

Portsmouth Water Division



Construction Manual

Part C - Installation of Water Mains

Prepared by:

Water Division, Department of Public Works
City of Portsmouth
680 Peverly Hill Road
Portsmouth, NH 03801-5356
(603) 427-1530

Original Issue
Revision #1
Revision #2
Revision #3

March 1989
August, 1992
January 2002
March, 2011

All water main extensions shall meet all applicable Water Division design, material, installation, testing and inspection standards and specifications prior to acceptance.

1. Plans and Specifications

All plans for water main extensions or improvements shall be drafted with the following specifications:

- A. **Plans** shall be drafted on 24" X 36" (Max.) plan and profile sheets with a horizontal scale of 1" = 20' or 1" = 40', and the vertical scale shall be no smaller than 1" = 4'. Detail sheets need not be on plan - profile sheets.
- B. **Specifications** shall be type written on standard 8 1/2" X 11" sheets.
- C. Water Division construction, material, installation and testing standards shall be incorporated into the plans and/or the specifications.
- D. **Engineering Design.** Once the Portsmouth Water Division or local fire department has determined what the necessary flows are, the Portsmouth Water Division may perform a hydraulic network analysis to determine what the main pipe sizes should be based on present and future domestic and fire demand on the water system. This service shall be performed the expense of the developer. Please see the Portsmouth Water Division Engineering Technician for more information.

2. Review Process

Besides reviews by other state and local regulatory agencies ALL water line extensions shall go through the review process in the following order:

- A. An approved site plan, and an approved subdivision plan shall be submitted with the plans in the review process.
- B. Plans shall be submitted to local fire department having jurisdiction for review, comment, and approval on the fire protection requirements (ie. hydrant spacing, required fire flows etc.) for the project.

If approved then:

- C. Plans shall be submitted to the Portsmouth Water Division for review, comment and approval. If approved then:
- D. Plan shall be submitted, by the owner or his engineer, to the N.H. Department of Environmental Services, Water Supply and Pollution Control Division, P.O. Box 95, 6 Hazen Dr. Concord, NH 03301, phone 271-3503 for their review, comment and approval. If approved then;

- E. Copies of all approved plans and specifications shall be submitted to the Portsmouth Water Division. Upon receipt of these items the project may begin.

3. Inspection Process

During construction the project will be visited by a city inspector to observe construction practices, inspect materials for compliance with specifications etc. Any deficiencies found in the construction by the inspector shall be corrected and not covered until inspected again and approved.

4. Record Drawings

The owner/contractor shall be responsible for developing a set of as-built, or record drawings of the water system that accurately indicates where the water lines and appurtenances are located with dimensions to all gates, bends, tees, wyes, crosses, service shut-offs, hydrants, and dead ends as well as the depths. It shall also indicate the location of the easement lines if there is an easement, and will be submitted to the Portsmouth Water Division.

5. Disinfection and Testing Water Lines

Any water line installed shall be disinfected and tested according to the section on "**Hydrostatic Testing Water Mains**".

6. Acceptance Process

No water mains can be activated or accepted until the Portsmouth Water Division is in receipt of the following information:

- A. Passed and complete pressure test report.
- B. Bacteria test report passed.
- C. Local municipality's acceptance of street(s).
- D. Record drawings and certification.
- E. Project Financial Information
- F. Any necessary easements.
- G. Any necessary state and local approvals.

Once these requirements have been met then the Portsmouth Water Division can then write a letter of acceptance for the water system.

MATERIAL SPECIFICATIONS

PUSH-ON JOINT WATER PIPE (4"-16")

100. PIPE

- 100.1 Pipe shall be cement lined, ductile iron, class 52, "Tyton" or push-on joint, asphalt coated inside and outside. Pipe shall meet or exceed all applicable A.W.W.A. Standards (latest revisions).
- 100.2 All necessary rubber gaskets and fitting lubricant as required by the manufacturer shall be supplied with the pipe.

MECHANICAL JOINT PIPE FITTINGS (4"-16")

200. FITTINGS

- 200.1 All fittings shall be ductile iron, cement lined inside and asphalt coated inside and out mechanical joint and shall conform to all applicable A.W.W.A. Standards.
- 200.2 All fittings shall be supplied with all necessary glands, rubber gaskets, bolts and nuts.

T-BOLTS AND NUTS

201. T-BOLTS AND NUTS

- 201.1 T-Bolts and Nuts shall be "Car-Blue T-Bolt" as manufactured by NSS Industries, 9075 General Dr., Plymouth, Michigan, 48170, 1-(800)-221-5126, or approved equal.

RETAINER RINGS/GLANDS (4"-16")

202. RETAINER RINGS/GLANDS

- 202.1 Retainer rings shall be the heavy duty "sprinkler system" type, and shall be asphalt coated for corrosion protection. They shall meet all applicable A.W.W.A. standards and be provided with all necessary set screws. Retainer rings shall be EBBA Iron Series 100; Series 300 Split Ring; Series 800 Coverall; of Eastland, Texas (817) 629-1737 or approved equal.

MECHANICAL JOINT CAPS (4"-16")

203. CAPS

- 203.1 Caps shall be asphalt coated inside and out, and shall be mechanical joint.

203.2 Caps shall be provided with all necessary glands, rubber gaskets, nuts and bolts.

GATE VALVES (4"-16")

300. GATE VALVES

- 300.1 All gate valves shall conform to A.W.W.A. Standard C-509 (latest revision) for Resilient Sealed Gate Valves.
- 300.2 Wedge shall be constructed of ductile iron, fully encapsulated in synthetic rubber except for guide and wedge nut areas.
- 300.3 Waterway shall be smooth and shall have no depressions in seat where foreign material can accumulate and prevent proper closing and sealing.
- 300.4 Stem shall be sealed by at least two O-rings and be the non-rising type.
- 300.5 Valve body and bonnet shall be fusion bonded epoxy coated, inside and out at least 8 mil. thick.
- 300.6 Valves shall have mechanical joints and be supplied with all rubbers, glands, nuts and bolts.
- 300.7 Valves shall open right and indicate so on the hub nut. Hub nut shall be standard AWWA 2" operating nut.
- 300.8 All gate valves installed at the Pease Transport shall be open left.

301. TAPPING GATE VALVES

- 301.1 Tapping gates shall conform to specification for gate valves except one outlet shall be flanged to fit standard same size tapping sleeve flange.
- 301.2 Tapping gate valve shall be supplied with all necessary rubber gaskets, nuts and bolts.
- 301.3 No lead gaskets shall be permitted under any circumstances.

TAPPING SLEEVES (MAIN SIZES 4"-16")

600. TAPPING SLEEVES, MECHANICAL JOINT

- 600.1 The tapping sleeves shall be a full mechanical joint type fitting, split tee, with branch flange faced and slotted for 125 pound template such as Clow Fig. No.F-5205 or approved equal.

600.2 The tapping sleeve shall be provided with all necessary glands, rubber gaskets, nuts and bolts. (Poured lead gasket joints are not acceptable.)

601. TAPPING SLEEVES, STAINLESS STEEL TYPE

601.1 Stainless steel tapping sleeves shall have a full rubber inside gasket in contact with the pipe such as a Ford "SST" type or Romac type or approved equal.

CAST-COUPLINGS (4"- 16")

700. CAST COUPLINGS

700.1 Cast couplings shall be Rockwell brand type 441 or approved equal.

700.2 Couplings shall be provided with all necessary glands, rubber gaskets, nuts and bolts.

AIR RELEASE VALVES

800. AIR RELEASE VALVES

800.1 Air release valve body and cover shall be constructed of cast on with ail P S female threaded inlet sized by the engineer. Working pressure shall be 3(3 {) PSI min.

800.2 The float shall be constructed of stainless steel. All other internal parts shall be constructed of stainless steel unless specified otherwise herein. The linkage shall be Delrin and bronze. The seat shall be Buna-N or approved equal.

800.3 The air release valve shall be a Val-Matie Model #45 as manufactured by G.A. Industries Inc., 1116 Ridge Ave., Pittsburgh, PA, 15233, (412) 321-5050; as distributed by Gil Moore & Co. Inc., 665 Hancock St., Quincy, MA, 02170, (617) 471-7300.

FIRE HYDRANTS

900. FIRE HYDRANTS

900.1 Hydrants shall be Kennedy K-81A Guardian Hydrant with a 5 1/4" valve opening.

900.2 The hydrant drain shall be plugged.

900.3 Joint at base of hydrant shall be a 6" restrained, mechanical joint.

- 900.4 Opening direction shall be clockwise and indicate so on hydrant. Opening direction for hydrants installed at the Pease Tradeport shall be counter clockwise and indicate so on the hydrant.
- 900.5 Operating nut shall be standard AWWA pentagon operating nut with 1 1/2" point to flat dimension.
- 900.6 Nozzles
 - Two 2 1/2" National Standard Hose Thread nozzles;
 - One 4 1/2" National Standard Hose Thread nozzle.

FLUSHING HYDRANTS

901. FLUSHING HYDRANTS (TYPE I)

- 901.1 Flushing hydrants shall be as manufactured by Murdock, 2488 River Rd., Cincinnati, Ohio, 45204, (513) 471-7700 Models and sizes listed below.

Size	Model Number
3/4"	BFHM 75
1"	BFHM 100
1 1/2"	BFHM 150
2"	BFHM 200

902.0 POST TYPE FLUSHING HYDRANT (TYPE II)

- 902.1 Flushing hydrants shall be post type hydrants, five foot (5') bury with eight cubic feet (8 C.F.) of crushed stone beneath hydrant to allow drainage.
- 902.2 All working parts shall be brass, with hydrant main valve opening being 2 3/16" min.
- 902.3 Inlet connection shall be 2" T.P. with one outlet being 2 1/2" National Standard Hose Thread.
- 902.4 All operating parts shall be removable from above ground with no special tools.
- 902.5 The hydrant shall be self draining, non-freezing with a three inch (3") ductile iron barrel and a cast iron top.

902.6 The hydrant shall have a pentagon socket operator and supplied with an appropriate wrench.

902.7 The flushing hydrant shall be an Eclipse Model #2 Hydrant, as manufactured by Kupferle Foundry, 813 Hamstead St., St. Louis, Missouri, 63102, phone: (800) 231-3990.

903.0 FLUSH TYPE FLUSHING HYDRANT (TYPE III)

903.1 Flushing Hydrant shall be a flush mounted box hydrant, 5 foot bury with 8 cubic feet-of crushed stone beneath hydrant to allow drainage of barrel.

903.2 All working parts shall be brass, with hydrant main valve opening being 2 3/16".

903.3 Inlet connection shall be 2" IPS with outlet being 2 1/2" NST male thread. 903.4 All operating parts shall be removable from above ground with no special tools.

903.5 The self draining, non-freezing hydrant's barrel shall be made of 3" ductile iron pipe.

903.6 The hydrant shall have a lockable cast iron box.

903.7 The hydrant shall be Eclipse No. 85 Blow-Off hydrant as manufactured by Kupferle Foundry, 813 Hampstead St., St. Louis, Missouri, 63102. Phone (800) 231-3990.

904.0 FLUSHING HYDRANT (TYPE IV)

904.1 Flushing Hydrant shall be a post type blow-off hydrant, 5 foot bury with 8 cubic feet of crushed stone beneath hydrant to allow drainage of barrel.

904.2 All working parts shall be brass, with hydrant main valve opening being 2 3/16".

904.3 Inlet connection shall be 2" IPS with outlet being 2 1/2" NST male thread.

904.4 All operating parts shall be removable from above ground with no special tools.

904.5 The self draining, non-freezing hydrant's barrel shall be made of 3" ductile iron pipe.

904.6 The hydrant shall have a lockable cover for the operator nut.

904.7 The hydrant shall be designed and constructed to break-away easily at the ground level.

904.7 The hydrant shall be a "Mainguard" model No. 77 as manufactured by Kupferle Foundry, 813 Hampstead St., St. Louis, Missouri, 63102. Phone (800) 231-3990.

PIPELINE INSTALLATION STANDARDS

1. MATERIAL

- 1.1 Material shall meet applicable specifications located in this manual.
- 1.2 Pipe shall have a minimum cover of 5'-0" and a, maximum of T-0".
- 1.3 Sand bedding under pipe shall be a minimum of 6" or the diameter of the pipe, whichever is greater.
- 1.4 A conductive indicator/tracer tape stating "CAUTION WATER LINE BURIED BELOW" shall be placed at a depth of 2' directly over the main. A sample of this tape shall be submitted to Water Division Engineering Technician's office for approval prior to it's use.
- 1.5 Water lines installed under turnpikes, railroads, or major state highways shall be sleeved and gated on both sides of the crossing.
- 1.6 Back-fill shall be compacted in 12" lifts with suitable material as approved by the Portsmouth Water Division.

2.0 FITTINGS

- 2.1 Material shall meet applicable specifications located in this manual.
- 2.2 All fittings shall be installed with EBBA Iron type retainer glands as specified in the material specifications section of this manual.

3.0 GATES

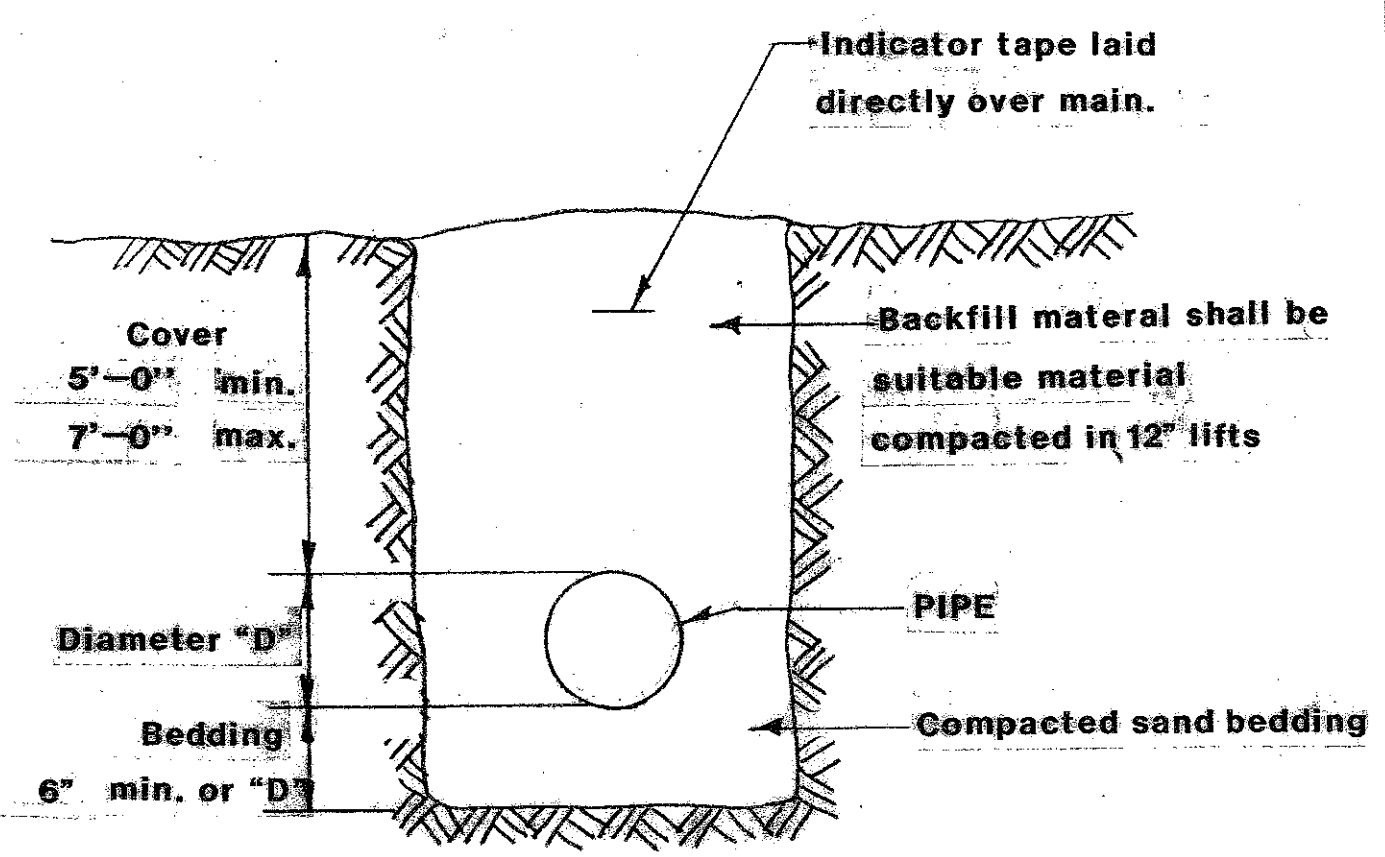
- 3.1 Material shall meet applicable specifications located in this manual. 3.2 Gates shall be installed with retainer rings
- 3.3 There shall be a maximum of 1000 feet between gate valves.
- 3.4 All gate valves and curb stops shall have proper gate boxes, or curb boxes installed and tops set at finish grade, prior to back-filling.
- 3.5 All gate boxes and service boxes shall be free from debris.
- 3.6 Any curb-stop or gate valve installed in areas of heavy growth shall be set a minimum of 6" above finish grade and witness stake set.

4.0 SERVICES

- 4.1 All services, both fire and domestic shall be gated in the public R.O.W. and shall enter the lot as separate services.

5.0 GENERAL

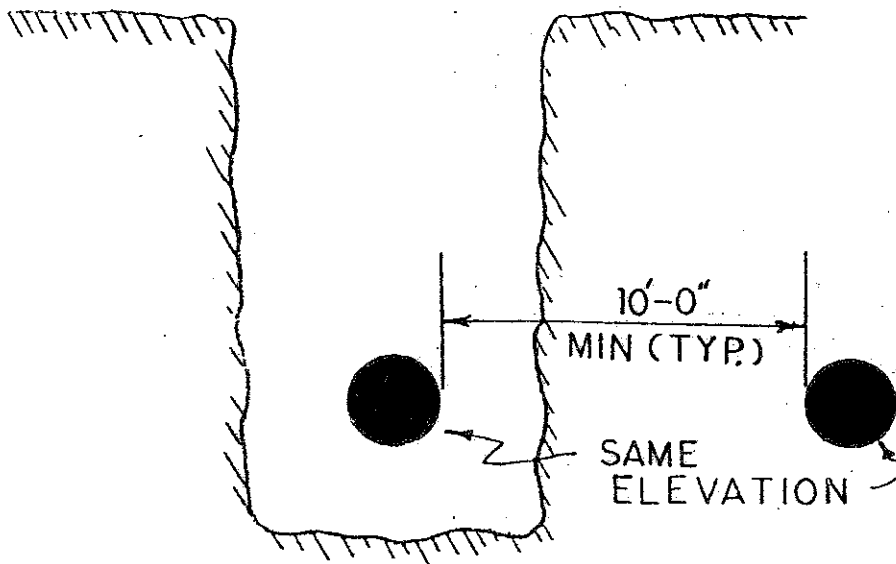
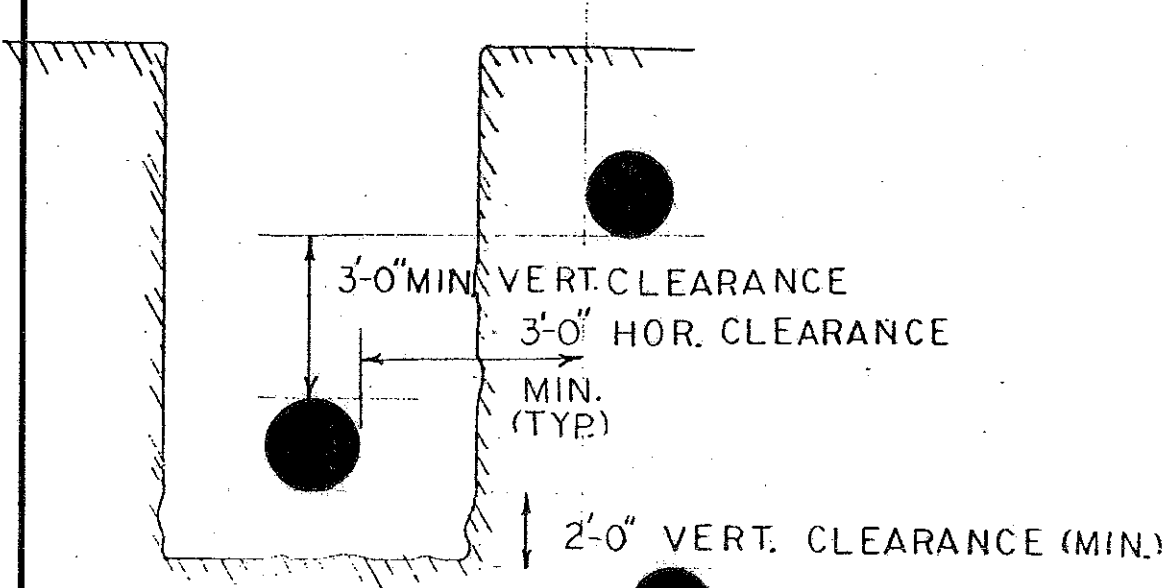
- 5.1 Where water and sewer lines are in close proximity to each other, the NH Water Supply and Pollution Control Division's Standards for separation or concrete encasement shall apply. Contact NHWSPCD at (603) 271-3503 for latest revised standard.



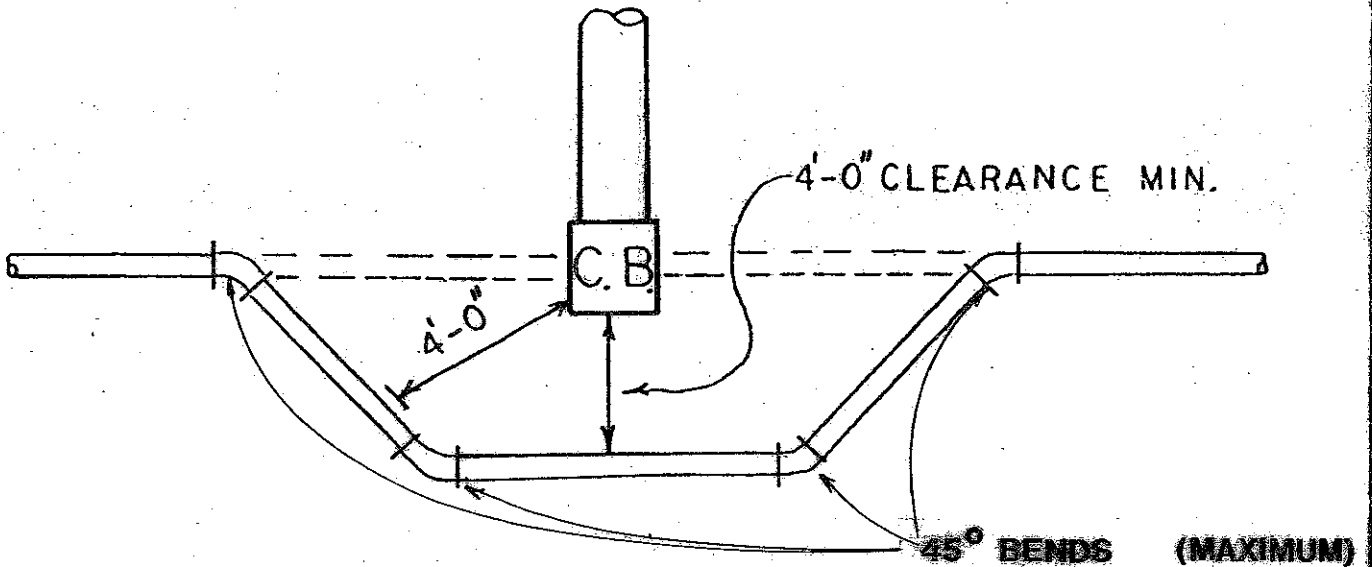
Pipe as specified by Portsmouth Water Division
 See specifications

APPROVED: <i>Thomas D. Craven</i> ENGINEERING	PORTSMOUTH WATER DIVISION PIPE LINE INSTALLATION	REV. 4 DATE 9/88	STD. NO. 780304-3
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TRENCH
X-SECT.



APPROVED: <i>Thomas N. [Signature]</i>	PORTSMOUTH WATER DIVISION CLEARANCE STD.	REV. DATE	STD. NO. 780305-0
ENGINEERING			

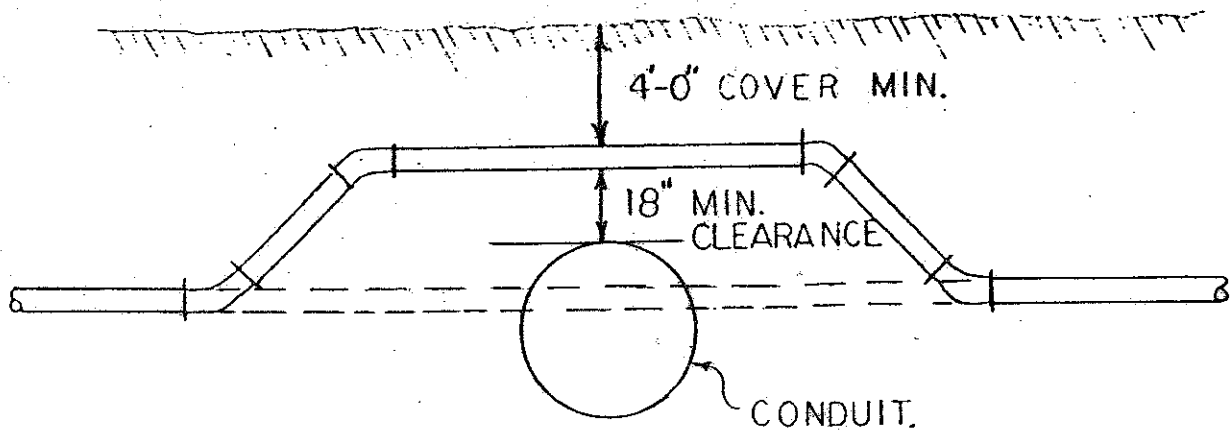


NOTES

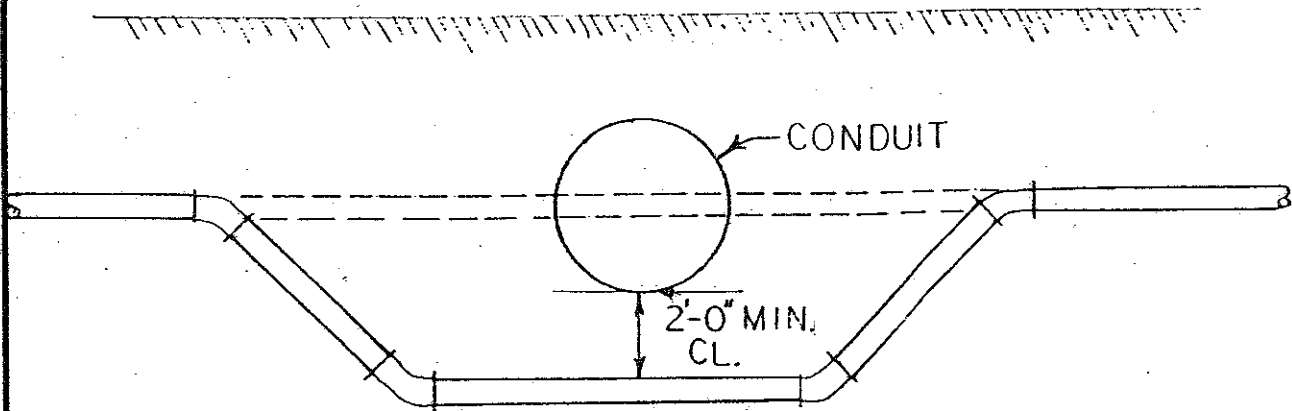
- 1 ALL FITTINGS SHALL BE M.J. WITH RETAINER GLANDS.
- 2 ALL PIPE, FITTINGS AND MATERIAL SHALL CONFORM TO PORTSMOUTH WATER WORKS STANDARDS
- 3 ALL WORK AND MATERIALS ARE SUBJECT TO INSPECTION AND APPROVAL BY PORTSMOUTH WATER WORKS PRIOR TO FINAL ACCEPTANCE.

APPROVED:  ENGINEERING	PORTSMOUTH WATER DIVISION HORIZONTAL WATER MAIN RELOCATION	REV. 2 DATE 9/88	STD. NO. 780306-1
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METHOD 1.



METHOD 2. FOR SHALLOW COVER



NOTES TYPICAL TO BOTH.

1. ALL FITTINGS SHALL BE MJ WITH RETAINER GLANDS.
2. ALL PIPES SHALL BE CEMENT LINED DUCTILE IRON CLASS 52.

APPROVED:

 ENGINEERING

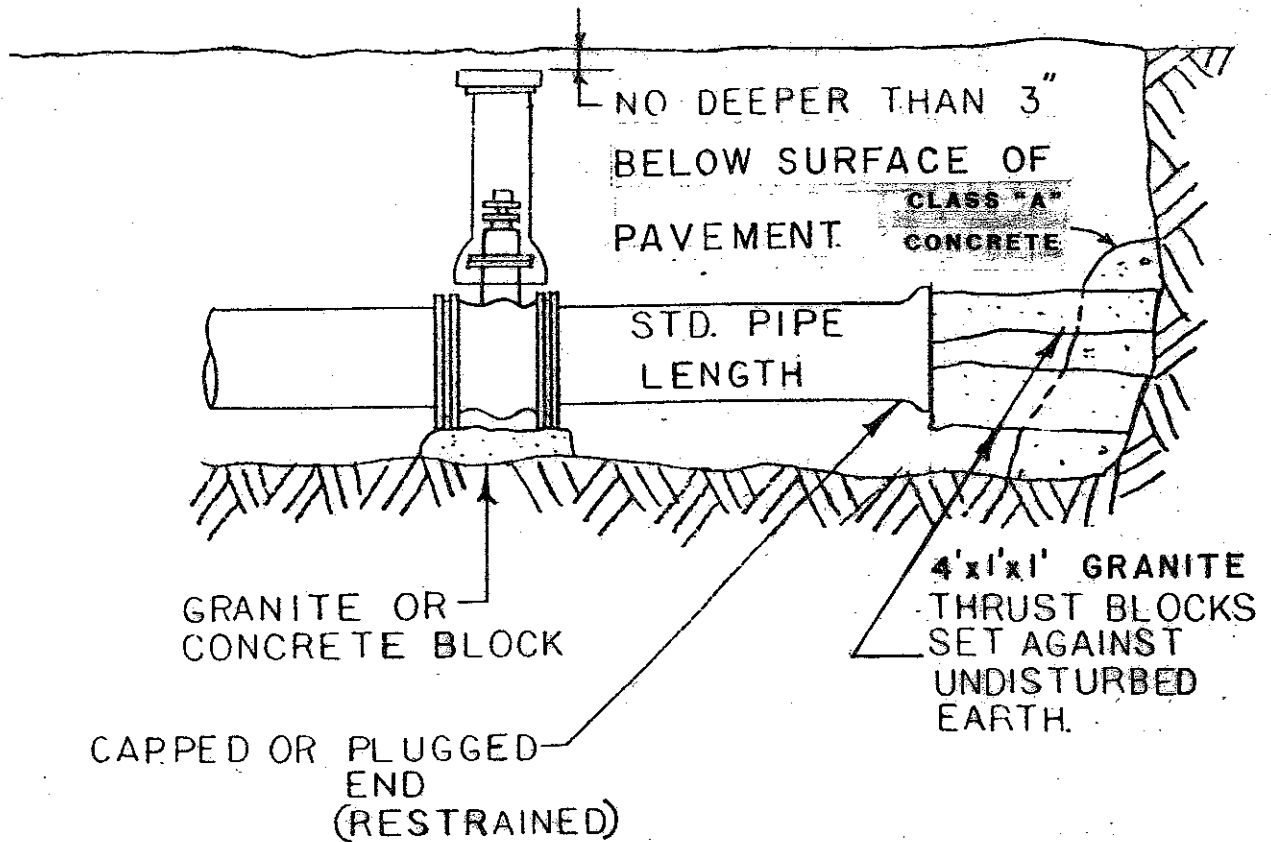
PORTSMOUTH WATER DIVISION
**VERTICAL WATER MAIN
 RELOCATION**

REV. 1
 DATE
 9/88

STD. NO.
 780307-0


3. ALL PIPE, FITTINGS, AND MATERIAL SHALL CONFORM TO PORTSMOUTH WATER DIVISION STANDARDS.
4. WHEN THE CONDUIT IS A SEWER, METHOD ONE IS THE ONLY ALLOWABLE METHOD. IF COVER IS TOO SHALLOW AN APPROVED INSULATION SHALL BE USED TO PREVENT FREEZING.
5. ALL WORK AND MATERIALS ARE SUBJECT TO INSPECTION AND APPROVAL BY PORTSMOUTH WATER DIVISION

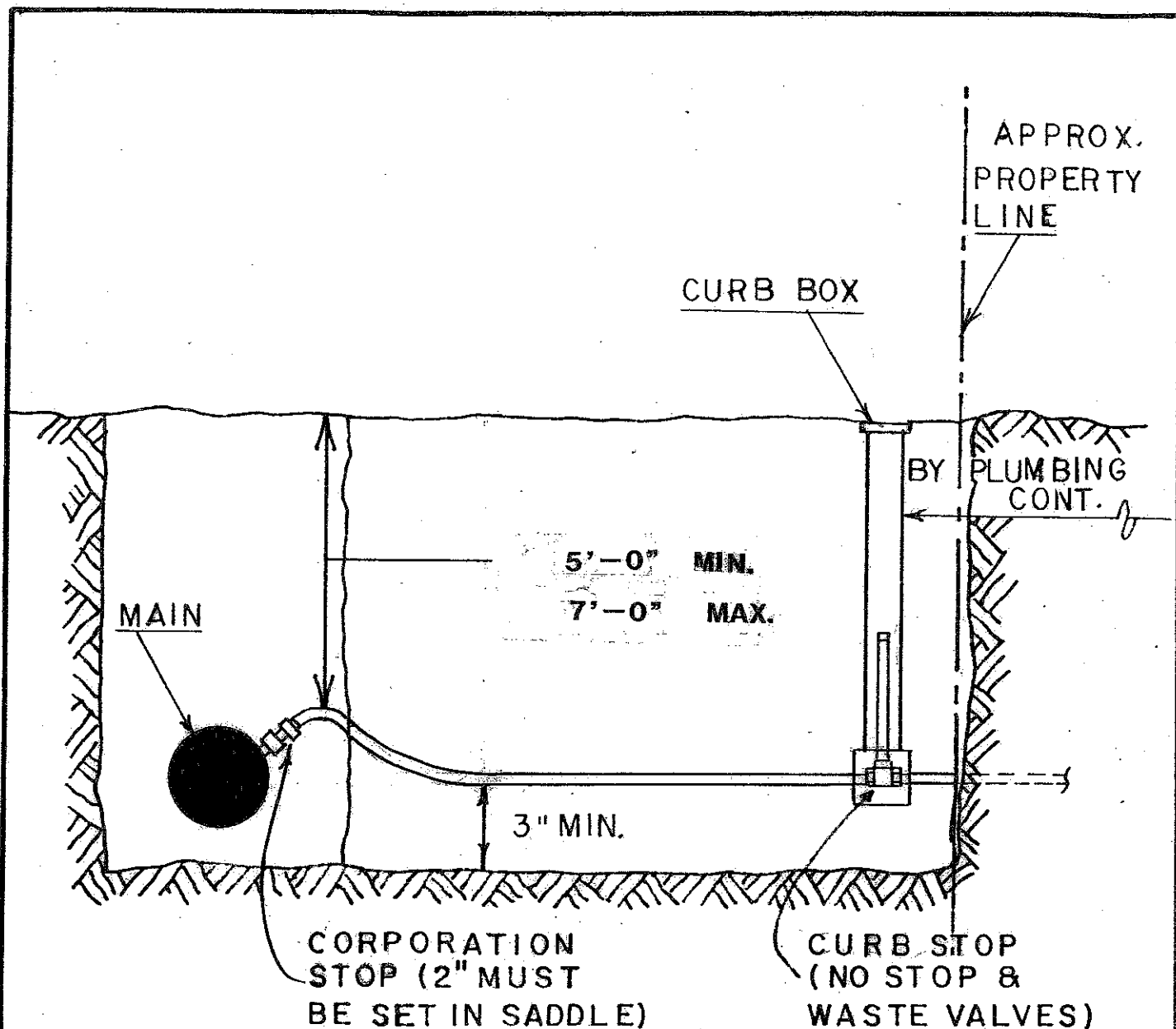
APPROVED: <i>Thomas M. [Signature]</i> ENGINEERING	PORTSMOUTH WATER DIVISION VERTICAL WATER MAIN RELOCATION	REV. DATE	STD. NO. 780307-0
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NOTE:

1. LOCATION OF SUCH GATE VALVE SHALL BE GIVEN TO THE WATER DIVISION.
2. ALL FITTINGS SHALL BE APPROVED BY THE PORTSMOUTH WATER DIVISION PRIOR TO INSTALLATION.
3. PRIOR TO BACKFILLING, THE WATER DIVISION SHALL BE NOTIFIED FOR FINAL VISUAL INSPECTION.

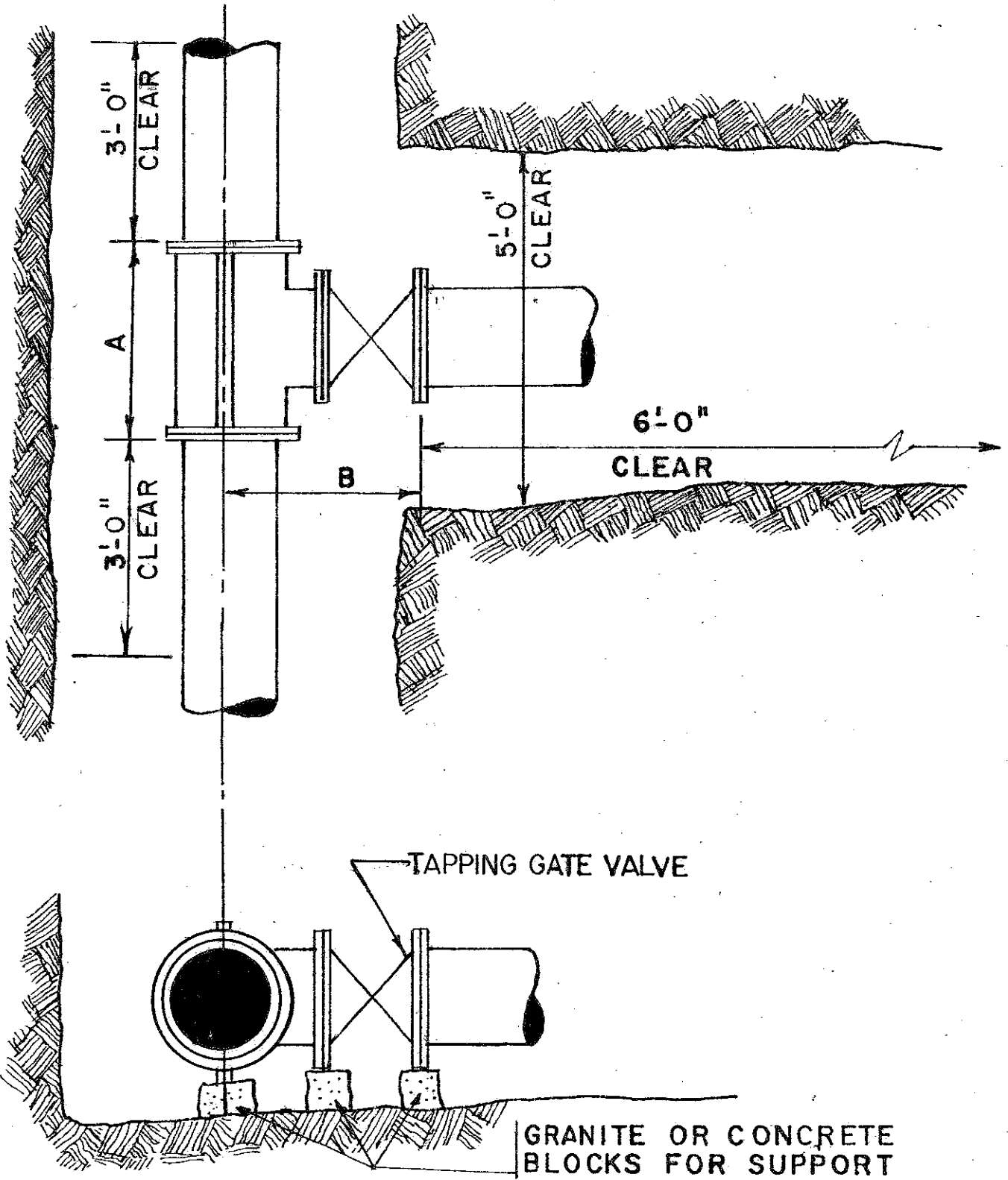
APPROVED  ENGINEERING	PORTSMOUTH WATER DIVISION DEAD END PIPE DETAIL	REV. 4 DATE 9/88	STD. NO. 780308-3
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NOTES:

1. SKETCH SHOWING LOCATION OF CURB BOX SHALL BE GIVEN TO PORTSMOUTH WATER DIVISION PRIOR TO ACCEPTANCE.
2. CURB BOX COVER IN AREA OF HEAVY GROWTH SHALL BE SET 6" ABOVE GRADE AND WITNESS STAKE SET.
3. CURB BOX SHALL BE SET APPROXIMATELY 1'-0" FROM PROPERTY LINE AS SHOWN ABOVE.
4. MATERIAL SHALL BE AS APPROVED BY WATER DIVISION.

APPROVED: <i>Thomas H. ...</i> ENGINEERING	PORTSMOUTH WATER DIVISION 3/4" - 2" WATER SERVICE	REV. 2 DATE 9/88	STD. NO. 780312-0
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APPROVED:

M. W. ...
ENGINEERING

PORTSMOUTH WATER DIVISION

TAPPING SLEEVE AND GATE

REV. 5
DATE

12-84

STD. NO.

780311-5

TAPPING SLEEVE & GATE

	<u>A</u>	<u>B</u>		<u>A</u>	<u>B</u>
4 X 4	17	8	12 X 4	17 1/2	12 1/4
6 X 4	16 7/8	8	12 X 6	23 1/2	12 1/4
6 X 6	19 7/8	8	12 X 8	23 1/2	12 1/4
8 / 4	16 3/4	10	12 X 10	29 1/2	12 1/4
8 X 6	22 3/4	10	12 X 12	29 1/2	11 1/2
8 X 8	22 3/4	10	16 X 4	26 1/4	14 1/2
10 X 4	17 5/8	10	16 X 6	26 1/4	14 1/2
10 X 6	26 1/8	10 7/8	16 X 8	26 1/4	14 1/2
10 X 8	26 1/8	10 7/8	16 X 10	26 1/4	14 1/2
10 X 10	26 1/8	10 7/8	16 X 12	26 1/4	14 1/2

STANDARD SPECIFICATIONS

1. ALL MATERIALS SHALL BE APPROVED BY THE PORTSMOUTH WATER DEPT. PRIOR TO INSTALLATION AND USE.
2. ALL JOINTS SHALL BE MECHANICAL.
3. "CLEAR" DIMENSIONS SHOWN ARE REQUIRED FOR WORKSPACE. NO JOINTS ON PIPE BEING TAPPED WITHIN "CLEAR" AREA.
4. FORD TYPE STAINLESS STEEL TAPPING SADDLES OR APPROVED EQUAL ARE ALSO ACCEPTABLE.

APPROVED:

[Signature]

ENGINEERING

PORTSMOUTH WATER DIVISION

TAPPING SLEEVE AND GATE

REV. 1

DATE

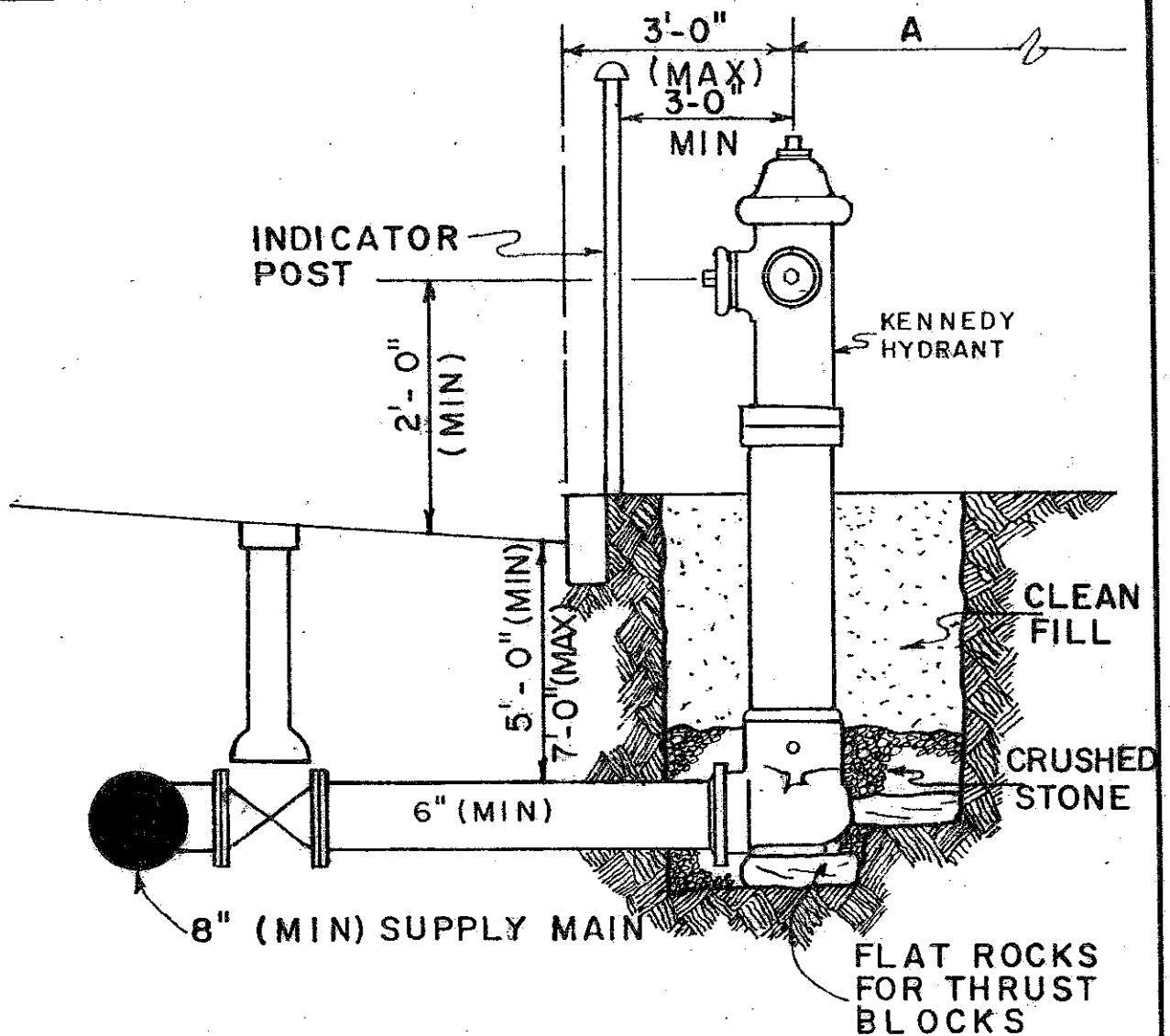
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STD. NO.

780311 - 5

1. HYDRANTS SHALL BE INSTALLED A MAXIMUM DISTANCE OF 3'-0" CURB LINE TO OPERATING NUT.
2. THE PUMPER OUTLET NOZZLE SHALL FACE THE STREET.
3. CENTERLINE OF NOZZLES SHALL BE A MINIMUM OF 2'-0" ABOVE FINISHED GRADE OF STREET.
4. AREA AROUND HYDRANT SHALL BE GRADED TO ALLOW ANY SURFACE WATER TO DRAIN AWAY FROM HYDRANT.
5. HYDRANT SHALL BE FIRMLY SUPPORTED UNDERGROUND ALL AROUND THE STANDPIPE.
6. EARTHFILL SHALL BE TAMPED TO GIVE FIRM SUPPORT TO THE HYDRANT BARREL.
7. A GATE VALVE SHALL BE INSTALLED BETWEEN THE HYDRANT AND THE MAIN ON THE LATERAL.
8. HYDRANT LATERALS SHALL BE 6" INSIDE DIAMETER MINIMUM.
9. HYDRANT LATERALS SHALL BE TAKEN FROM WATER MAINS 8" IN DIAMETER OR LARGER.
10. ALL JOINTS AT HYDRANT CONNECTION SHALL BE RESTRAINED MECHANICAL JOINT.
11. INSTALLATION OF HYDRANTS IN AREAS OF HEAVY GROWTH SHALL HAVE A 10' RADIUS CLEAR AREA ALL AROUND THE OPERATING NUT OF HYDRANT.
12. THERE SHALL ALSO BE AN INDICATOR POST FABRICATED FROM 2" I.D. GALV. STEEL PIPE, 7'-0" ABOVE FINISHED GRADE, AND SET 2'-0" BELOW GRADE IN CLASS "A" CONCRETE 6" ALL AROUND POST. THIS POST SHALL BE PRIMED WITH ZINC CHROMATE PRIMER AND PAINTED WITH HIGH VISIBILITY RED. THE INDICATOR POST SHALL BE NO CLOSER THAN 3'-0" FROM THE OPERATING NUT, AND SET ON SIDE OF HYDRANT THAT IS FACING ONCOMING TRAFFIC. TOP OF POST SHALL BE THREADED AND CAPPED.
13. INSTALLATION OF HYDRANTS IN HEAVY GROWTH AREAS SHALL HAVE GATE BOXES RAISED 6" ABOVE GRADE AND BE PAINTED ORANGE FOR HIGH VISIBILITY.

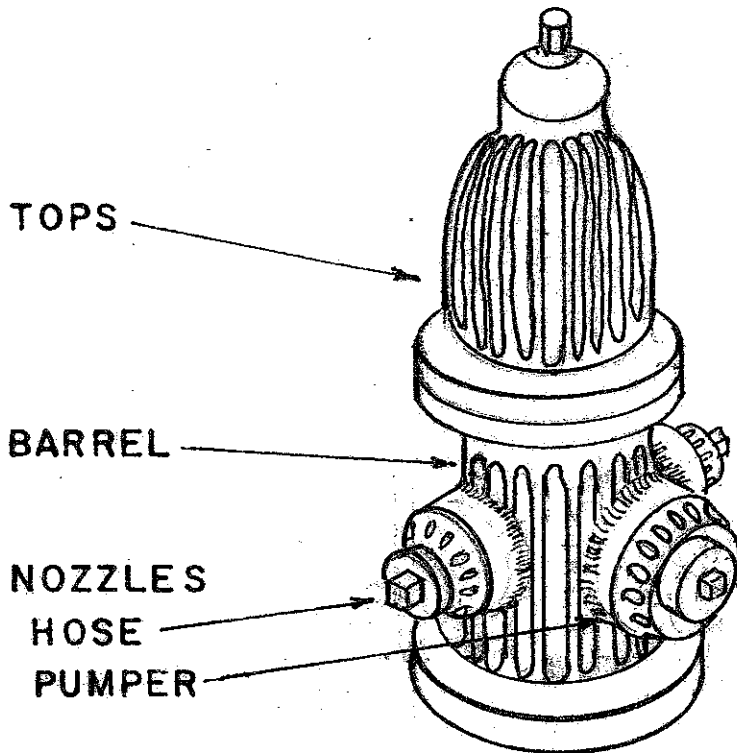
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ENGINEERING	INSTALLATION	12 / 84	780309-2



NOTES:

1. HYDRANT TYPE AS SPECIFIED BY PORTS. WATER DIV.
2. "A" SHALL BE 10' CLEAR RADIUS IN HEAVY GROWTH AREAS.
3. INDICATOR POST AS SPECIFIED BY THE PORTSMOUTH WATER DIVISION.

APPROVED:  ENGINEERING	PORTSMOUTH WATER DIVISION STANDARD FIRE HYDRANT INSTALLATION	REV. 3 DATE 12/84	STD. NO. 780309-2
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	PUBLIC	PRIVATE
BARRELS	YELLOW	RED
TOPS	REFLECTIVE WHITE	

NOZZLE CAPS (HOSE PUMPER)
 GREEN 1000 GPM OR GREATER
 ORANGE 500 1000 GPM
 RED UNDER 500 GPM

GALLONS PER MIN FLOW DETERMINED
 BY FIRE FLOW TESTS CONDUCTED ON
 HYDRANTS. UNDER DIRECTION OF
 WATER DIVISION

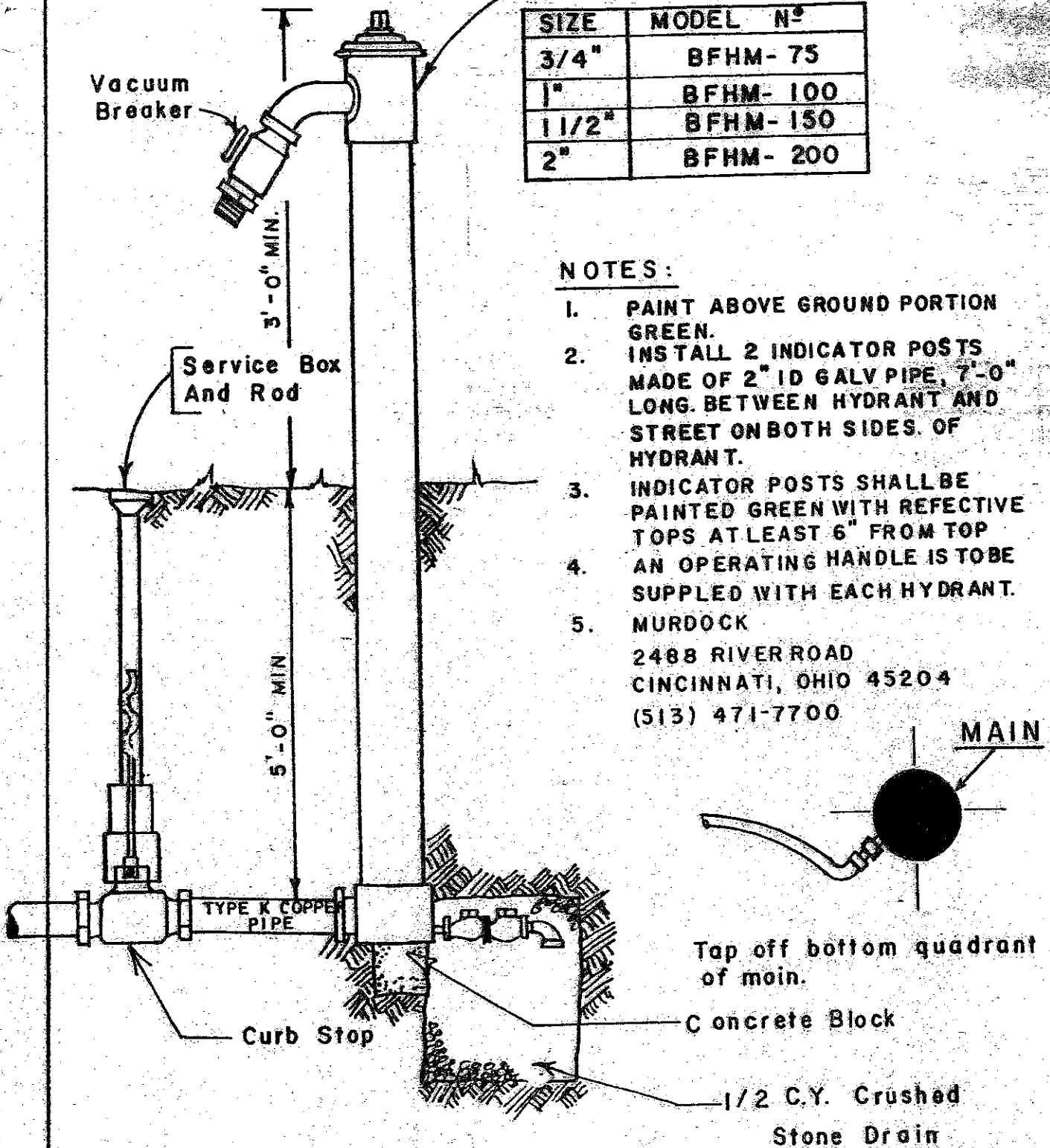
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MURDOCK HYDRANT

SIZE	MODEL N°
3/4"	BFHM- 75
1"	BFHM- 100
1 1/2"	BFHM- 150
2"	BFHM- 200

NOTES:

1. PAINT ABOVE GROUND PORTION GREEN.
2. INSTALL 2 INDICATOR POSTS MADE OF 2" ID GALV PIPE, 7'-0" LONG. BETWEEN HYDRANT AND STREET ON BOTH SIDES OF HYDRANT.
3. INDICATOR POSTS SHALL BE PAINTED GREEN WITH REFLECTIVE TOPS AT LEAST 6" FROM TOP
4. AN OPERATING HANDLE IS TO BE SUPPLIED WITH EACH HYDRANT.
5. MURDOCK
2488 RIVER ROAD
CINCINNATI, OHIO 45204
(513) 471-7700



APPROVED:

[Signature]
ENGINEERING

PORTSMOUTH WATER DIVISION
FLUSHING HYDRANT
STANDARD TYPE I

REV. 0
DATE

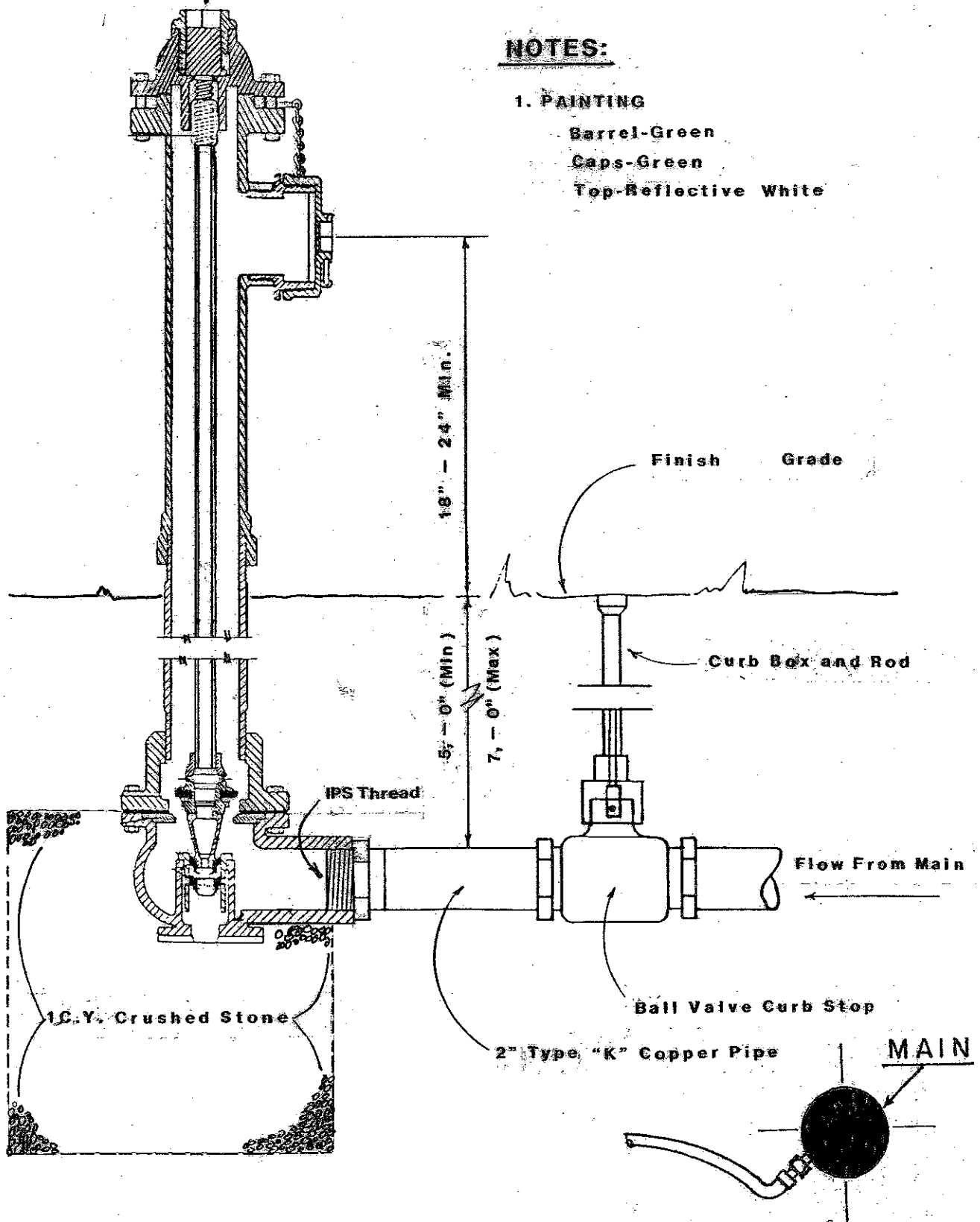
STD. NO.
780314-0

Eclipse No. 2 Hydrant With Tamper Proof Option

NOTES:

1. PAINTING

- Barrel-Green
- Caps-Green
- Top-Reflective White



APPROVED:

PORTSMOUTH WATER DIVISION

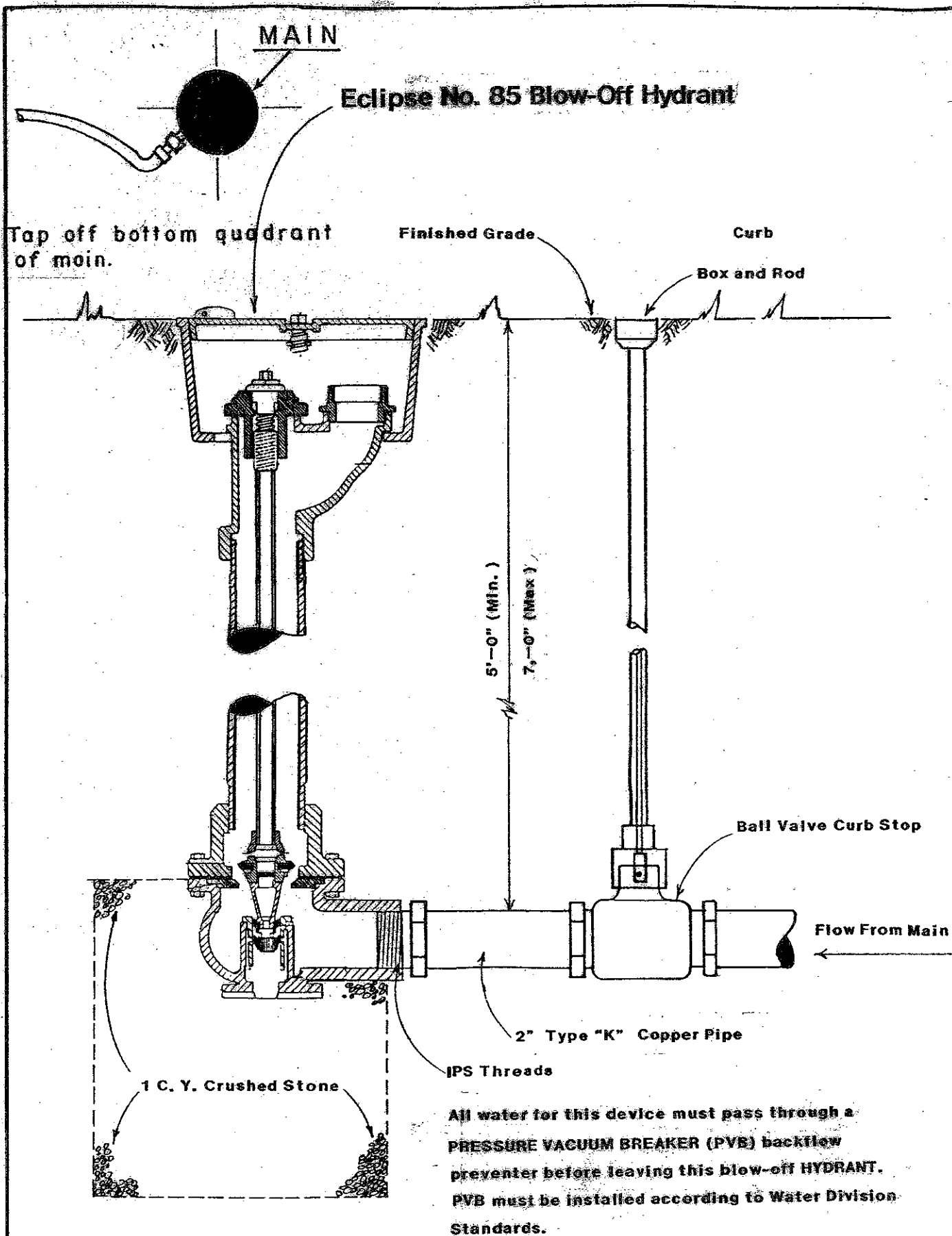
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ENGINEERING

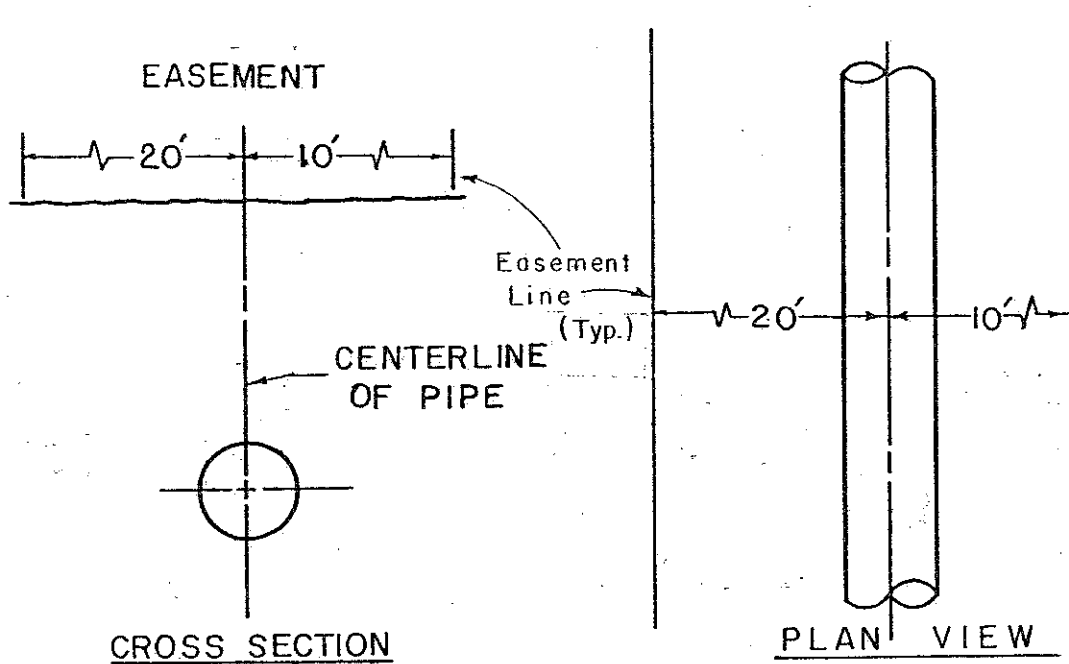
FLUSHING HYDRANT, TYPE II

3/89



APPROVED:	PORTSMOUTH WATER DIVISION	REV. 0 DATE	STD. NO.
ENGINEERING	FLUSHING HYDRANT TYPE III	3/89	

WATER MAIN EASEMENT



1. NO BUILDINGS, STRUCTURES, OR SEPTIC SYSTEMS SHALL BE LOCATED WITHIN THE EASEMENT AREA.
2. TREES SHALL NOT BE PLANTED WITHIN TEN (10) FEET OF THE MAIN.
3. UTILITY/LIGHT POLES SHALL BE LOCATED NO CLOSER THAN TEN (10) FEET FROM THE PIPE.
4. FINAL FINISHED GRADE CAN NOT BE CHANGED MORE THAN 6".
5. ANY CONSTRUCTION ACTIVITIES WITHIN THE EASEMENT AREA MUST FIRST BE REVIEWED BY THE WATER WORKS AT LEAST THIRTY (30) DAYS PRIOR TO START OF WORK.
6. WATER WORKS SHALL HAVE THE RIGHT TO REPAIR, RELAY, AND PERFORM ANY NECESSARY MAINTENANCE WORK INCLUDED BUT NOT LIMITED TO MAIN EXTENSIONS AND SERVICE INSTALLATIONS IN ACCORDANCE WITH THEIR WATER TARIFF.

APPROVED:

Thomas W. ...

ENGINEERING

PORTSMOUTH WATER DIVISION
STANDARD WATER MAIN
EASEMENT

REV. 0
DATE

5/21/86

STD. NO.

780310-0

Portsmouth Water Division



Hydrostatic Testing Water Mains

Prepared by:
Water Division, Department of Public Works
City of Portsmouth
680 Peverly Hill Road
Portsmouth, NH 03801-5356

Original Issue: June, 1980
Revision #1: February, 1989
Revision #2: January 2002
Revision #3: March, 2011

PURPOSE

The purpose of this booklet is to inform the contractor exactly what is expected for testing water mains.

JURISDICTION

All water mains within the Portsmouth Water System, whether new or old, must be inspected and tested prior to acceptance and/or activation by the Portsmouth Water Division.

Fire services shall also be inspected and tested prior to being activated or re-activated.

TEST EQUIPMENT STANDARDS

GAUGES

1. All gauges shall have a minimum of 3" diameter face.
2. Gauges shall have black painted numerals and lines on a white background.
3. Gauges shall read 0450 PSI Max. graduated in 2 lb. increments (Max.).

PUMPS

Pumps shall be of an approved type and size specifically made for main testing. Pressure range compatible to test pressures required. They shall not have been used for testing with any other fluid.

MAKE-UP TANKS

1. Make-up tanks shall be a smooth, clean, cylindrical rigid plastic or steel tank.
2. Conical tanks, garbage cans, used oil containers, and the like are not acceptable.
3. The tanks shall have either a full length sight tube on the side, or the top be completely open for measuring the draw down on the water.

Hydrostatic testing shall be performed in accordance with A.W.W.A. standard C-600 latest revision.

HYDROSTATIC TESTING

Sec. 1 PRESSURE TEST

After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 100 PSI and:

1. Not exceed pipe or thrust restraint design pressures.
2. Be of at least 2-hr duration
3. Not vary by more than ± 5 PSI
4. Not exceed twice the rated pressure of the valves or hydrants when the pressure boundary of the test section includes closed valves or hydrants
5. Not exceed the rated pressure of the valves if resilient-seated butterfly valves are used.

1.2 PRESSURIZATION

Each valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gage, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Portsmouth Water Division.

1.3 AIR REMOVAL

Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged or left in place at the discretion of the Portsmouth Water Division.

1.4 EXAMINATION

All exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves, or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory to the Portsmouth Water Division.

SECTION 2 - LEAKAGE TEST

A leakage test shall be conducted concurrently with the pressure test.

2.1 LEAKAGE DEFINED

Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 PSI of the specified test Pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

ALLOWABLE LEAKAGE

No pipe installation will be accepted if the leakage is greater than that determined by the following formula.

$$L = \frac{ND \sqrt{P}}{7400}$$

in which **L** is the allowable leakage, in gallons per hour;

N is the number of joints in the length of pipeline tested;

D is the nominal diameter of the pipe, in inches; and

P is the average test pressure during the leakage test, in pounds per square inch gage.

2.2.1 Allowable leakage at various pressures is shown in table 1

2.2.2 When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/hr/in. of nominal valve size shall be allowed.

2.2.3 When hydrants are in the test section, the test shall be made against the closed hydrant. The hydrant lateral gate shall be open.

2.3 Acceptance of Installation

Acceptance shall be determined on the basis of allowable leakage. If any test of pipe laid discloses leakage greater than that specified in Sec 2.2, the contractor shall, at his own expense, locate and repair the defective material until the leakage is within the specified allowance.

2.3.1 All visible leaks are to be repaired regardless of the amount of leakage.

Table 1

Allowable leakage per 1000 feet of pipeline* gph

Average Test Pressure psi	Nominal Pipe Diameter – in											
	2	3	4	6	8	10	12	14	16	18	20	24
150	0.19	0.28	0.37	0.53	0.74	0.92	1.10	1.29	1.47	1.66	1.84	2.21
125	0.17	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	1.68	2.01
100	0.15	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.80

* For pipes with 18 -ft. nominal lengths.

1. A written Certificate of test must be submitted to the Portsmouth Water Division prior to the main being considered for acceptance.
2. The attached list of "approved pipe line testing companies" have been approved to do testing on water mains within the jurisdiction of the Portsmouth Water Division.
3. All companies wishing to do testing must have a Portsmouth Water Division representative present before testing can begin.
4. Consult the back of this booklet for test equipment standards.

BACTERIA TESTING.

1. Mains shall have been thoroughly disinfected with chlorine or powered sodium hypochlorite (no tables allowed) at least 24 hours prior to sampling for bacteria.
2. Mains shall be thoroughly flushed prior to sampling.
3. The Portsmouth Water Division laboratory personnel will do the sampling and testing.
4. Samples can only be collected Mondays - Thursdays.
5. Results of samples are usually ready to read 24 hours after it has been collected.

PIPE PRESSURE TESTING COMPANIES

The following companies offer the service of pipe pressure testing on underground piping systems. This list is not to be considered an endorsement by the Water Division for any products or services provided by the listed companies but merely a source of contacts.

John Hoadley & Sons, Inc.

672 Union Street
Rockland, MA 02370
(781) 878-8098

Pipe Line Testing Service Inc.

P.O. Box 122
Winchester, MA 01890
(617) 729-3519

Green Mountain Pipe Line Services

1887 River Street
Bethel, VT 05032
(802) 234-9931

WASTE Inc.

58 Chenell Drive
Concord, NH 03301
(603) 225-92765

Water Service Consultants, Inc.

8 Industrial Park Drive, Unit 18
Hooksett, NH 03106
(603) 668-0088

Water & Waste Pipe Testing, Inc.

P.O. Box 2145
Wakefield, MA 01880
(781) 245-6705

LEAKAGE SURVEY COMPANIES

The following companies offer the service of leak location on underground piping systems. The Portsmouth Water Division is not available for leak detection on private water lines or water lines under construction by those other than the Portsmouth Water Division. This list is not to be considered an endorsement by the Water Division for any products or services provided by the listed companies but merely a source of contacts.

Heath Consultants Inc.

306 East Main St.
P.O. Box 511
Norton, MA 02766-0511
(508) 285-9891

John Hoadley & Sons, Inc.

672 Union Street
Rockland, MA 02370
(781) 878-8098

Pipe Line Testing Service Inc.

P.O. Box 122
Winchester, MA 01890
(617) 729-3519

Green Mountain Pipe Line Services

1887 River Street
Bethel, VT 05032
(802) 234-9931

WASTE Inc.

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Wakefield, MA 01880
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**PORTSMOUTH WATER DIVISION
PRESSURE/LEAKAGE**

TEST REPORT & CERTIFICATION

Passed Failed

Project Name:

Location:

Date of Test:

Domestic Water Main Fire Service

Size and length of pipe tested:

Size and number of valves:

Size and number of services:

Number of hydrants:

TEST

PRESSURE START:

TIME START:

PRESSURE FINISH:

TIME FINISH:

PRESSURE CHANGE:

ELAPSED TIME:

GALLONS USED TO KEEP TEST PRESSURE

GALLONS.

MAXIMUM ALLOWABLE LEAKAGE (BY WATER DIVISION)

G.P.H.

TEST PASSED

TEST FAILED

BY

(Portsmouth Water Division official)

I hereby certify this report is a true and accurate record of the actual test performed.

Tester signature:

Date:

Tester Typed Name:

Company Name:

Address:

City:

State:

Zip:

Phone Number: ()

Distribution:

Portsmouth Water Division; Testing Co.; Contractor; Developer

BACTERIA TEST PASSED

SAMPLE LETTER

Date

Name
Title
Company Name
Address
City, State, Zip

Re: (Project in question)

Dear

This is to notify you that the bacteria test for the above noted project meets our requirements.

Should you need anything further please let me know.

Sincerely,

Chemist

**LOCAL MUNICIPALITY STREET ACCEPTANCE
SAMPLE LETTER
(ON LOCAL MUNICIPALITY LETTERHEAD)**

Water Division, Public Works Department
City of Portsmouth
680 Peverly Hill Road
Portsmouth, NH 03801-5356

Re: Acceptance of (street name)_Street

Dear Sirs:

Please be advised that the town of (town name) has accepted (street name) as a municipal street open to the public.

Sincerely,

(MUNICIPAL SEAL)

Town Manager or Selectmen
(With typed names below each signature)

RECORD DRAWING CERTIFICATION

Date: _____

We hereby certify that the drawings submitted herewith are accurate and complete to the best of our knowledge and all location dimensions and discrepancies are noted on the drawings.

PROTECT NAME:

Contractor		Developer	
Company Name		Company name	
Address		Address	
City		City	
State	Zip	State	Zip
() Phone		() Phone	
Signature		Signature	
Typed Name		Typed Name	
Title		Title	

PROJECT FINANCIAL INFORMATION

WATER/SEWER DIVISION

This information is required prior to turning water lines over to the City of Portsmouth for acceptance.

Project Name:

Location:

Owner's Name:

Address:

City:

State:

Zip:

Phone No.: ()

Contractor's Name:

Address:

City:

State:

Zip:

Phone No.: ()

INSTRUCTIONS:

1. Fill in the data requested above and on the attached page(s).
2. Submit these completed forms to:

Engineering Technician

Portsmouth Water Division
680 Peverly Hill Road
Portsmouth, NH 03801-5356

3. If there are any questions please feel free to contact the Water/Sewer Accountant.

PORTSMOUTH WATER DIVISION

WATER MAIN FINANCIAL DATA

1. Value of mains installed by size:

Size			
Length			
Total Value			

3. Value of services installed by size:

Size			
Number			
Total Value			

3. Value of hydrants:

Valve Opening Size			
Number			
Total Value			

This must be signed prior to submission to the Portsmouth Water Division.

Signed: _____

Typed Name: _____

Company: _____

Date: _____

**PORTSMOUTH SEWER DIVISION
 SEWER MAIN FINANCIAL DATA**

1. Value of gravity mains (and manholes) installed by size:

Size			
Length			
Total Value			

2. Value of forced sewer main by size:

Size			
Length			
Total Value			

3. Value of sewage lift stations:

Location			
Designation Name or Number			
Total Value			

This must be signed prior to submission to the Sewer Division.

Signed: _____

Typed Name: _____

Company: _____

Date: _____

**ACCEPTANCE OF WATER LINES AND APPURTENANCES
SAMPLE LETTER**

(On Portsmouth Water Division Stationary)

Date

Name

Company Name

Address

City, State Zip

Re: Acceptance of water lines and appurtenances on (street name) in
(project name)

Dear Name:

This letter is to inform you that the Portsmouth Water Division is in receipt of all required data on the (street name) in (project name) and does hereby accept ownership of the water lines and appurtenances in accordance with the rules, regulations and water tariff of the Portsmouth Water Division as of the date of this letter.

Sincerely,

Public Works Department

MISCELLANEOUS

HYDRANT METER RENTALS

Fees for use of water from a hydrant for construction, filling skating rinks, etc. are as follows:

Connect and turn on	\$25.00
Disconnect and turn off	\$25.00
Meter Deposit 5/8"	\$1,000.00
3"	\$1,000.00
Meter & Valve	\$5.00 / Day
Water used	Standard rate
Hose	When available
Labor	Standard Rate
Backflow Preventer	\$15.00 / Day

1. The customers are responsible for the meters and all accessories and fittings. if meter is damaged, or parts are missing the customer will be billed.
2. If the meter is stopped when returned, a flat rate of \$10.00/day will be charged for the water used.
3. All equipment (meters, connections, valves etc.) must be returned to the Water Maintenance Shop at Portsmouth Public Works Department. Hours of operation are 7:30 a.m. to 3:30 p.m.
4. The hydrant to be used shall be with the prior approval of the foreman. This includes use of private hydrants.

**WATER AVAILABILITY
SAMPLE LETTER**

Date

Name

Title

Company Name

Address

City, State, Zip

Re: (Location of property. Town, Tax Map No., Lot No., House Number, Subdivision Name, etc.)

Dear Mr.

Water can be made available to the above mentioned development from (Street) in accordance with the rules, regulations, and the Water Tariff of the Portsmouth Water Division, which is on file here and with the Public Utilities Commission.

Should you have any questions please let me know.

Sincerely,

Engineering Technician