

Western Water Company

Lead Mapping

March 2017

Submitted to:

*Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402*

By:

*Western Water Company
1775 State Route 28
Goshen, Ohio 45122*



*Data and Report Compiled by:
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RELIABILITY OF REPORT - DISCLAIMER

Conclusions reached in this report are based upon the objective data available to the CONSULTANTS at the time of forming their opinions and as presented in the report. The accuracy of the report depends upon the accuracy of these data. Every effort is made to evaluate the information by the methods that generally are recognized to constitute the state of the art at the time of rendering the report and conclusions, and the conclusions reached herein represent our opinions.

The CONSULTANTS are not responsible for actual conditions proved to be materially at variance with the data that were available to them and upon which they relied, as presented in the report.

The opinions, conclusions and recommendations shown in the report are put forth for a specific and proposed purpose and for the specific site discussed. The CONSULTANTS are not responsible for any other application, whether of purpose or location, of our opinions, conclusions and recommendations other than as specifically indicated in the report.

INTRODUCTION

Substitute H.B. 512 of the 131st General Assembly that enacted Section 6109.121 of the Ohio Revised Code (ORC), effective September 9, 2016. Division (F) of ORC Section 6109.121 stipulates that not later than six months after the effective date of the law (i.e., March 9, 2017), the owner or operator of a community public water system shall identify and map areas of the distribution system that are known or likely to contain lead service lines and identify the characteristics of buildings serviced by the system that may contain lead piping, solder, or fixtures.

Subsequent to the passage of H.B. 512 and the enactment of ORC Section 6109.121, the Ohio EPA issued a January 6, 2017 guidance document, number PWS-04-001 titled, Guidelines for Lead Mapping in Distribution Systems. This document outlines the Agency's position on how to map a distribution system to identify areas that are known to contain or likely to contain lead service lines, and identify characteristics of buildings served by community water systems that may contain lead piping, solder, or fixtures. Further, the guidance document establishes mapping requirements and recommendations relative to format, scale, land base features (including parcels and buildings served by the system), color schemes and naming conventions for water service lines on both the public and private side of the meter, and the use of coloring or other mapping tools to highlight areas on the water distribution map that are known or likely to have lead services lines, lead piping, solder, or fixtures. Submittal requirements for the map, together with a narrative description of buildings served by the water system likely to contain lead solder, plumbing, or fixtures as well as the list of sampling locations that are Tier 1 sites used to collect samples, as required by rules adopted under ORC Section 6109.121, are also outlined in the guidance document. The attached map and this narrative report were produced in compliance with Ohio EPA guidance.

WESTERN WATER COMPANY

Western Water Company (Western Water) serves approximately 16,000 customers in four counties: Clermont, Clinton, Brown and Warren in southwest Ohio. Western Water began collecting the data necessary to develop a GIS-based (Geographic Information System) information system in 2007. This data was used as the basis of the mapping required by H.B. 512.

ANALYSIS OF PIPING AT WESTERN WATER COMPANY

During the development of the GIS system for Western Water, data was collected on the type of piping that had been installed in the system. This data was compiled from as-built drawings that were scanned into the GIS system and used as reference when digitizing the piping network. In addition, each time a leak is repaired or a pipe is exposed for repair, Western Water personnel note the material of each pipe. This data is stored in the GIS system and used to verify the pipe material. This data is summarized in Table 1.

Table 1. Pipe classification in Western Water.

Pipe Material	Number of Pipes
Plastic	1903
Asbestos Concrete	230
Ductile Iron	40

The Responsible Person for Western Water has signed the Verification Form for Community Public Water Systems Claiming no Lead Service Lines (attached). All distribution piping shown on the attached map are known to not be lead.

Western Water also requires that consumers who apply for new taps, follow the requirements in the document “Construction Specification for Waterline Facilities” and the “Water Tap Hook Up Procedure”. Both documents are attached to this report. Among other requirements, these documents specify that *“the service line can be polyethylene, PVC or K-copper”*. In addition, Western Water inspects the service line on the private side of the meter prior to initiating water supply. The inspection form used during this inspection is also attached.

Western Water is not responsible for installation of piping or fixtures within the house (this is typically owned by the property owner). However, for the purposes of this mapping (as required by H.B. 512), analysis has been performed to tentatively identify the probable piping within each house served by Western Water.

PIPING WITHIN BUILDINGS SERVED BY WESTERN WATER

Very few water utilities have any records or direct knowledge of the type of interior plumbing materials used in the buildings served by the system. Nevertheless, enactment of division (F) of ORC Section 6109.121 now requires water utilities to identify and map areas of their distribution system that are known or are likely to contain lead service lines and identify characteristics of buildings served by the system that may contain lead piping, solder, or fixtures.

Ohio EPA “Guidelines for Lead Mapping in Distribution Systems” outlined the Agency’s recommendations about identifying characteristics of buildings served by community water systems that are known to contain, or likely to contain, lead piping, solder or fixtures. According to Ohio EPA, *“Because it is practically impossible to determine the lead content of an installed fixture, fitting or pipe, it should be assumed that the manufacture or installation date is the primary indicator of the lead content. Therefore, the characteristics of buildings and piping solder or fixtures would be buildings in Ohio built prior to 1998 or that use plumbing material or solder manufactured before 1998 may have materials with greater than 8% lead and are at a higher risk of contributing lead to the drinking water than materials manufactured after 1998. In addition, buildings built and plumbing materials manufactured after 2014 were required to have less than 0.25% lead by weight and have the lowest risk for contributing lead to the drinking water. It should be noted however that, although prohibited, some use of leaded solder or leaded components may have occurred after the prohibitions became effective.”*

VERIFICATION FORM FOR COMMUNITY PUBLIC WATER SYSTEMS CLAIMING NO LEAD SERVICE LINES

The owner or operator of all community public water systems must identify and map areas of their distribution system that are known or are likely to contain lead service lines. Systems must submit a copy of the applicable map to the Ohio Department of Health and the Ohio Department of Job and Family Services. Systems must also submit a report to the director containing at least both of the following: (1) The applicable map with narrative, and (2) A list of sampling locations used to collect samples as required by Ohio Revised Code (ORC) Section 6109.121 and any rules adopted thereunder, including contact information for the owner and occupant of each sampling site.

Should a water system determine no lead service lines exist in their distribution system, they must provide information stating they reviewed, at the minimum, historical permit records and local ordinances, distribution maintenance records and information pertaining to installation dates or materials for all services lines. This information must be verified below.

I HEREBY CERTIFY THAT THE FOLLOWING METHOD(S) WERE USED TO DETERMINE NO LEAD SERVICE LINES EXIST IN THIS WATER SYSTEM'S DISTRIBUTION SYSTEM, AS REQUIRED BY ORC 6109.121(F):

LEAD SERVICE LINE VERIFICATION

This PWS states they have no lead service lines and has reviewed the following information (select one or more of the following):

- ☐ Historical permit records and/or local ordinances
- ☐ Distribution maintenance records (i.e. meter replacement, waterline break repairs)
- ☐ Information pertaining to installation dates for all service lines (i.e. after 1986 when lead services lines were banned)
- ☒ Service line material of all service lines is known (i.e. all service lines are known to be PVC)

James R. Swearingen 2-24-2017
Signature of Responsible Person Date
JAMES R. SWEARINGEN PLANT SUPERVISOR
Printed Name and Title of Responsible Person

PWS NAME: WESTERN WATER COMPANY
PWS ID: OH 8300512
COUNTY: WARREN

For Ohio EPA use only:

Date Verification Rec'd: _____

To comply with Ohio EPA guidelines, Western Water has identified (to the best of its ability given the data available) buildings served that were constructed before 1998. These buildings are assumed to contain plumbing materials containing higher percentages of lead than those constructed after 1998. Pipes in buildings constructed before 1998 are, therefore, assumed to have a higher risk of contributing lead to the drinking water than pipes in buildings constructed after 1998.




To compile data on the year that each building served by Western Water was constructed, data was obtained from the Warren County Auditor, Brown County Auditor, Clinton County Auditor and Clermont County Auditor. The year that a building was constructed is not typically included in the data download available from a county auditor's website. It was, therefore, necessary to obtain the CAMA file (or equivalent) from each county auditor. Each auditor's office provided this data in slightly different database formats. This data was then standardized before it could be used in geospatial analysis.

Using ESRI ArcMap software, meters were linked to parcels on a county-by-county basis. The parcel ID number was then used to link meters to parcel information from the county auditor's office. When available, data on the year buildings were constructed was linked to the meter and used to develop the dataset on the attached map.

Note that this mapping is subject to limitation imposed by the datasets available from the county auditor's site. These limitations include the following:

1. The "year built" reported by the county auditor is accurate.
2. Not every building is identified with a "year built". In these cases, buildings were identified as "unknown" in the attached map.
3. Manufactured homes in some counties are not identified as having a "year built". In these counties, manufactured homes were identified as unknown.
4. When no "year built" was identified on the auditor's site, parcel IDs and/or addresses were searched individually to check whether the land was vacant (included in the "post-1998" classification), or whether a building was on the property (included in the "unknown" classification).
5. Some county auditor's sites contained information on the year a property was remodeled. It was assumed that this remodel did not include replacement of all indoor pipes, and the "year built" was retained for the purposes of this analysis.

Each dot on the attached map represents a Western Water customer. The color of the dot represents the most likely date range during which the private-side service line and indoor piping was installed:

-  Pre-1998
-  Post-1998
-  Unknown/No Information

LEAD AND COPPER SAMPLING LOCATIONS

As required, attached is a list of Tier I sites used to collect lead and copper samples. The attached table contains contact information for the owner/occupant of each sampling site.

INTENDED USE OF THIS DATA

Data in the attached map has been compiled to facilitate notification in case of a system-wide exceedance in the lead action level. The required notifications are defined in ORC 6109.121(C). Specifically, within 5 business days of receipt of laboratory results showing the system has exceeded the lead action level, the community water system must notify *“all consumers known or likely to have lead service lines, lead pipes or lead solder as identified in the map required to be completed under division (F) of this section.”* In the event of a system-wide exceedance of the lead action level, there are also additional notifications that are required to be made to the entire system, regardless of classification on the attached map.

Respectfully submitted,
BENNETT & WILLIAMS
ENVIRONMENTAL CONSULTANTS, INC.

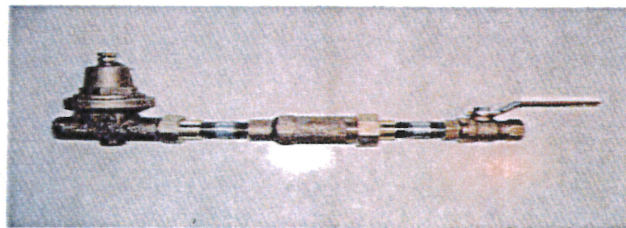


Kerry H. Zwierschke, P.E., Ph.D.
Principal Engineer

WATER TAP HOOK UP PROCEDURE

1. Stake your preferred meter box location.
2. Notify the adjacent property owners on each side of your property and directly across the road that Western Water Company in the near future will be constructing water service.
3. Attach your service line to the 3 ft. pigtail leaving the meter box.
4. The service line must be 1 inch or larger and a minimum of 200 psi.
5. The service line can be polyethylene, PVC, or K-copper.
6. Three valves are required for residential installations.
 - a. Shut off Valve
 1. gate valve
 2. globe valve
 3. ball valve
 - b. *Dual Check Valve
 - c. Pressure Regulator

REQUIRED VALVES AS ILLUSTRATED



7. No water service line is permitted within 10 feet of any part of a sewage disposal system.
8. All frost free yard hydrants require a shut off valve and dual check valve in an accessible pit at the hydrant location.

*Dual Check Valve with test ports required on commercial service installations. (Annual testing is required)

Cross-connection of a public water supply and a private water system such as wells, cisterns, or ponds is unlawful and will result in termination of service.

Inspection will be made when service line has been laid to the house and all valves are in place.

The meter will be bolted in and water turned on when the inspector passes the installation as described above.

Call 24 hours in advance to schedule and inspection, (513) 722-1682.

CONSTRUCTION SPECIFICATIONS
FOR
WATER LINE FACILITIES

WESTERN WATER
COMPANY

1775 ST RT 28
Goshen, Ohio 45122
(513) 722-1682
(513) 722-1684 Fax

Distribution Department
Revised: March 1, 2016

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- D-16 Straw Bale Barrier
- D-17 Free Bore
- D-18 Tracer Wire Detail

PART I GENERAL

1.1 SCOPE

- A. Water lines and appurtenances designed and constructed on the Western Water Co system shall conform to the requirements of this specification.
- B. Variations from these specifications shall be approved by the Western Water Co Engineering Department.
- C. Variations shall be reviewed on a case-by-case basis.

1.2 WARRANTIES

- A. The Contractor shall warrant all work for a period of one year after final acceptance by Western Water Co.

1.3 PRECONSTRUCTION MEETING

- A. The Contractor shall arrange for a preconstruction meeting prior to beginning water line work. This meeting may be in conjunction with other preconstruction meetings for the same project.
- B. Notify Western Water Co 24 hours minimum prior to the meeting.

1.4 SUBMITTALS

- A. Submittals shall be approved by Western Water Co prior to beginning work. Western Water Company will stamp submittals approved.
- B. Manufacturer and Material List
 - 1. Provide a list of all materials supplied including manufacturer, size, class, and model numbers.
- C. Surveying
 - 1. Provide water line survey cut sheets showing locations of fittings, valves, reducers and all other appurtenances.
 - 2. Survey stakes, marking the backside of the curb, must be in place prior to waterline construction beginning.

1.5 RECORD DRAWINGS

- A. Contractor shall maintain a set of records drawings as construction progresses to mark changes and deviations from the design.
- B. Record Drawings (As-Built Drawings) shall be submitted to Western Water Co, in a ACAD Dwg file preferably tied to State Plane Coordinate System, prior to final acceptance of the water lines. Record Drawings shall be professionally drafted using the same level of quality as the approved drawings.

1.6 FINAL ACCEPTANCE

- A. Final acceptance shall occur when all punch list items have been addressed to the satisfaction of Western Water Co and Western Water Co has received the As-Built Record Drawings in a ACAD Dwg file preferably tied to State Plane Coordinate System.

1.7 SEQUENCE OF EVENTS

- A. The following list shows the pertinent events throughout the course of the project.
 - 1. After all approvals are received from Western Water Co and OEPA as well as all required fees paid and paperwork completed, the Developer or Contractor notifies Western Water Co of pre-construction conference meeting. Call (513) 899-3211 and ask for Chief Inspector.
 - 2. Contractor to submit manufacturer and materials list 1 week prior to construction.
 - 3. Western Water Co will issue letter accepting manufacturer and materials list.
 - 4. Contractor to notify Western Water Co 72 hours prior to construction.
 - 5. Contractor to notify Western Water Co 72 hours prior to when water lines need filled. Western Water Company will fill all water lines.
 - 6. Contractor to pressure test water lines. Call Western Water Co in advance of test start. Start test prior to 2:00 PM.
 - 7. Contractor to disinfect water lines and to notify Western Water Co when they are ready for bacteriological tests.
 - 8. Western Water Co to perform flushing and bacteriological tests.
 - 9. Western Water Co to notify Contractor when bacteriological test have passed.
 - 10. Contractor to remove blow-offs.
 - 11. Contractor to notify Western Water Co when ready for final walk through.
 - 12. Western Water Co to issue punch list to Contractor.
 - 13. Contractor to notify Western Water Co when punch list items are completed.
 - 14. Western Water Co to make punch list inspection and issue second punch list letter, if necessary.
 - 15. Engineer to provide Western Water Company with as-built Record Drawings in a ACAD Dwg file preferably tied to State Plane Coordinate System.
 - 16. Western Water Co to issue acceptance letter and warrantee period begins.

1.8 GENERAL NOTES

- A. General Notes as modified by Western Water Co and shown on the approved Construction Drawings shall supercede the requirements of this specification wherever a conflict may occur.
- B. Standard General Notes:
 - 1. Water line materials and installation methods shall conform to The Western Water Co Construction Specifications For Water Line Facilities, latest revision. Contractor shall obtain a copy and have in his possession during construction. Coordinate work with Western Water Co (513) 899-3211.
 - 2. Water mains shall become the ownership of Western Water Co upon final acceptance.
 - 3. Water Line Construction
 - a. For pipe 6-inch and larger: Use PVC SDR 21 Class 200 pipe and mechanical joint fittings.
 - b. For 2-inch pipe: Use PVC SDR 21 Class 200 pipe with mechanical joint or push-on gasket fittings.
 - c. Maintain a minimum 10-foot horizontal and 1.5-foot vertical separation distance between water lines and sanitary and storm sewers.
 - d. Water lines shall be NSF 61 approved.
 - e. Provide concrete thrust blocking for all fittings, valves and anchor tees.

- f. Minimum depth of cover shall be 60 inches to the top of pipe, except where otherwise required or approved by Western Water Co.
 - g. Place a 5-foot steel fence post or 2"x4" wood post at curb-stops, water main valves and the ends of lines.
 - h. All mechanical joint fittings require restraints, plus 40 feet up and down stream of said fittings.
 - i. Tracer wire for purpose of locating to be installed (Note: tracer tape not acceptable).
- 4. Water Service Construction
 - a. For meters 1-inch and smaller, use 1-inch iron pipe size (IPS) polyethylene SDR 7 Class 200 pipe manufactured by Phillips Drisco Pipe Co.
 - b. Connections to PVC pipe shall be Power Seal saddle type 3401 or Western Water Co approved equal.
 - c. Provide a curb stop and box at the end of the service line. Locate end of service line at ROW, but a minimum of five feet from the "curb side" edge of sidewalk. No curb stops or boxes in roadway or sidewalks.
 - d. Depth of cover shall be 34 inches.
 - e. Place a 5-foot steel fence posts or 2"x4" wood post at the curb-stop. The ends of all 1" poly service line pigtails to extend above grade 3 feet.
 - f. Contractor shall be responsible for special backfill material for all lines, including those installed by Western Water Co, where required by the County or City Engineer.
- 5. Hydrants
 - a. Hydrants shall conform to AWWA C502 for dry barrel hydrants.
 - b. Main valve: 5.25-inch compression
 - c. Nozzles
 - i. Threading: Conform to NFPA National Standard fire hose threads.
 - ii. One 4.5-inch steamer
 - iii. Two 2.5-inch hose
 - d. Inlet Connection: 6-inch mechanical joint
 - e. Operating Nut: 1.5-inch pentagon, turn counterclockwise to open.
 - f. Extensions and parts: Shall be manufactured by the original equipment manufacturer.
 - g. Approved Manufacturers: M&H, Mueller or American Darling.
 - h. Painting: Repaint all hydrants after installation.
 - White barrel, Red caps and Dome.

6. Miscellaneous

- a. Obtain written approval of material and manufacturers list from Western Water Co prior to beginning construction.
- b. Provide casing pipe for all County road crossings. Casing pipe shall be Steel pipe with 0.375-inch wall thickness or SDR 21 Class 200. Casings larger than 12-inch may be AWWA C905 DR 25.
- c. Easements shall be provided to Western Water before permission will be given to make new service line connections.
- d. Connections to existing water lines will be made by Western Water Co at the Contractor's expense, or performed by contractors who are approved for making connections.
- f. Booster pumps are not allowed on individual services.
- g. Dead end mains 6" or larger require a 6" hydrant and watch valve.
- h. Dead end mains 6" or less require a 2" flush hydrant and watch valve.

PART II PRODUCTS

2.1 WATER MAIN LINE PIPE

A. General

1. Provide Polyvinyl Chloride (PVC) or ductile iron pipe (DIP) as required in the General Notes. Ductile iron is preferred.
2. Pipe shall have a circumferential stripe at the spigot end to indicate the proper length of insertion.
3. Joints: Push-On bell and spigot.
4. Identification: Provide manufacturer's name, nominal size, SDR, pressure class, and National Sanitation Foundation (NSF) stamp markings continuously along pipe.
5. Joint Lubricant: Water soluble, NSF 61 approved, imparting no taste or odors, non supportive of bacteriological growth, and causing no deterioration effect on the pipe or gasket materials.

B. PVC Pipe (IPS)

1. Conformance: ASTM D2241
2. Class: Class 200 as required in the General Notes.

C. PVC Pipe (AWWA)

1. 4-inch through 12-inch
 - a. Conformance: AWWA C900
 - b. Class: DR 25 Class 100, DR 18 Class 18, or DR 14 Class 200 as required in the General Notes.
2. 16-inch
 - a. Conformance: AWWA C905
 - b. Class: DR 25 or DR 18 as required in the General Notes.

D. DIP

1. Conformance: AWWA C104, C111, C151 and C153
2. Class: 52 as required in the General Notes.

E. Approved Manufacturers

1. PVC Pipe
 - b. Johns-Manville Corp.
 - c. North American Pipe Corp.
 - d. Bristol
2. DIP
 - a. US Pipe
 - b. American Pipe

2.2 FITTINGS

A. General

1. Fittings 3-inch and larger shall be ductile iron.
2. NSF 61 approved.
3. Lubrication: Conform to Section 2.1.A.5.

B. Ductile Iron Fittings

- a. Conformance: AWWA C104, C111, C151 and C153 for Compact Fittings.
- b. Class: 350
- c. Lining: Cement mortar.
- d. Coating: Epoxy.

- e. Joints: Mechanical Joint.
- f. Approved Manufacturers
 - a. Tyler
 - b. Union
 - c. Sigma
 - d. McWayne
 - e. WWC approved AWWA equivalent

2.3 MAIN LINE VALVES

A. General

- 1. Stem Extensions: Provide to bring operating nut to between 30 and 54 inches of finished grade if valve operating nut is greater than 54 inches deep. No valves or valve boxes in roadways or sidewalks.

B. Gate Valves

- 1. Use for water lines up to 12-inch diameter.
- 2. Conformance: AWWA C509 for resilient seated valves.
- 3. Pressure Class: 150 PSI or equal to that of connecting pipe, whichever is greater.
- 4. Joints: Mechanical Joint
- 5. Operation: Non-rising stem, 2-inch square operating nut, and open counter clockwise.
- 6. Coating: Epoxy
- 7. Approved Manufacturers
 - a. Mueller
 - b. American Flow Control
 - c. Clow
 - d. WWC approved AWWA equivalent

2.4 SERVICE CONNECTIONS

A. For PVC Pipe

- 1. Type: Single strap saddle with minimum 2-inch bearing area on pipe. Bronze screws and confined O-ring seal.
- 2. Design working pressure: 200 PSI
- 3. Size shall fit class of PVC pipe.
- 4. Outlet: Sized for 1-inch corporation stop or as shown on drawings.
- 5. Markings shall indicate size of PVC pipe and O.D. of connecting pipe.
- 6. Approved Manufacturers

Manufacturer	Style, Type, Model No. or Series	
	PVC (IPS) Pipe	PVC AWWA Pipe
Power Seal	3401	3401
Ford Meter Box	S70	S90
Mueller	H-13000	H-13000
A.Y. McDonald	3801	3805

2.5 CORPORATIONS STOPS

- A. Conformance: AWWA C800
- B. Size: As shown on plans.
- C. Approved Manufacturers

Manufacturer	Model
Ford Meter Box	F-1001
Meuller	H-15005 or H-15009
A.Y. McDonald	4701-33

2.6 SERVICE LINE PIPE

- A. General
 - 1. This section applies to the service line from the main line to the meter pit.
 - 2. Pipe Size: Required line size is based on meter size according to the following table:

Meter Size (Inches)	Service Line Size (Inches)	Class
5/8 to 1	1	PE SDR 7 (IPS)
1½ to 2	2	PVC SDR 21
3	3	PVC SDR 21

- B. PVC pipe shall conform to Section 2.1.B.
- C. Polyethylene (PE) Pipe
 - 1. Conformance: AWWA/ASTM C901/D1248
 - 2. Class: SDR 7 Class 200 (IPS)
 - 3. Approved Manufactures
 - a. Phillips Driscopipe Ultaline 5100H water tubing 3408

2.7 CURB STOPS

- A. Ford Compression Type
- B. AY McDonald
- C. Mueller
- D. Approved Manufacturers

Manufacturer	Model
Ford Meter Box	B61-444 or Z61-444
Mueller	H-15191, H-15171 or B-25171
A.Y. McDonald	6102-33

2.8 HYDRANTS

- A. Type: Breakable main rod and barrel flange.
- B. Conformance: AWWA C502 for dry barrel hydrants.
- C. Main valve: 5.25-inch compression
- D. Nozzles
 - 1. Threading: Conform to NFPA National Standard fire hose threads.
 - 2. One 4.5-inch steamer
 - 3. Two 2.5-inch hose
- E. Inlet Connection: 6-inch mechanical joint

- F. Operating Nut: 1.5-inch pentagon, turn counterclockwise to open.
- G. Extensions and parts: Shall be manufactured by the original equipment manufacturer.
- H. Approved Manufacturers

Manufacturer	Model
Mueller	
M&H	
American Darling	

2.9 FLUSHING HYDRANTS

- A. Type: 2-inch post with traffic break-away coupling
- B. Nozzle: 2.5-inch brass NSFT with cap and chain
- C. Freeze proof
- D. Shut-off valve: Bronze with 2-inch MJ inlet.
- E. Approved Manufacturers
 - 1. M&H
 - or Western Water Co. approved equivalent

2.10 VALVE BOXES

- A. Type: Cast iron, two-piece adjustable extension, length as required for finish grade.
- B. Cover: Cast iron with the word "WATER" cast in.
- C. 18" X 18" X 6" deep, concrete pad around valve boxes. Circular concrete pad dimensions must be approved by Western Water Company.
- D. No valve boxes are permitted in roadway pavement, sidewalks, driveways etc.

2.11 CURB BOXES

- A. Type: Cast iron, two-piece adjustable extension, length as required for finish grade.
- B. Cover: Cast iron with the word "WATER" cast in. Held securely by a brass bolt.
- C. No curb boxes permitted in sidewalks, driveways, etc.

2.12 TAPPING SLEEVES

- A. Type: All metal, with flanged connection to receive a flanged by mechanical joint tapping valve.
- B. Design Pressure: 150 PSI.
- C. Flange material: Stainless steel, carbon steel or ductile iron.
- D. Approved Manufacturers

Manufacturer	Model
Romac Industries	SST
Power Seal	3480
Ford Meter Box	FAST
Smith Blair	662 or 663
JCM	432 (for AWWA C905)

2.13 CASING PIPE

- A. Approved Types
 - 1. Welded steel with 0.375-inch wall thickness
 - 2. PVC SDR 21 Class 200
 - 3. PVC AWWA C905 DR 25
- B. Size

Nominal Water Line Size (Inches)	Casing Size Inside Diameter (Inches)
2	4
3	6
4	8
6	10
8	14
10	16
12	18
16	24

2.14 SAMPLING STATION

- A. Approved type to be placed on every road of development.
 - 1. Eclipse style #88 or Western Water Co approved equivalent.

2.15 Tracer Wire

- A. Tracer wire used to locate the main is required on all installed water mains and long service taps / road bores.
 - a. 12 Ga. solid copper with insulated jacket.
 - b. Connections to be made with 3M Gel Cap connectors.
- See Detail D-16

PART III EXECUTION / INSTALLATION

3.1 PIPE, FITTINGS AND VALVES

A. General

1. Install in accordance with manufacturer's recommendations.

B. Minimum Bending Radius in feet for PVC Pipe

Class	Nominal Pipe Diameter (Inches)						
	2	3	4	6	8	10	12
SDR 26	59	59	75	110	144	179	213
SDR 21	59	75	110	144	179	213	275
C900	59	88	100	150	200	250	300

C. All mechanical joint fittings require restraints, unless noted on plans.

D. Minimum Depth of Bury: 60 inches to top of pipe unless otherwise approved by Western Water Co.

E. Bedding

1. Suitable Bedding Material: Compacted clean sand or clay free of debris, trash, organic material, frozen material, or rocks larger than 0.75 inches.
2. Suitable Bedding Material shall extend to a minimum of 6 inches below and on sides of pipe and 8 inches above top of pipe.
3. Where bedrock or stones larger than 0.75 inches are encountered, over excavate 6 inches below and around pipe and fill with Suitable Bedding Material.

F. Backfill: As required by regulating agency when under roads or in right-of-way.

G. Support valves with cast-in-place or precast solid concrete block. Valves smaller than 6-inch shall be supported by anchoring to rebar driven into ground on each side of valve.

H. Valve boxes shall be centered over operating nut so as not to hinder operation.

I. Notify Western Water Co inspector to schedule filling of water lines. Western Water Company will fill the water main.

3.2 TAPPING WATER LINES

A. Contractors must be pre approved by Western Water Co to perform taps on water lines.

1. **All taps to be made "wet" with water main filled and pressurized. No dry taps will be permitted.**

B. Tapping Machine

1. Use only tapping machines designed to tap through the corporation stop. The machine must operate with a cutting tool classified as a core cutting tool or the shell design, which retains the coupon while penetrating the pipe wall.
2. Equipment using a twist drill, hole saw or auger bit are not allowed.

C. Support tapping sleeves where the tap size is greater than 2-inch on cast-in-place or precast concrete solid block.

D. Sleeves where the tap size is greater than 2-inch shall be pressure tested in accordance with Section 3.6 with no leakage present prior to tapping.

3.3 SERVICES

- A. Services from the main line to the meter shall be a single continuous pipe. Couplings are not allowed.
- B. Remove blow-offs when disinfection is completed by shutting off the corporation stop and cutting the service line to within 6 inches of the water main line. Cap service line with a compression coupling or insti-tite fitting and a brass plug.
- C. Turn corporation stop so that shut off is facing up.
- D. Bedding shall comply with Section 3.1.E.

3.4 HYDRANTS

- A. Set depth so that breakaway flange is within 6 inches above finished grade.
- B. Steamer nozzle shall be facing road.
- C. Check each hydrant to ensure there is no leaking at breakaway flange and that water freely drains through weep hole when shut off.
- D. Painting
 - 1. Repaint hydrants after installation. White barrel with Red caps and Dome.

3.5 CASING PIPE

- A. Install by bore and jack or open cut as required by local authority.
- B. Casing pipe shall extend beyond edge of road a minimum of 5 feet.

3.6 PRESSURE TESTING

- A. Test all water lines, hydrants and services together.
- B. Conformance: AWWA C605
- B. Provide all equipment necessary for test.
- C. Test Gauge: Range from 0 to 300 PSI with 5 PSI maximum increments. Gauge shall be approved by Western Water Co. inspector prior to the test.
- C. Drums and other equipment used in test shall be clean and free of oil, grease or other contaminants.
- D. Time of Test: Test shall commence Monday through Friday between the hours of 8:00 AM and 2:00 PM with a Western Water Co inspector present.
- E. Notify Western Water Co inspector at least 72 hours in advance to the test.
- C. Test pressure shall be the greater of the following:
 - 1. 150% of maximum static pressure
 - 2. 150 PSI
- D. Test Duration: 2 hours

E. Compliance

1. Successful pressure test will meet all the requirements shown below:
 - a. Pressure drop shall not exceed 5 PSI
 - b. Maximum allowable leakage shall be interpolated from the following table:

Pipe Size (Inches)	Test Pressure (PSI)		
	150	200	250
Allowable Leakage (Gallons per 1,000 feet per hour)			
2	0.16	0.19	0.21
3	0.25	0.29	0.32
4	0.33	0.38	0.43
6	0.50	0.57	0.64
8	0.66	0.76	0.85
10	0.83	0.96	1.07
12	0.99	1.15	1.28

- F. Retests will not be allowed until the problem has been identified and corrected.
- G. Air only pressure testing is not permitted. All lines and services will be filled with water.

3.7 DISINFECTION

- A. Conformance: AWWA C651
- B. Approved methods of chlorination:
 1. AWWA Tablet Method
 - a. Calcium hypochlorite in granule form is permitted.
 - b. Calcium hypochlorite in tablet form is permitted.
 2. AWWA Continuous Feed Method
 3. AWWA Slug Method
- C. Place calcium hypochlorite granules at beginning of main line pipe and at 500-foot intervals according to the following schedule:

Pipe Diameter (Inches)	Calcium Hypochlorite Granules (oz.)
4	1.7
6	3.8
8	6.7
10	10.5
12	15.1
14	D ² X 15.1

AWWA C651 Table 1

- D. Western Water Co will flush lines and perform bacteriological testing after disinfection by the contractor is complete. In the event that the bacteriological tests fail, the contractor shall repeat disinfection of lines again as required until a satisfactory bacteriological test is obtained. Western Water Co personnel shall perform all line flushing.

3.8 PUNCH LIST

- A. Notify Western Water Co inspector for final punch list walk-through. Check and correct the following items prior to notifying Western Water Co for the final walk through.
 - 1. Valve boxes shall be 2 inches above finished grade.
 - 2. Valve boxes shall be centered on valve accessible with wrench.
 - 3. Valve boxes shall be plumb and positioned directly over valve.
 - 4. Fire hydrants shall be repainted.
 - 5. Fire hydrants shall have all caps and chains in place.
 - 6. Fire hydrants shall drain properly.
 - 7. Fire hydrants shall be facing the proper direction.
 - 8. Fire hydrants shall not leak at breakaway flange, and breakaway rings shall not be cracked.
 - 9. Valve operating nuts shall be extended where required.
 - 10. Valves operate properly.
 - 11. Watch valves shut down fire hydrant properly.
 - 12. Phase valves are open or closed as appropriate.
 - 13. All blow-offs are removed properly.
 - 14. Mark all Valve and curb boxes with 5-foot steel "T" post or 2" X 4" wood post.
 - 15. Provide Western Water Co. with Record Drawings in an AutoCAD .Dwg file, preferably tied to the State Plane Coordinate System.
- B. Final acceptance will not be granted until all items on the punch list have been addressed to the satisfaction of Western Water Co.

* * END OF SPECIFICATIONS * *

Western Water Company
1775 S. R. 28
Goshen, Ohio 45122

Inspection Form

Location: _____
Address _____
Name of Owner or Occupant _____

Service Line Inspection

Type of Material: _____ Copper K
_____ PVC
_____ PE *Polyethylene*
_____ CPVC
_____ PB *- Polybutylene*
_____ Galvanized
_____ Steel
Size: _____ 1 inch
_____ 1 1/4 inch
_____ 1 1/2 inch
Pressure Rating: _____ 160 psi
_____ 180 psi
_____ 200 psi

Approvals: _____ Service line material approved
_____ Depth of line approved
_____ Size of line approved
_____ Installation of check valve approved
_____ Installation of globe or gate valve approved
_____ Installation of pressure regulator approved

Remarks: _____

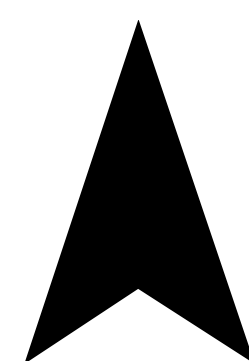
Inspector: _____ Date _____

Cross Connection Inspection

Type of private water supply: _____ Cistern
_____ Drilled well
_____ Dug well
YES NO

Private supply abandoned _____
Private supply to be abandoned _____
Cross Connection(s) eliminated _____

Inspector _____ Date _____



"Because it is practically impossible to determine the lead content of an installed fixture, fitting or pipe, it should be assumed that the manufacture or installation date is the primary indicator of the lead content. Therefore, the characteristics of buildings and piping solder or fixtures would be buildings in Ohio built prior to 1998 or that use plumbing material or solder manufactured before 1998 may have materials with greater than 8% lead and are at a higher risk of contributing lead to the drinking water than materials manufactured after 1998. In addition, buildings built and plumbing materials manufactured after 1998 were required to have less than 0.25% lead by weight and have the lowest risk for contributing lead to the drinking water. It should be noted however that, although prohibited, some use of leaded solder or leaded components may have occurred after the prohibitions became effective."

To comply with Ohio EPA guidelines, Western Water has identified (to the best of its ability given the data available) buildings served that were constructed before 1998. These buildings are assumed to contain plumbing materials containing higher percentages of lead than those constructed after 1998. Pipes in buildings constructed before 1998 are, therefore, assumed to have a higher risk of contributing lead to the drinking water than pipes in buildings constructed after 1998.

Each dot on the attached map represents a Western Water customer. The color of the dot represents the most likely date range during which the private-side service line and indoor piping was installed:

Red: Pre-1998
Green: Post-1998
Grey: Unknown/No Information

Legend

Service Connections

- POST-1998
- PRE-1998
- UNKNOWN

Pipes-no lead

Clermont County

Brown County

Clinton County

Warren County