNING TAPE
A. Furnish and install continuous underground warning tape at the depth indicated in the Contract Drawings. Center the warning tape above new water mains. Departure from true centerline of water main shall not exceed six inches.

3.11 DISINFECTION AND FLUSHING

A. Disinfect all new water mains completed under this Contract. Comply with AWWA Standard C600 and C651.

B. Thoroughly flush all pipelines prior to the disinfection process.

C. Install a double check-valve between the test-water source and the new water distribution system. Provide other safety measures as may be required.

D. Following the disinfection process, thoroughly flush all pipelines before sampling for tests.

E. Following the flushing process, retrieve and convey test samples to a certified water testing laboratory. Water samples shall be analyzed for coliform bacteria, heterotrophic plate count (HPC), and physical parameters (pH, Color, Odor, Turbidity), Total Chlorine Residual. To pass, test results must reveal total coliform (TC) = 0 and heterotrophic plate count (HPC) <100 colonies/mL.

F. If, the Owner and/or Engineer determine that the disinfection process failed, repeat the entire disinfection process to the satisfaction of the Owner, at no cost to the Owner, and without extension of time for completion of the work.

G. Dispose of all chlorinated test water in accordance with local, state, and federal regulations (which may require de-chlorination). Obtain all required discharge permits prior to start of the disinfection process.

3.12 PRESSURE AND LEAKAGE TESTING

A. Conduct pressure and leakage testing on all new water mains completed under this contract. Comply with AWWA Standard C600.

B. If hydrants or blow-offs are not available for releasing air, excavate at high points, tap the main, and install a plug for air release. Install plug and backfill the excavation following successful completion of the test.

C. If the section shall fail to pass the pressure and leakage test, locate, uncover, retest and repair or replace the defective pipe, fitting or joint, all at no cost to the Owner and without
extension of time for completion of the work. Make additional tests and repairs until the section passes the specified tests.

D. The Owner will provide at no charge to the Contractor, the necessary water for this initial pressure and leakage tests. If this initial test fails, the Owner will charge the Contractor for all subsequent required water.

PART 4 - METHOD OF MEASUREMENT

A. New water mains shall be measured as the actual linear feet of that size pipe measured in place along the centerline of the pipe installed in accordance with these Contract Drawings and Specifications, through pipe, fittings, valves, appurtenances, testing, and all other work not measured or paid for under any other item.

B. Trench excavation, bedding, backfill, paving, sidewalks, curbs and lawn restoration shall not be included in any of the above items.

C. Water main fittings and appurtenances shall be measured as the actual number and size of each fitting installed by the Contractor, and accepted for use by the Engineer.

PART 5 - BASIS OF PAYMENT

A. The water mains shall be paid for at the Contract Unit Price of the specified items. Seventy five (75) percent of the unit price will be payable once the mains are installed, with the remaining 20% payable once the water quality and pressure and leakage tests are approved by the owner, with 5% held as retainage.

B. Water main fittings and appurtenances shall be paid for at the Contract unit price for that type and size of fitting.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. The scope of work in this Section includes the following items:

1. Furnish and place topsoil in areas designated on the Contract Drawings. Comply with ConnDOT Form 817, Article 9.44.01.
2. Establish turf in areas designated in the Contract Drawings. Comply with ConnDOT Form 817, Article 9.50.01. Erosion control matting is not required.

1.2 RELATED DOCUMENTS

A. ConnDOT Form 817.

1.3 SUBMITTALS

A. Material certification for topsoil.
B. Material certifications for grass seed, lime, fertilizer, and mulch.

1.4 PROJECT / SITE CONDITIONS

A. No special conditions apply.

1.5 SEQUENCING

A. Regrade areas disturbed by construction activities and establish turf immediately upon completion of subsurface construction.

PART 2 - PRODUCTS

2.1 GRASS SURFACE RESTORATION

A. Topsoil: Comply with ConnDOT Form 817, Article 9.44.02.
B. Turf Establishment: Comply with ConnDOT Form 817, Article 9.50.02.
PART 3 - EXECUTION

3.1 GRASS SURFACE RESTORATION:

A. Topsoil: Comply with ConnDOT Form 817, Article 9.44.03.

B. Turf Establishment: Comply with ConnDOT Form 817, Article 9.50.03.

PART 4 - METHOD OF MEASUREMENT

4.1 GRASS SURFACE RESTORATION

A. This item shall be measured as the actual square yard finished surface area that has developed sufficient seed germination and turf establishment, as determined by the Engineer, in accordance with the limits shown on the Contract Drawings and Specifications.

PART 5 - BASIS OF PAYMENT

5.1 GRASS SURFACE RESTORATION

A. This item shall be paid for at the Contract unit price for “Grass Surface Restoration”

END OF SECTION