

*Small Distribution Systems
Best Practices*

ATCAVE

February 23, 2010

Presenter: Robert J. Longo

Robert J. Longo

Education and Licenses

- **BS Environmental Science, Eastern Connecticut State University**
- **State of Connecticut Distribution System Class III Operator**
- **State of Connecticut Water Treatment Plant Class II Operator**
- **State of Connecticut General Backflow Preventer Tester / Cross Connection Inspection**

Experience

■ **Valley Water Systems, Inc.** Plainville, CT

Project Manager

- **Operator of Class III Distribution System with 6,000 Service Connections**

■ **New England Service Company** Plainville, CT

V.P. of Operations

- **Contract Operations throughout New England**
- **Chief Operator for Approx. 10 Small Water Systems throughout Connecticut**
- **Provided Consulting, Management and Maintenance Services to many other Small Systems**
- **Water Meter Installations and Change-out Projects for Small to Medium size Water Systems**
 - **Millis, MA – 5,000**
 - **Bethel, CT – 4,000**
 - **Ledyard, CT – 2,000**
 - **Blanford, MA – 250**
 - **North Haverhill, NH -200**
- **Cross Connection Inspection and Backflow Preventer Installation, Testing and Repair**
- **Develop Hydrant Maintenance and Flush Plans for systems**

Experience Cont.

■ **Bristol Water Department** Bristol, CT

Superintendent

- **16,000 Service Connections**
- **800 Miles of Water Main**
- **1,600 Fire Hydrants**
- **Class IV Surface Water Treatment Plant and 3 Class II Wellfields**
- **6 Reservoirs**
- **5,000 acres of Watershed Land**

■ **Utility Business Solution, LLC** Newington, CT

Partner

- **Water System Operations and Management Company**

Best Practices.....

Begin and End with....

GOOD RECORD KEEPING!

- Know Where Records are Stored
- Verify Accuracy of Records
- Update Regularly
- Organize Files for Easy Access
- Create Backups
- Utilize a Computer if Available
- Be Proactive
- KNOW YOUR SYSTEM and Document what you know for future operators!

Typical Distribution System Operator Responsibilities

- **Map and Record Maintenance**
- **Fire Hydrant Inspection and Maintenance**
- **Flushing**
- **Meter Installation, Reading and Calibration**
- **Storage Tank Maintenance**
- **Water Main and Service Installations and Repair**
- **Water Main Rehabilitation and Replacement**
- **Service Interruptions**
- **System Pressure Maintenance and Regulation**
- **Leak Detection**
- **Pump Station Operations and Maintenance**
- **Customer Relations**

Maps and Ties

- **Do you have maps of your system and how updated are they?**
- **Do you store copies OFF-SITE?**
- **Are any of your maps electronic?**

GIS - A full GIS system requires scanned images of all maps, service cards, valve cards, etc.

- **A simple map directory on a computer can save time researching maps, allow information to be taken off site for backup and can help save time in the event of an emergency.**

Simple Electronic Index

Microsoft Excel - Maps and Valve Cards Index.xls

File Edit View Insert Format Tools Data Window Help

Times New Roman 10 B I U

A6 fx 100%

2	Distribution System Maps		Distribution System Map 1-11-2010.pdf
4			800 Scale BWD Map 12-2009.pdf
6			800 Scale Hydrant Number Map.pdf
8			Assessor Map 2009.pdf
10			Billing District Map 3-26-10.pdf
13	<i>Street</i>	<i>Cross Street</i>	<i>Map</i>
14	Shawn Drive	Adna Road	10A26.pdf
15	Adna Road	Jefferson Avenue	10A26.pdf
16	Coolidge Avenue	Jefferson Avenue	10A26.pdf
17	Jefferson Avenue	Shawn Drive	10A26.pdf
18	Shawn Drive	Adna Road	10A26-1.pdf
19	Jerome Avenue	Coolidge Avenue	10A26-1.pdf
20	Adna Road	Jefferson Avenue	10A26-1.pdf
21	Coolidge Avenue	Jefferson Avenue	10A26-1.pdf
22	Jefferson Avenue	Shawn Drive	10A26-1.pdf
23	Beechwood Lane	Fleetwood Road	10A57.pdf
24	Birchwood Drive	Stafford Avenue	12A45.pdf
25	Farmington Avenue	Collins Road	14A32.pdf
26	Boardman Street	Farmington Avenue	14A32.pdf
27	Britten Road	Farmington Avenue	14A32.pdf

Ready NUM SCRL

Easy Ability to Search Records

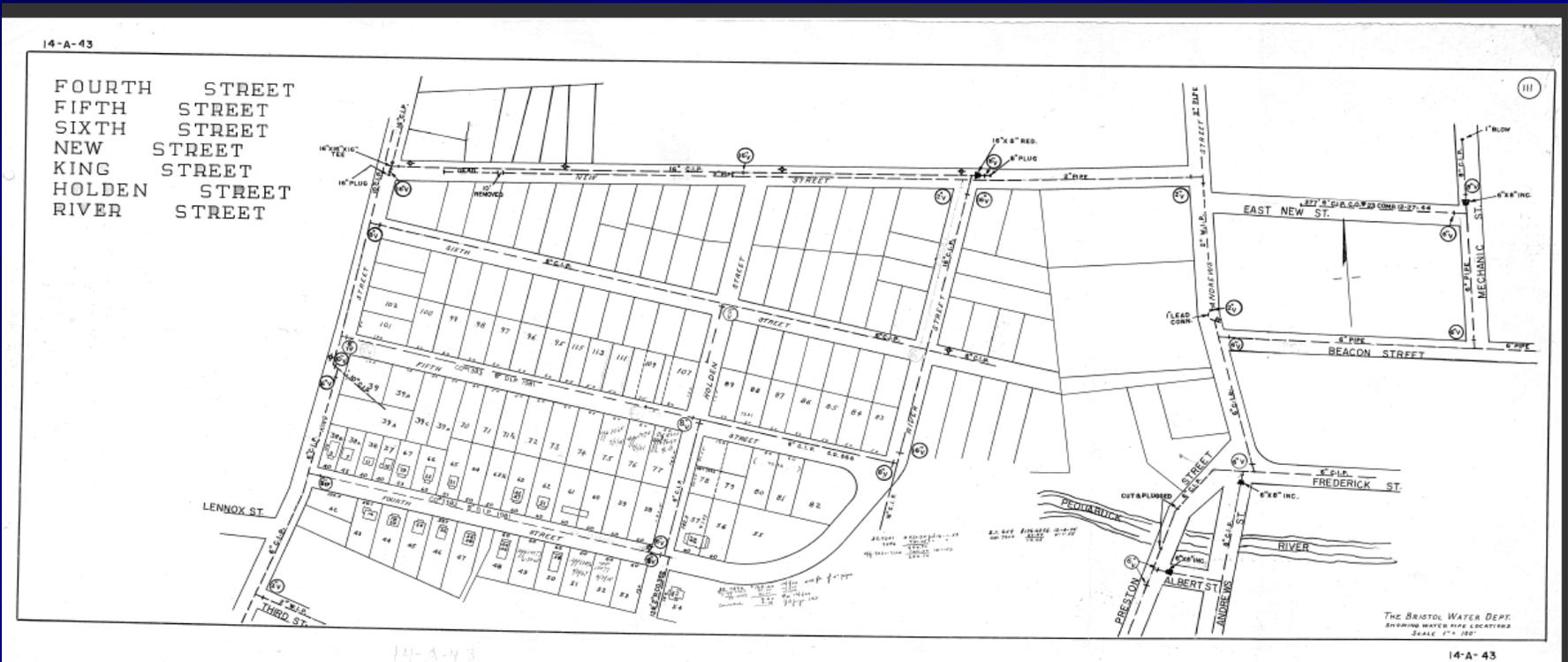
	<i>Street</i>	<i>Cross Street</i>
12		
13		
14	(All)	Adna Road
15	(Top 10...)	Jefferson Avenue
16	(Custom...)	Jefferson Avenue
17	3rd Street	Shawn Drive
18	4th Street	Adna Road
19	5th Street	Coolidge Avenue
20	6th Street	Jefferson Avenue
21	Abbey Lane	Jefferson Avenue
22	Academy Street	Shawn Drive
	Acorn Lane	
	Addison Street	
	Adeline Avenue	
	Adna Road	
	Alba Drive	
	Albert Street	
	Aldbourne Drive	
	Alder Street	
	Alexander Street	
	Allen Street	
	Allentown Road	
	Jefferson Avenue	Shawn Drive

Grouping Common Records

6			800 Scale Hydrant Number
8			Assessor Map 2009.pdf
10			Billing District Map 3-26-10
11			
12			
13	<i>Street</i>	<i>Cross Street</i>	<i>Map</i>
696	Albert Street	Andrews Street	10A19.pdf
1028	Albert Street	Andrews Street	11B40.pdf
1225	Albert Street	River Street	11B31.pdf
1994	Albert Street	Andrews Street	14A43.pdf
2583			
2584			

file:///server/cserver/Mapping and Ties/Maps and Valve Cards/10A19.pdf - Click once to follow. Click and hold to select this cell.

Scanned Map



Index can be set up for any information and do not have to be by Street

12			
13	<i>Street</i>	<i>Cross Street</i>	<i>Map</i>
2549	Renee Street	Design Detail (1950)	7A2.pdf
	Reservoir #1		
2550	Reservoir #2	Bridge and Spillway Plans (1950)	7A3.pdf
	Reservoir #3		
2551	Reservoir #4	ROW Marsh Road to Clover Road	7A4.pdf
	Reservoir #5		
2554	Reservoir #6	Test Pit Locations Below Reservoir #3 (1950)	7A5.pdf
	Reservoir #7		
2556	Reservoir #8 (Cooks Dam)	Property Line Map	7A6.pdf
	Reservoirs		
2557	Revere Drive	Property Line Map	7A7.pdf
	Rhoda Lane		
2558	Rich Lane	Map of Reservoir with Elevations	7A8.pdf
	Richard Court		
2559	Richmond Place	Proposed Dam (1912)	7A10.pdf
	Ridge Road		
2560	Ridge Road	Proposed Dam (1912)	7A11.pdf
	Ridgecrest Lane		
2561	Ridgecrest Lane	Contour Map Proposed Water Level Elevations	7A12.pdf
	Ridgewood Street		
2562	Rita Drive	East Plymouth Road Survey Dam Improvements	7A14.pdf
	River Street		
2563	Reservoir #7	Proposed Design Plan (1945)	7A15.pdf
	Reservoir #7		
2564	Reservoir #7	Proposed Road Design	7A16.pdf
	Reservoir #7		
2565	Reservoir #7	Inlet and 16" Pipe Map	7A17.pdf
	Reservoir #7		
2566	Reservoir #7	Spillway Plan with Contours	7A18.pdf

Filter Mode

Index for Valve Cards

Microsoft Excel - Maps and Valve Cards Index.xls

File Edit View Insert Format Tools Data Window Help

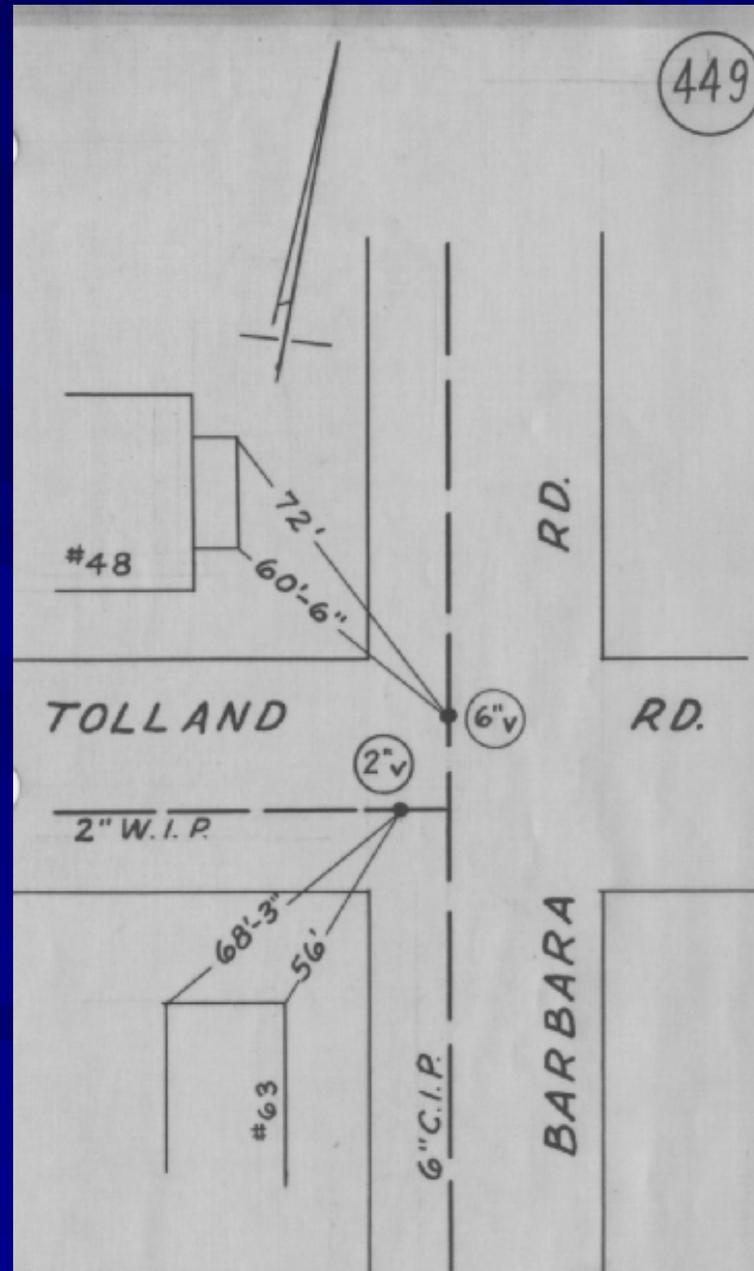
Times New Roman 24 B U

A1 Street

	A	B	C	D	E
1	Street	Cross Street	Tie Card Page #	Tie Card Image	
2	East Road	Hull	1	PAGE 1.tif	
3	East Road	Pole #2607 & 2617	1	PAGE 1.tif	
4	Hull Street	East Road	1	PAGE 1.tif	
5	Hull Street	H.S. #174	1	PAGE 1.tif	
6	Hull Street	Sigourney	2	PAGE 2.tif	
7	Sigourney Street	Hull St	2	PAGE 2.tif	
8	South Street	South Street Extension	3	PAGE 3.tif	
9	South Street	West	3	PAGE 3.tif	
10	South Street Ext	South St	3	PAGE 3.tif	
11	South Street Ext	West	3	PAGE 3.tif	
12	South Street Ext	Wolcott	3	PAGE 3.tif	
13	West Street	So. St. Ext	3	PAGE 3.tif	
14	West Street	South	3	PAGE 3.tif	
15	West Street	Wolcott	3	PAGE 3.tif	
16	Wolcott Street	South	3	PAGE 3.tif	
17	Wolcott Street	South Street Extension	3	PAGE 3.tif	
18	Wolcott Street	West	3	PAGE 3.tif	
19	Church Street	South	4	PAGE 4.tif	
20	South Street	Chruch	4	PAGE 4.tif	
21	South Street	Union	4	PAGE 4.tif	

Ready NUM SCRL

Scanned Valve Card



Service Card Database



Bristol Water Department

Tie/Pipe Master

Find:

- ABBAY LN
- ACADEMY ST**
- ACORN LN
- ADDISON ST
- ADELINE AVE
- ADNA RD
- ALBA DR
- ALBERTSON WAY
- ALDBOURNE DR
- ALDER ST
- ALEXANDER ST
- ALICE TER
- ALLEN ST
- ALLENTOWN RD
- ALLENTOWN ROAD
- ALOHA LANE
- AMY LANE
- ANDERSON AVE
- ANDREWS ST

100	RICHARD & MARY BUDNICK
101	#101-103 BLAISE ROCHE
106	ANDREW & ELSIE WENTLAND
111	ANDREW SKORUPSKI
18	HILLSIDE COMMUNITY CHURCH
26	JESSE MORTON
32	JESSE A MORTON
35	RICHARD STONE
40	BRUCE BERUBE
46	#46-48 JOHN & ANITA WILKIE
60	GEORGE CARTIER
72	TIMOTHY & JANICE HANNON
86	#86-88 EDWARD & MELISSA C
91	DISCONNECTED AT CURB AND
96	SCOTT W THIBODEAU

[Show Tie Card](#) [Google Maps](#)

[Exit](#)

Scanned Service Card

3) App. 6348 106 Academy St. Lot. #134A
(next to Julius Warner)

Andrew H. Westland

1" C. L. pipe
3/4" lead connection

6-15-49

Limelburner

Can be Linked to Web Based Maps



Bristol Water Department

Tie/Pipe Master

Find:

- ABBEY LN
- ACADEMY ST**
- ACORN LN
- ADDISON ST
- ADELINE AVE
- ADNA RD
- ALBA DR
- ALBERTSON WAY
- ALDBOURNE DR
- ALDER ST
- ALEXANDER ST
- ALICE TER
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86	#86-88 EDWARD & MELISSA C
91	DISCONNECTED AT CURB AND
96	SCOTT W THIBODEAU

Show Tie Card

Google Maps

Exit

Google Maps

106 ACADEMY ST, Bristol CT 06010 - Google Maps - Windows Internet Explorer

http://maps.google.com/maps?f=q&source=s_q&hl=en&geocode=&q=106+ACADEMY+ST,+Bristol+CT+06010&t=h&z=18

File Edit View Favorites Tools Help

106 ACADEMY ST, Bristol CT 06010 - Google Maps

Web Images Videos Maps News Shopping Gmail more Loading... New! | Help | Sign in

Google maps 106 ACADEMY ST, Bristol CT 06010 Search Maps Show search options

Get Directions My Maps

106 Academy St
Bristol, CT 06010



Directions Search nearby more



100 ft
50 m

(2 items remaining) Downloading picture http://maps.gstatic.com/mapfiles/mv/imgs3.png... Internet 100%

Hydrant Database



Bristol Water Department

Hydrant Master
Record 1 of 26

Search

Street / Hydrant Number:

Hydrant: Secondary Gate: Latitude:
Location: Main Size: Longitude:
On Road: BranchSize: District:

Manufacturer	Current	Image 
Make: <input type="text" value="US PIPE"/>	Static PSI: <input type="text" value="0"/>	
Model: <input type="text" value="MET 250"/>	Static PSI Date: <input type="text"/>	
Size: <input type="text" value="5 1/4"/>	Installation Date: <input type="text" value="1/1/1994"/>	
Nozzles: <input type="text" value="2 - 2 1/2 1 - 4 1/2"/>	Replacement Date: <input type="text"/>	
Wet Hydrant <input type="checkbox"/>		

Flow Test	Comment
Date: <input type="text"/>	<input type="text"/>
Static PSI: <input type="text"/>	
Residual PSI: <input type="text"/>	
Flow GPM: <input type="text"/>	
Nozzel Size: <input type="text"/>	

Water Meters

■ Installation

- **Install Meters in a location that allows easy access for meter changes and also can reduce theft**
 - **Typical Location 1 foot off wall at entrance to building and 1 foot off floor**
 - **Seal Meters**
- **Install Outside Readers in locations where they can accessed all year**

Bad Outside Remote Locations!



Water Meters

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- **Radio Transmitters Inside or Outside?**
- **Meter Installation Record**

Utility Business Solutions, LLC
Meter Installation Record

Customer Name: _____ Phone: _____

Address: _____ Town/State: _____

Appointment Date: _____ Appointment Time: _____

=====

Meter Installed

Meter Manufacturer: _____ Serial Number: _____

Model: _____ Registration: _____

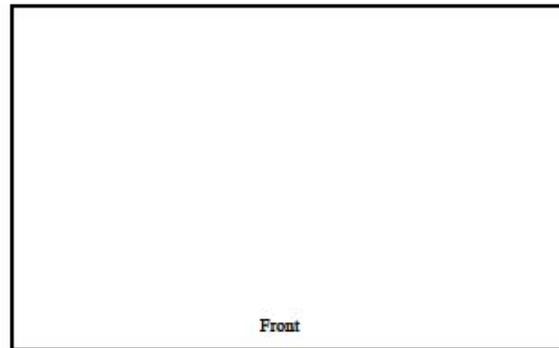
Size: _____

Reading: _____ ▲ _____

Transmitter Installed

Manufacturer: _____ Serial Number: _____

Model: _____ Remote Type: Radio / Touch Pad



Meter - O

Transmitter - X

Comments: _____

Date Installed: _____ Installer: _____

Water Meters

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- **Radio Transmitters Inside or Outside?**

■ Reading

- **Frequency**
 - Annual
 - Semi-Annual
 - Quarterly
 - Monthly

■ Testing

- **Frequency**
 - AWWA Standard M6
 - CT DPUC - Requires 5/8" Meters be tested every 8 years
- **Production Meters – Test Annually**
- **Test Bench**
- **Testing Companies**

Meter Test Bench



Water Meters

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■ Testing

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■ Repair / Replacement

- **Who owns they meters in your system?**
 - Who is responsible if they Freeze or become damaged?

Who should pay for this???



Fire Hydrants

- **Do you know where all of your hydrants are?**

Can you find your hydrants during Storms?





01/13/2011 11:19 AM



01/13/2011 11:24 AM

Can You Find Your Hydrants the rest of the Year????



Fire Hydrants

- **Do you know where all of your hydrants are?**
- **Do you know where your Blow-Offs are?**
- **When was the last time they were inspected and operated?**
 - **Inspection Form**

Utility Business Solutions, LLC

Hydrant Inspection Form

Utility Name: _____ Phone: _____
Water System: _____ Town/State: _____
Hydrant Location: _____

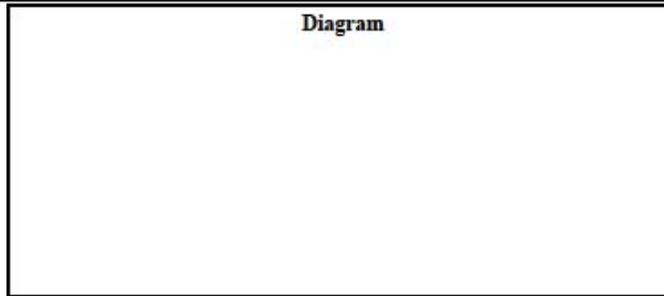
Visual Inspection

Hydrant Make: _____ Hydrant Model: _____
Manufacture Date: _____ Main Valve Size: _____
Nozzle Sizes: _____ Picture Taken Prior to Inspection: _____
Condition Prior to Inspection: _____

Inspection and Maintenance

Hydrant Static Pressure Tested: YES / NO Pressure Reading: _____ Psi
Hydrant Flowed: YES / NO Hydrant Drains: YES / NO
Nozzles Greased: YES / NO Hydrant Painted: YES / NO Color: _____
Secondary Valve Operated: YES / NO Valve to Hydrant: FT / IN
Comments / Repairs Required: _____

Diagram



Picture taken after Inspection: _____
Inspection Date: _____ Inspector: _____

Fire Hydrants

- **Do you know where all of your hydrants are?**
- **Do you know where your Blow-Offs are?**
- **When was the last time they were inspected and operated?**
 - **Inspection Form**
- **Do you know who to contact to get parts?**
- **Do you have a distribution system flushing program?**
- **Do you have the Manufacturer, Model, Size, Static Pressure, Etc. recorded anywhere?**
 - **Hydrant Database**

Hydrant Database



Bristol Water Department

Search

Street / Hydrant Number:

Find

Show All

Hydrant Master

Record 1 of 1

Hydrant: 272

Secondary Gate: 10'

Latitude:

Location: IN FRONT OF #490

Main Size: 8"

Longitude:

On Road: STAFFORD AVE.

BranchSize: 6"

District: 2

Manufacturer

Make: A.P. SMITH

Model:

Size: 5 1/4"

Nozzles: 2 - 2 1/2" 1 - 4 1/2"

Wet Hydrant

Current

Static PSI: 75

Static PSI Date: 1/10/2008

Installation Date: 8/1/1934

Replacement Date: 4/29/1968

Image



Flow Test

Date: 8/12/2004

Static PSI: 77

Residual PSI: 35

Flow GPM: 1250

Nozzel Size: 2 1/2"

Comment

Replaced w/ 8X6 Anc. Tee, OR/DD Mueller GV, 10' CIP

Use Hose when Flushing so water does not flood Apt. Parking Lot



First



Prior



Next



Last



New



Edit



Inspection



Winterization



3 x 5



Label



Exit

Valves, Mains and Service Lines

■ Installation

- Set up Standards for Materials and Installation
 - AWWA Standards
 - Suppliers are ALWAYS WILLING to help!
- Review all plans to make sure they meet your needs as an operator
 - Services under Driveways, hydrants located in places to get most out of flushing program, valves located at intersections, etc.
- Inspect Installation
 - Inspect actual work
 - Verify pipe is installed properly, chlorinated and pressure tested
 - Take Measurements, pictures and even video tape if possible

■ Maintenance / Inspections

- Verify Locations
 - Check measurements and update as needed
- Operate ALL valves (Gate Valves, Secondary Valves and Curbstops)
 - Count number of turns to open/close (3X Diameter of Pipe)
 - Perform a Test Shut Down of area with hydrant, blowoff or customer's house
 - Measure depth to operating nut

Best Practices....

- **Best Practices for the successful operation of all size water distribution systems depends on recording all available information**
- **Having information and records available at your finger tips in the event of an emergency will not only save time and money, but will also decrease impacts on customers**
- **Share information – Maintaining good records will help future operators understand your water system**
- **Try to Leave YOUR Water System in better shape then when you started!**

Acknowledgments

- William Sullivan, DPH
- Brookfield Water Company
- Town of East Hampton WPCA
- Bristol Water Department

Questions or Comments.....

Robert J. Longo, Superintendent

Bristol Water Department

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