

PORTSMOUTH WATER AND FIRE DISTRICT
1944 East Main Road, PO Box 99, Portsmouth, RI 02871
401-683-2090

WATER MAIN EXTENSION POLICY, PROCEDURES AND REQUIREMENTS

Approved: November 19, 1991

Revised for Rates: May 1, 2007

Revised for Rates: May 1, 2016

Revised for Material Standards and Procedures and Requirements: Board Approved March 19, 2019

A. POLICY FOR WATER MAIN EXTENSIONS

1. The Applicant shall submit a written request to the Administrative Board for each water main extension.
 - a. The written request shall indicate the name, location, map and lot numbers and zoning of the property the main extension will serve.
 - b. A master site plan of the area to be served shall be provided with the written request. The master plan shall be at a scale sufficient to provide the plan on a maximum size sheet of 11" x 17".
 - c. The written request shall indicate the number of residential lots to be served by the proposed extension. For non-residential uses, the Applicant must show the building footprint on the master plan, the square footage of occupancy and an estimate of water usage. The usage estimate shall include average day, maximum day and peak demand and shall be prepared and stamped by a professional engineer registered in the State of Rhode Island.
 - d. Site plans for water main extensions shall be submitted, along with the required application fee, as specified herein.
2. Applications for water service in areas of the District previously unserved shall be granted under the following conditions:
 - a. Water mains shall be constructed to the end(s) of Applicant's property line(s) which abut(s) property, if any, not then having other reasonable access to District water lines.
 - b. New water mains constructed hereunder shall be connected to all existing water mains proximate to the area wherever practical for the purpose of "looping" the District system. This section shall be interpreted so as to provide access to District water lines for the greatest potential number of future water customers within the District and in furtherance of the purposes for which this District was incorporated and to minimize the number of dead-end pipelines.
 - c. All water main and service connection materials, construction and inspection required hereunder shall be at the sole cost and expense of the Applicant.
 - d. All applications made hereunder shall include construction plans approved in writing by the District and in compliance with the specifications herein.
 - e. Easements in a form acceptable to the Administrative Board permitting the maintenance, repair or replacement of water liens and all other related activities by the District shall be required from the Applicant.
 - f. Review of any requirements for water service hereunder shall be considered by the Administrative Board upon written request by Applicant.
 - g. The Administrative Board reserves the right to reject any application for service to any property owner or developer if, in the opinion of the Board, such application or combined applications might jeopardize the existing water system by causing an excessive demand upon the District's contracted supply, or by affecting the District's ability to deliver water for domestic use or fire protection.

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3. The Board may approve a permanent dead-end water main extension that is hydraulically designed to serve only the applicant's subdivided property provided the Board determines that:
 - a. A loop-in of the extension is not feasible and/or will not offer a significant benefit to the existing or future water system by:
 - 1) Providing water main access to other areas that may be developed in the future
 - 2) Eliminating existing dead-end mains
 - 3) Improving system reliability
 - 4) Improving water quality, and/or
 - 5) Improving fire protection;
 - b. The existing water system can provide adequate fire protection for the applicant's property;
 - c. The water main extension will service six or fewer single family dwelling units
 - d. The approval of a hydraulically designed water main does not otherwise increase the District's exposure to potential new customers
 - e. The size of the hydraulically designed water main does not exceed a nominal pipe diameter of three inches (3")

B. PROCEDURE FOR SUBMITTAL OF PLANS FOR WATER MAIN EXTENSION APPROVAL

1. The submittal procedure shall be as follows:
 - a. The Applicant shall submit two (2) paper sets as well as a pdf copy of of the construction drawings to the District for approval.
 - b. Upon review by the District Engineer, one (1) set of the prints with the required modifications duly noted, if any, shall be returned to the Applicant.
 - c. The required modifications, if any, shall be carefully and neatly incorporated onto the original construction drawings by the Applicant.
 - d. Three (3) sets of prints of the revised construction drawings shall be submitted to the District Engineer by the Applicant for final review and approval. If the revised drawings are not acceptable, the applicant shall revise and resubmit the drawings until approval is given.
 - e. One (1) set of the approved drawings shall be returned to the Applicant for his records.
2. Drafting Standards
 - a. Site Plans shall meet the following standards:
 - 1) Drawings shall include a legend containing the name of the subdivision or project, the name of the Applicant, the name of the person or company that prepared the plans, the date and the scale.
 - 2) Plans shall be orientated such that north is located in the upper right hand quadrant of the drawing. A north arrow shall be shown on each plan.
 - 3) Match lines to other plans shall be provided.
 - 4) Plans shall be drawn to a horizontal scale of forty feet to the inch. The vertical scale of profiles shall be four feet to the inch.
 - 5) Drawings shall be professionally drafted and stamped by a professional engineer registered in the State of Rhode Island.
 - 6) Drawings shall be 24" x 36" in size.
3. Site Plan Standards
 - a. Water main drawings shall include the following information:
 - 1) Proposed roadways and road rights-of way including all property lines and street lines.
 - 2) Existing and required utility easements.
 - 3) All future roadways planned by the Applicant or required by the Town of Portsmouth Planning Board.

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- 4) Dimensions for all property lines and centerline of road lengths; property line angles and arcs shall be clearly shown.
 - 5) Existing water system including mains, valves, hydrants, blowoffs, tees and branches left for future system expansion and other appurtenances.
 - 6) Proposed water system.
 - 7) All other existing and proposed utilities including but not limited to, storm sewers and catch basins, sanitary sewers, underground electrical and telephone line, utility poles, gas lines, cable television, etc.
 - 8) Complete detail of adjacent roadways, easements, utilities, etc., when the District requires the proposed water main extension to be looped into the existing water system.
 - 9) Profile of centerline of roadway, right-of-way or easement where the waterline will be installed.
 - 10) The District's standard details for hydrants thrust blocks and air vents.
4. Other required data:
- a. Profile drawings of all existing and proposed sanitary and storm sewers shall be provided.
 - b. When required by the District Engineer, the Applicant shall provide adequate soil test data taken along the proposed routing of the new water system.
 - c. Any and all other data or submittals deemed necessary by the District Engineer to ensure adequate design and construction of the proposed water system expansion.

C. ADMINISTRATION

1. Guarantee
 - a. The Applicant shall guarantee all materials furnished and work performed for a period of one (1) year from the date of preliminary acceptance and start-up. The Applicant warrants and guarantees for a period of one (1) year from the date of preliminary acceptance and start-up of the system that the completed system is free from all defects due to faulty materials or workmanship and the Applicant shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The District will give notice of observed defects with reasonable promptness. In the event that the Applicant should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the District may do so and charge the Applicant the cost thereby incurred. The performance bond shall remain in full force and effect throughout the guarantee period.
2. Performance Bond
 - a. The Applicant shall provide a performance bond to the District prior to the start of construction. The performance bond shall be in full force and effect for the duration of the project construction plus thirteen months after preliminary acceptance and start-up of the pipeline, or until any defects in material or workmanship discovered during the guarantee period are properly repaired and accepted by the District.
 - b. The performance bond form and sureties shall be as approved by the District.
 - c. The bond shall be written for a total value equal to \$75.00 per linear foot of approved pipeline.
3. Application Fee
 - a. The Applicant shall pay a non-refundable application fee of \$1,500.00. This fee covers administration fees as well as the required preconstruction meeting and up to three hours of plan review time. Any review time required prior to the start of construction and over three hours will be billed out per approved schedule of rates and charges.

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4. Inspection
 - a. The Portsmouth Water and Fire District will provide distribution operator to inspect the construction of the pipeline, water services, and appurtenances, and to witness the required pressure and leakage test and pipeline chlorination. Inspection is required to ensure the pipeline is installed to District standards, in the proper location and at the proper depth.
 - b. Inspection of the pipeline installation, any assistance provided during installation, witnessing of tests by the District, and subsequent approval does not in any way relieve the Applicant from his responsibility to properly install the pipeline in accordance with the District's standards. Preliminary approval of the pipeline installation by the District does not indicate that the pipeline was constructed in strict accordance with the District's standards and does not in any way alter the responsibility of the Applicant to guarantee the pipeline for the thirteen month warranty period.
 - c. The cost for all administration, inspection and coordination provided by the District during construction shall be borne by the Applicant. The rates for this work shall be per approved schedule of rates and charges.
5. Acceptance by the District
 - a. Preliminary Acceptance
 - 1) Preliminary acceptance of the water main extension shall be made by the District upon successful installation, testing and start up of the new system and completion/approval of as-built drawings in accordance with the specifications herein and as directed by the District.
 - 2) Start-up shall mean the opening of all valves and the servicing of the water main extension with system pressure and water from the District's system after successful completion and approval of all required tests.
 - 3) The District shall operate the water main extension and perform minor routine maintenance such as flushing and exercising of valves, as necessary, until final acceptance of the pipeline.
 - 4) The Applicant shall be responsible for performing any required repairs to the water main extension (under the supervision of the District) during the guarantee period and until final acceptance by the District.
 - b. Final Acceptance
 - 1) Within 30 days prior to the expiration of the guarantee period, the District shall conduct a final inspection of the water main extension and notify the Applicant concerning any defects to be corrected.
 - 2) The inspection shall include, but is not limited to, a leak detection survey by District personnel, and operation of valves, hydrants, blow-offs and curb stops and including formed concrete pad's for gate box top sections and proper grade and straightness of curb stop and gate boxes
 - 3) The Applicant shall remedy any defects to the satisfaction of the District within 30 days of notice thereof.
 - 4) The cost of the final inspection and inspection of any correction of defects shall be borne by the Applicant.
 - 5) Final acceptance shall be certified in writing by the District. Upon final acceptance, the water main extensions shall become the property of the District.
 - 6) Within 30 days after final acceptance the Administrative Board shall release the Performance Bond.
6. Working Hours - Water main extension work may be performed Monday through Friday, excluding holidays, from 8:00 AM to 3:30 PM, unless otherwise directed in writing by the District.

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7. Indemnification
 - a. The Applicant and his Subcontractors will indemnify and hold harmless the District and its agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the work, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the Applicant and his Subcontractors, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.
 - b. In any and all claims against the District or any of its agents or employees by any employee of the Applicant and his Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification of obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Applicant or any Subcontractors under Workers' Compensation acts, disability benefit acts or other employee benefit acts.
8. Insurance
 - a. The Applicant shall procure and shall maintain, during the life of the contract period, Contractor's General Public Liability Insurance including products and completed operations coverage. The Portsmouth Water and Fire District shall be named as an additional insured on the liability policy. Insurance coverage shall have a limit of liability of not less than \$1,000,000 for all damages arising out of bodily injury and/or property damage, including death, at any time resulting therefrom, sustained by any one person in any one accident; and a limit of liability of not less than \$2,000,000 aggregate for any such damage sustained by two or more persons in any one accident.
 - b. The Applicant shall maintain, during the life of the contract period, vehicle liability coverage with a limit of liability of not less than \$1,000,000.
 - c. The Applicant shall procure and maintain, during the life of the contract period, in accordance with the provisions of the laws of the State of Rhode Island, Workers' Compensation Insurance for all of the Contractor's employees.
 - d. In the event that work is sublet, the Applicant shall require such Subcontractor similarly to provide Contractor's General Public Liability Insurance, Vehicle Liability Coverage, and Worker's Compensation Insurance for all of the Subcontractor's employees.
9. District's Representative and Referenced Standards
 - a. Any reference herein to the Portsmouth Water and Fire District, the District or District Engineer shall mean the District's General Manager and Chief Engineer or his authorized representative.
 - b. Any references made herein to standards promulgated by other agencies shall be deemed to refer to the latest editions of said standards.
 - c. The reference to Owner in American Water Works Association (AWWA) and other standards referenced herein shall be interpreted to mean the Portsmouth Water and Fire District.
10. Applicant's Supervision and Subcontractors
 - a. The Applicant will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Applicant will employ and maintain on the work site a qualified supervisor or designated person who shall have been designated in writing by the Applicant as the Applicant's representative at the site. The supervisor or designated person shall have full authority to act on behalf of the Applicant and all communications given to the supervisor shall be as binding as if given to the Applicant. The supervisor or designated person shall be present on the site at all times in order to perform adequate supervision and coordination of the work.

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- b. Any Contractor or Subcontractor engaged by the Applicant to install water mains, water services or appurtenances shall be approved by the District.

D. MATERIAL STANDARDS

1. General:

- a. The manufacturers of pipe, fittings, valves, hydrants, and service tubing shall furnish a sworn statement that the inspection and all specified tests have been made and all results thereof comply with the requirement of the referenced AWWA standards.
- b. Shop drawings or catalogue cuts shall be provided for all pipe, fittings, gate valves, tapping sleeves, road boxes, curb boxes, service tubing and other materials as directed by the District.
- c. The printed installation recommendations of the material manufacturer shall be provided to the District upon request.
- d. Materials shall be approved by the district prior to the start of construction

2. Pipe:

- a. Ductile Iron, AWWA C151, Class 52
- b. Cement lining, AWWA C104, double thickness
- c. Joints
 - 1) Mechanical Joint, AWWA C111
 - 2) Push-on Joint, AWWA C111

3. Fittings

- a. Ductile Iron AWWA Class153 compact fittings, 350 psi minimum
- b. Cement lining, AWWA C104, double thickness
- c. Joints
 - 1) Mechanical Joint, AWWA C111

4. Valves:

- a. AWWA C509 for iron body, and C515 for DI resilient-seated NRS, open left (counter clockwise)
- b. Catalog data and assembly drawings shall be provided.
- c. O-ring stem seal
- d. Interior epoxy coating, AWWA C550
- e. Joints
 - 1) Mechanical Joint, AWWA C111

5. Hydrants:

- a. AWWA C502, Mueller Super Centurion 200, 5-1/4 main valve, Catalog number A-423
- b. AWWA C502, Kennedy Guardian K-81D
- c. Hose Nozzles:
 - 1) Two, 2-1/2" nozzles, National Standard Thread
 - 2) One, 4-1/2" nozzle, National Standard Thread
- d. Bury length: 5'-0" minimum
- e. Inlet Connection: 6" Mechanical Joint
- f. Operating Nut: National Standard
- g. Direction of Opening: left (counter-clockwise)

6. Corporations Stops:

- a. 3/4" CC x CTS
 - 1) Mueller: B-25008N
 - 2) Ford: - FB 1000-4-Q-NL Quick Joint Couplings
 - 3) Cambridge Brass 301NL-A3H3

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7. Curb Stops:
 - a. ¾” CTS x CTS, without drain
 - 1) Mueller: - B-25008N
 - 2) Ford: - B44-Q-NL
 - 3) Cambridge Brass 202NL-H3H3
8. Service Fittings:
 - a. Use and type of service fittings to be as approved by the District.
 - b. ¾” CTS x CTS
 - 1) Mueller
 - 2) Ford
 - 3) Cambridge Brass

*Note: all above can be larger than ¾” if required and approved by the District or an acceptable comparable with submittal for approval
9. Service Tubing:
 - a. Polyethylene water service tubing, AWWA C901
 - b. PE3408, 200 psi minimum pressure rating, CTS
 - c. Any service that crosses the roadway shall be installed in conduit.
10. Road Boxes and Curb Boxes:
 - a. Curb Boxes
 - 1) Cast Iron, - Buffalo type
 - 2) Two section, telescoping type with 2-1/2” shafts and extension range of 40” to 60”
 - 3) Cast iron inlaid lid with the word “WATER” imprinted thereon, and pentagonal brass bolt
 - b. Gate Valve Boxes
 - 1) Cast Iron, - Buffalo type, -
 - 2) Two section, telescoping type with 5-1/4” shaft, 8-1/2 diameter and 9” high bell-shaped bottom section and extension range of 36” to 60”
 - 3) Cast iron inlaid cover with the word “WATER” imprinted thereon
11. Concrete:
 - a. Cement concrete for thrust blocks and encasements shall conform to Section 600 “Portland Cement Concrete” of the Rhode Island Standard Specifications for Road and Bridge Construction.
 - b. Cement concrete shall have a minimum compressive strength of 3,000 psi after 28 days.
12. Tapping Sleeves and Valves
 - a. Tapping sleeves shall be -18-8 type 304 stainless steel and conform to AWWA C223 and they shall be of sizes suitable for use on the pipe on which the respective sleeve is to be installed.
 - b. Tapping sleeves shall be provided with a 304 stainless steel ¾” NPT test plug, for Hydrostatic testing of the valve and sleeve assembly. The test pressure shall be 200 psi or not to exceed the working pressure of any of the fittings. The sleeve and valve assembly shall hold the determined test pressure for a minimum of 30 minutes without any pressure drop. Air testing is NOT allowed on any tapping sleeve. Tapping sleeve outlet flange shall be 304 Stainless steel ring flange per AWWA C228 Class D. Compatible with ASNI 125 and 150 bolt circles.
 - c. In all other respects tapping valves shall meet the requirements for gate valves as specified herein.

E. DESIGN STANDARDS

1. General
 - a. Water main extensions shall be designed in accordance with the minimum standards herein and as directed by the Portsmouth Water and Fire District.

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- b. Water main extensions shall also be designed in accordance with the “Recommended Standards for Water Works (Ten State Standards)”, by Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers.
2. Water Main Location
 - a. The water mains shall be installed in the unpaved town or state right-of-way on the north and east sides of the road, and approximately four feet in from the property line unless otherwise approved by the District.
3. Bedding Conditions
 - a. Water mains, appurtenances and water services shall be bedded in a 12-inch envelope of clean compacted sand. The compacted sand bedding shall extend 12-inches below and 12-inches above the pipe and a minimum of 12-inches on each side. Water marking tape shall be placed 12 inches above the top layer of sand.
 - b. Any service that crosses the roadway shall be installed in conduit with 12” of sand over and to the sides of the conduit with water marking tape 12 inches above the top layer of sand.
 - c. The District shall dictate whether different bedding material and/or pipe protection is required.
4. Pipeline Cover
 - a. Water mains, valves and hydrant branches shall have a minimum earth cover of 4’-6” from finished grade.
 - b. Water services from the main to the curb stop shall have a minimum earth cover of 4’-0” from finished grade.
5. Gate Valve Locations
 - a. Gate valves shall be installed on each water main branch line and shall be approximately located at the right-of-way line that is perpendicular to the branch, or as directed by the District.
 - b. Gate valves shall be installed on each run of pipe at a maximum spacing of -500 feet.
 - c. Gate boxes located off the road shall have a concrete pad 1 ½’ x 1 ½’ x 6”.
 - d. Gate valves that are 8-inches or larger shall be installed on a concrete block.
6. Hydrant Locations
 - a. Hydrants shall be installed in accordance with the District’s details and shall be located on the same side of the street as the water main. The District’s standard hydrant detail shall be incorporated onto the Applicant’s construction drawings.
 - b. Hydrants shall be spaced in residential areas so that a 500 foot run along the road from each hydrant and at any point 250 feet from the last house.
 - c. Hydrants shall be spaced in commercial areas so that a 250 foot run along the road from each hydrant completely covers all property in the proposed commercial area, as well as adjacent commercial areas.
 - d. The exact number and location of hydrants shall be as determined by the District.
 - e. Hydrant locations and spacing shall be approved by the Fire Marshall/Portsmouth Fire Department prior to start of construction.
 - f. A gate valve shall be provided for each hydrant.
7. Service Lines and Curb Stops
 - a. Curb stops shall be located at the property line of the property to be served. Unless otherwise approved by the District, the curb stop shall be located at the center of the property or center of proposed building. The property line shall be established from a survey by a professional land surveyor registered in the State of Rhode Island.
 - b. Unless otherwise approved by the District, the service line from the main to the curb stop shall be designed to run generally perpendicular to the water main.
 - c. Unless otherwise approved by the District, service lines and curb stops shall be ¾” in diameter.

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8. Pipeline Termination
 - a. Pipelines shall be looped-in to the new or existing water system to eliminate dead-end pipelines.
 - b. Approved dead-end pipelines shall be constructed to the end(s) of the Applicant's property lines in accordance with the Policy for Water Main Extensions.
 - c. Approved dead-end pipelines shall have a fire hydrant located at the dead-end. Any such hydrant shall be in addition to hydrants required to meet the minimum hydrant coverage requirements specified herein.
 - d. Where approved by the District, 2" blow-offs may be installed at dead-ends in place of fire hydrants. Blow-offs shall be installed in accordance with the District's standard blow-off detail.
9. Thrust Blocks
 - a. Thrust blocks shall be provided in accordance with the District's standard details. Said details shall be incorporated onto the Applicants construction drawings.
10. Clearances from Individual Sewerage Disposal Systems (ISDS) and Sewers.
 - a. ISDS
 - 1) ISDS facilities shall be installed as far away as possible from water supply lines.
 - 2) The RI Department of Environmental Management's Rules establishing Minimum Standards Relating to Location, Design, Construction and maintenance of on-site Wastewater Treatment Systems, pertaining to minimum horizontal distances between the parts of an individual sewerage disposal system and water supply lines must be satisfied. SD3.05 Table 22.1 (June 27, 2016) requires the following minimum clearances from water mains and water services:
 - a) Building sewer, distribution box, dosing tank, pump tank, septic tank, septic tank effluent pipe - 10 feet
 - b) Leach field - 25 feet
 - c) Building Sewer - 10 feet
 - 3) If the setbacks to a water supply line for a public water system cannot be met, a variance from The Department of Environmental Management and the District is required.
 - b. Sewers
 - 1) Water mains shall be located a minimum of ten feet horizontally from any existing or proposed sanitary sewer and five feet horizontally from any existing or proposed storm sewer. The distance shall be measured from edge of pipe to edge of pipe.
 - 2) Where sewer lines and water supply lines must cross, sewer lines shall be located below water supply lines whenever possible as determined by the District.
 - 3) Where sewer lines and water supply lines must cross, the sewer lines shall be constructed of durable, corrosion-resistant material with watertight joints. If the sewer is existing and does not comply with this requirement, then it shall be re-laid to meet compliance.
 - 4) Where water supply lines are being installed at sewer crossings, one full length of water pipe shall be located so both water pipe joints will be as far from the sewer as possible. Where sewers are being installed at water supply line crossings, one full length of sewer pipe shall be located so both sewer pipe joints will be as far from the water supply line as possible.
 - 5) At crossings between water supply lines and sewers, a minimum vertical distance of 18 inches shall be provided between sewers and water supply lines. This shall be the case where the water supply line is either above or below the sewer. Said vertical distance shall be measured from edge of pipe to edge of pipe, or from the edge of any sleeve or concrete encasement and edge of pipe, as appropriate.
 - 6) At crossings between water supply lines and sanitary sewers, the sewer shall be sleeved as directed by the District for a distance of at least twenty five feet each side of the crossing

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measured from the edge of the water main. The sleeve shall be schedule 40 PVC pressure pipe with watertight joints.

11. Clearances from Other Utilities

- a. Water mains and water services shall have a minimum horizontal clearance of 3'-0" measured edge to edge from other utilities, conduits or appurtenances.
- b. Water mains and water services shall have a minimum vertical clearance of 18-inches measured edge to edge when crossing over or under other utilities, conduits or appurtenances.

F. CONSTRUCTION STANDARDS

1. General

- a. In addition to the specifications stated and referenced herein, the Applicant shall install water works materials in accordance with the printed recommendations of the material manufacturer, and as directed by the District.
- b. The Applicant's attention is directed to the Design Standards herein concerning water main and water service clearance from ISDS, sewers and other utilities.
- c. The Applicant shall obtain all road opening permits from the Town of Portsmouth and State of Rhode Island, as required. The cutting of roads, backfilling of trenches and roadway repair shall be performed in accordance with the respective specifications of the Town of Portsmouth and State of Rhode Island and the stated permit conditions.
- d. The Applicant shall refer to the Design Standards herein for additional information on water main extension requirements.
- e. The Applicant shall have the project engineer install Grade stakes in center of road way or offsets showing finish road elevations at 50' stations and all property corners and any easements along with stakes showing the radius point of curves in the road.
- f. All drainage and catch basins shall be installed prior to water main construction.
- g. As part of the inspection, the District Inspector will take GPS points at the location of all pipe joints, fittings, valves, hydrants, corporation stops, and curb stops. The GPS points will be downloaded, differential corrected, exported into GIS format, and input into the District geodatabase. The GIS features can be converted to AUTOCAD format and used for As-builts. To obtain the AUTOCAD file, a written request to the General Manager must be submitted. This work will be billed out per approved schedule of rates and charges.

2. Earthwork

- a. Dewatering Excavations
 - 1) All construction work shall be performed in dry trench conditions. The Applicant shall be responsible for performing all required dewatering in a manner to prevent injury to persons or public health or damage to existing facilities or to the work in progress.
- b. Unsuitable Materials
 - 1) In addition to AWWA C600, unsuitable materials are also defined as organic material, peat, organic silt, or combinations thereof, all having unsuitable insitu bearing properties; and all material of whatever description which are too loose or saturated for use as backfill to provide satisfactory bearing. If unsuitable material is encountered at the depths for bottom limit of excavation, the Applicant shall immediately notify the District and shall not proceed further until instructions are given.
 - 2) The Applicant shall satisfactorily excavate and remove all unsuitable material to lines, grades and limits as directed by the District. All resulting below grade excavations shall be refilled with compacted bank-run gravel refill.

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- 3) Material which becomes unsuitable as a result of the Applicant's lack of dewatering or improper dewatering shall be removed by the Applicant and replaced with bank run gravel or gravel bedding as directed by the District.
- c. Excavation
- 1) All excavation, sheeting, shoring and dewatering operations shall be accomplished in a manner than prevents the undermining or disturbing of existing waterlines, utilities and structures or of any completed construction.
 - 2) Immediately after excavation to the required limits, the Applicant shall compact the exposed bottom surface of the trench with two passes of an approved plate-type vibratory compactor. If the insitu material is fine-grained and saturated or if the insitu material is judged by the District to have adequate in-place density, this compaction requirement may be waived by the District.
 - 3) Excavation operations adjacent to and below existing waterlines shall be done in a manner to prevent disturbance of or damage to the existing waterlines.
 - 4) The Applicant shall keep all excavated and construction material a safe distance back from the edge of excavations to avoid overloading the sides of excavations and to prevent slides or cave-ins.
 - 5) Grading shall be performed as necessary and where practicable to prevent surface water from flowing into excavations and any water accumulating therein shall be removed by pumping or other approved method. The pipelines shall not, at any time, be used for trench drainage.
 - 6) The maximum trench width permitted at the top of the pipe shall be the suggested trench widths shown in Table 1 of AWWA C600.
- d. Backfilling
- 1) Unless otherwise directed by the District, excavations shall not be backfilled until the work as installed conforms to all requirements specified herein and has been inspected by the District and approved for backfilling.
 - 2) Placement of sand bedding shall be done in accordance with the following procedure:
 - a) The bottom of the excavations shall be thoroughly compacted and in approved condition prior to placing sand bedding, unless waived by the Districts Inspector. A 12-inch depth of sand bedding shall be placed below the pipe.
 - b) The sand bedding shall then be deposited uniformly on both sides of the pipe up to the spring line and shall be thoroughly compacted by tamping under and on each side of the pipe with an approved hand tamping tool to provide uniform support around the pipe which is free from voids.
 - c) All other backfill placed in trenches below a level 12 inches above the top of pipe shall consist of sand bedding, 12" of clean fill shall be placed over the sand then water marked tape shall be laid out. All other fill from 1 foot above the top of the pipe to the subgrade, material containing stones up to 8 inches in their greatest dimension may be used up to grade.
 - d) The Applicant shall exercise care in all operations to prevent disturbing joints and displacement of or damage to the pipes already installed. The Applicant shall remedy any poor alignment, displaced or damaged pipe, disturbed joints or any other defects as directed by the District.
- e. Compaction
- 1) Fills placed under around and over waterlines shall be compacted to not less than 90 percent of the ASTM maximum dry density.
 - 2) All percentages of compaction specified herein shall be related to the maximum dry density as established by Method D ASTM Designation D1557-70 and verified in the field at the

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- District's discretion by ASTM Designation D1556-68, D2167-66 or an approved nuclear density testing device.
- 3) Field density tests to determine the actual in-place densities being attained will be made at the Applicant's expense by a testing laboratory approved by the District and in sufficient quantity to determine that the required compaction is being attained. The quantity of testing will be as determined by the District.
 - 4) Vibratory compaction equipment shall be furnished with a vibrating surface at least 24 inches in width, and be capable of operating at a minimum of 2,000 blows per minute.
 - 5) Backhoe buckets, jack hammers, rubber-tired vehicles and similar equipment not specifically designed and manufactured for the compaction of granular materials will not be approved for use.
 - 6) It is the intent of these compaction requirements that the minimum in-place dry density of the compacted materials resulting from the specified minimum number of passes of the compaction equipment will be equal to or greater than the minimum percentages specified herein. Additional passes of the specified equipment shall be required if the minimum in-place dry densities as specified are not obtained with the minimum passes indicated.
- f. Protection of Existing Utilities and Structures
- 1) Excavation, backfill and compaction operations shall be done in such a manner as to prevent cave-ins of excavations or the undermining, damage or disturbing of existing utilities or of new work. Backfill shall be placed and compacted so as to prevent future settlement or damage to existing utilities and new work.
- g. Test Pits
- 1) Test pits shall be dug by the Applicant at the locations selected and to the dimensions directed by the District to establish locations of existing pipelines or any other buried item for which the exact location is to be determined.
- h. Excavation Support Systems
- 1) The minimum requirements for earth support systems for excavations shall be as required by current US Department of Labor, Occupational Safety and Health Act (OSHA) regulations, all Federal, State and Local regulations, requirements of individual utility companies having utilities in or adjacent to the areas where the work is being performed and the requirements stated herein.
 - 2) The Applicant shall be responsible for providing a Competent Person in accordance with 107 "Contract Worker Hours and Safety Standards Act", OSHA 29 CFR Part 1926.
3. Water Mains
- a. Installation
- 1) Water mains shall be installed in strict accordance with the following standards as specified herein, and as directed.
 - a) AWWA C600, "Installation of Ductile Iron Water Mains and Their Appurtenances"
 - b) "A Guide for the Installation of Ductile Iron Pipe" by Ductile Iron Pipe Research Association
 - c) "Recommended Standards for Water Works (Ten State Standards)", by Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers
 - 2) Water mains, valves and hydrant branches shall have a minimum earth cover of 4'-6" from finished grade.
 - 3) Water services from the main to the curb stop shall have a minimum earth cover of 4'-0" from finished grade.

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- 4) Provision shall be made to keep any stones, mud, or debris from entering the gate boxes during and after backfilling. Any blocking of the box shall be remedied prior to preliminary and final acceptances.
- 5) Whenever pipeline installation is stopped the Applicant shall seal the open end of the pipe with a watertight plug to prevent trench water, debris, vermin or other foreign material from entering the pipe.
- 6) Pipeline installation shall be performed in dry trench conditions. If water is present in the trench after installation, then the plug shall be left in place until the trench has been pumped dry. No pipe shall be installed when, in the opinion of the District, trench or weather conditions are unsuitable. The District reserves the right to require pipe protection or alternate bedding when ground conditions necessitate.
- 7) The Applicant shall not under any circumstances, operate any of the District's valves, hydrants, blowoffs and other appurtenances.
- 8) When pipe cutting is necessary, pipe shall be cut without damage to the pipe or cement lining leaving a smooth end at right angles to the axis of the pipe. The District reserves the right to reject cut pipe where the cement lining has been damaged beyond repair in the judgment of the District. All pipe cutting shall be done with approved mechanical cutters. Flame cutting using an oxyacetylene torch shall not be used.
- 9) Unless specifically authorized otherwise by the District in writing, the pipeline shall be installed so that a positive or negative grade is maintained between high and low points to avoid air pockets. If an air vent is required it shall be made a permanent air vents and set up as a blow off with a curb stop using the Districts standard details.
- 10) Where mechanical couplings are required the ends of the pipes shall be prepared and the couplings installed in strict accordance with the coupling manufacturer's printed recommendations and as directed by the District. The use and locations of mechanical couplings shall be approved by the District.
- 11) The Applicant shall exercise care in all operations to prevent disturbing joints and displacement of or damage to the pipes already installed. The Applicant shall remedy any poor alignment, displaced or damaged pipe, disturbed joints or any other defects as directed by the District.
- 12) Connections to existing water mains shall be made in strict accordance with the following standards, as further specified herein, and as directed.
 - a) AWWA C600, "Installation of Ductile-Iron Water Mains and Their Appurtenances"
 - b) AWWA C603, "Installation of Asbestos-Cement Pressure Pipe"
 - c) AWWA C900, "Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. through 12 In. for Water Distribution"
 - d) AWWA Manual No. M23, "PVC Pipe - Design and Installation"
 - e) AWWA C651, "Disinfecting Water Mains, Section 9: Disinfection Procedures When Cutting Into Or Repairing Existing Mains" and Section 10: "Special Procedure for Caulked Tapping Sleeves"
 - f) Mechanical Couplings and Transition couplings for connection to the existing water system shall be as approved by the District and shall be installed in strict conformance with the printed recommendations of the respective manufacturer.
- 13) Wet Tap Connections
 - a) The Applicant proposed for installing tapping sleeves and valves and for making the wet taps under full main pressure shall be approved by the District.
 - b) Existing water mains where wet tap connections are made shall be kept in service at all times.

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- c) Machine sleeves shall be installed in such a manner as to bring the tapping connections exactly at right angles to the centerline of the pipe to be tapped. Taps shall be a minimum of three pipe diameters or a minimum of three feet away from any joint, other tap, or fitting in the water line being tapped.
 - d) The wet tap connections shall be made in accordance with additional requirements of the manufacturer of the tapping sleeves and valves.
 - e) The Applicant shall take all precautions necessary to prevent contamination of the existing potable water system when making the wet tap. Before the tapping sleeve is installed, the exterior of the main to be tapped shall be thoroughly cleaned and swab chlorinated and the interior surface of the sleeve after installed shall be swabbed chlorinated with sodium hypochloride solution.
 - f) The tapping sleeve, valve, adapter and tapping machine assembly shall be pressure tested in-place before making the tap. The test pressure shall be 200 psi or not to exceed the working pressure of any of the fittings. The sleeve and valve assembly shall hold the determined test pressure for a minimum of 30 minutes without any pressure drop. Air testing is NOT allowed on any tapping sleeve.
 - g) The Contractor shall properly cut, remove and dispose of any asbestos cement pipe and shall provide proof of proper hazardous waste disposal to the District.
 - h) If an active water main needs to be shut down, a water sample shall be taken by the District in the area off the shutdown to be paid by the Applicant.
- b. Excavation of Existing Facilities
- 1) When connections are to be made to existing pipelines or appurtenances, the actual location and elevation of which cannot be determined without excavation, the Applicant shall excavate for and expose the existing facilities before laying any pipe or conduit. The District will inspect the existing facilities and will make any necessary adjustments in the line or grade of the proposed pipeline to accomplish the connection.
 - 2) As-built Dimensions - Prior to backfilling the PWFD Inspector or GIS Analyst shall record "as-built" locations and depths of all pipe, fittings, valves, hydrants, corporation stops, curb stops and ledge; connections to existing water mains; and pipe size. Locations of all temporary corporations used for blow-offs, air release and chlorination shall also be recorded. All items shall be located with at least two measurements to permanent above ground structures, not including ties to the new or existing water system. If, in the opinion of the District, adequate above ground structures are not available for taking ties; the as-built dimensions shall be accurately referenced to centerline of road survey. The centerline of road survey as-builts shall be referenced to above ground structures prior to finalizing as-built drawings.
 - 3) Reaction Anchorage and Blocking:
 - a) The Applicant shall provide thrust blocks, anchors, joint harness or other approved means for preventing pipe movement at all push-on or mechanical joint plugs, tees, crosses, bends of 1 1/4 degrees or more, reducers and valves.
 - b) Thrust blocks shall be constructed in accordance with the details shown on the drawings and shall be sized to accommodate the specified test pressure and pipe size. Thrust blocks shall extend from the fitting to solid undisturbed earth and shall be constructed so the joints are accessible for repair. If, in the opinion of the District, adequate support against undisturbed earth cannot be obtained, the Applicant shall provide joint harnesses in addition to thrust blocks as directed.

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- c) Installation of concrete for thrust blocks and encasements shall be in accordance with Section 600 “Portland Cement Concrete” of the State of Rhode Island Standard Specifications for Road and Bridge Construction.
- d) All concrete used for thrust blocks and encasements shall remain uncovered for at least sixteen hours after installation unless otherwise approved by the District. When early backfilling is permitted additional curing measures may be required if directed by the District.
- c. Protection of Metal Surfaces (if required)
 - 1) The Applicant shall protect all ferrous metal rods, clamps, bolts, and other accessories subject to submergence or contact with earth or fill material with two coats of an approved material. The Applicant shall apply the first coat to clean, dry metal surfaces and allow it to dry before applying the second coat.
- 4. Water Services
 - a. Installation
 - 1) Water services shall be installed in strict accordance with the following standards, as further specified herein, and as directed.
 - a) AWWA C901, Appendix A, “AWWA Guideline Criteria for Design and Installation of PE Water Pipe and Tubing in Sizes ½ In. Through 3 In.”
 - b) AWWA C800, “Underground Service Line Valves and Fittings”
 - c) ASTM D2774, “Standard Recommended Practice for Underground Installation of Thermoplastic Pressure Piping”
 - 2) Water service taps shall be done by site contractor or an independent contractor approved by the District.
 - 3) Water services from the main to the curb stop shall have a minimum of 4’-0” of earth cover from finish grade.
 - 4) Saddles for corporation stops shall be provided where directed by the District.
 - 5) An “S” bend shall be provided on each service at the corporation.
 - 6) A water service and curb stop shall be provided for each subdivided lot. Unless otherwise approved by the District, curb stops shall be located and sized as follows:
 - a) Curb stops shall be located at the property line of the property to be served. The curb stop shall be located at the center of the property or center of proposed building. The property line shall be established from a survey by a professional land surveyor registered in the State of Rhode Island.
 - b) The service line from the main to the curb stop shall be designed to run generally perpendicular to the water main.
 - c) Service lines and curb stops for residential installations shall be ¾” in diameter unless otherwise approved by the District.
 - d) Any service that crosses a roadway shall be installed in a conduit.
 - 7) Service Taps
 - a) The Applicant proposed for making wet taps for corporations shall be approved by the District.
 - b) Wet taps shall be made in accordance with the printed recommendations of the pipe manufacturer, corporation manufacturer and the taping machine manufacturer and as directed by the District
 - c) Set service taps at right angles to proposed meter location and locate taps in upper pipe segment within 45 degrees of pipe springline unless otherwise approved by the District.

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5. Pressure and Leakage Test
 - a. The pressure and leakage test shall be performed by the site contractor or an independent certified testing agency approved by the District.
 - b. The pressure and leakage test shall be performed on the water mains and service lines connected thereto.
 - c. The test pressure shall be a minimum of 150 psi or 1 ½ times the working pressure whichever is greater and held for 2 hours with zero leakage and the entire pressure and leakage test shall be performed in the presence of the District’s inspector unless otherwise directed in writing.
 - d. When approved by the District the pressure test may be performed against a new or existing closed valve(s) connection to the District’s water system. Should the valve(s) fail to seat tightly, thereby creating an invalid pressure test, then the Applicant shall disconnect the piping and repeat the pressure test using temporary plugs, caps and thrust blocking.
 - e. Results of the pressure and leakage tests shall be transmitted by the PWFD site inspector to the District Distribution System Manager for review and approval.
6. Disinfection
 - a. Water main extensions shall be disinfected in strict accordance with AWWA C651, “Disinfecting Water Mains”.
 - b. Chlorination of the water main shall be performed by an independent certified testing and chlorination agency approved by the District.
 - c. The entire chlorination procedure shall be performed in the presence of the District’s inspector unless otherwise directed in writing.
 - d. Chlorination shall be performed using the continuous-feed method with liquid chlorine or sodium hypochlorite.
 - e. The Applicant shall install temporary blow-offs at the beginning and end of each water main extension and branch main, no more than 1 foot from the inlet valve and end of line and be no less than a ¾” size as directed by the District, for chlorination and testing purposes.
 - f. DeChlorination shall be done by AWWA procedure
 - g. Bacteriological samples shall be obtained from the end of the water main extension and at the end of each branch main. The number and location of samples shall be as directed by the District.
 - h. A standard bacteria and heterotrophic plate count (HPC) shall be required on all samples. A minimum of an inlet and outlet and a comparative sample of the nearest active service shall be taken. In addition to the absence of coliform organisms, the samples shall demonstrate that the water quality in the new mains is consistent with the quality of the water in the District’s distribution system.
 - i. The District will select the testing laboratory to perform the bacteriological tests. The samples shall be obtained and transported to the testing laboratory by the District. The cost of the testing and transporting samples shall be born by the Applicant.
 - j. Results of bacteriological tests shall be transmitted by the testing laboratory directly to the District for review and approval.

G. AS-BUILT DRAWINGS

1. As-Built drawings are required for all water main extensions and will be completed by the District’s GIS Analyst unless otherwise approved by the Administrative Board. All costs associated with the As-Built drawings will be paid by the Applicant per the approved schedule of rates and charges.
2. As-Built Drawing Requirements:
 - a. As-built plans shall be stamped by a professional land surveyor or engineer registered in the State of Rhode Island if plans are not completed by the District. Plans shall be drafted on sheets

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measuring 24" x 36". The sheets, along with one copy of each drawing and an editable electronic file, shall be provided to the District.

- b. The words "AS-BUILT DRAWINGS" shall be clearly marked on the original in ½" block letters.
- c. Accurate as-built plans shall be professionally drafted at a scale of 1" = 40'.
- d. As-built plans shall be stamped by a professional land surveyor or engineer registered in the State of Rhode Island. The words "AS-BUILT DRAWINGS" shall be clearly marked on the drawing in ½" block letters. As-Built drawings shall include depth and location of all pipe, fittings, valves, hydrants, corporation stops, curb stops and ledge; connections to existing pipes; pipe size; date of installation; applicant's name, installation contractor; north arrow, property lines, and all other information necessary to provide a complete description of as-built conditions as directed by the District.
- e. As-built dimensions tied to three above ground permanent structures shall be provided.
- f. As-built depths shall be referenced to finished grade.
- g. As-built dimensions for curb stops shall be tied to existing houses, or permanent structure (catch basin)

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