

# PLAN REVIEW PROCEDURES AND DESIGN REQUIREMENTS

This document outlines the procedures needed to submit plans for review to the Cleveland Division of Water. All projects involving new or replaced water mains, as well as work taking place in a public right-of-way or water main easement must be submitted for review. While there is charge for plan review for water main projects, there is no fee if your project has no water work or ultimately performs no water work

## Contents

Plan Review Procedures.....	2
Water Main Extension Projects (Including Subdivisions) .....	2
Water Main Replacement or Rehabilitation Projects.....	3
Projects That Do Not Propose Any Water Work.....	3
Water Main Design Guidelines .....	4
Plan Format.....	4
Title sheet.....	4
Scales.....	4
General.....	4
Water Mains .....	4
10 States Standard .....	4
Sizing .....	4
Depth .....	5
Location.....	5
Dead-Ends/Looping.....	5
Utility/Obstruction Clearances .....	5
Valves .....	6
Pipe Fittings.....	6
Thrust Restraints.....	6
Hydrants.....	7
New Connections as Part of Main Installation.....	7
Other Agency Approvals .....	7

## Plan Review Procedures

City of Cleveland Codified Ordinance 535.35 states that no water mains shall be laid or extended within the City of Cleveland or in any direct service suburb unless properly submitted plans have been approved by the Commissioner of Water. These plans shall be in accordance with the standard specifications and standard details of Cleveland Water.

In addition, Cleveland Water requests copies of all plans for projects taking place in the public right-of-way or a dedicated water main easement to ensure all Cleveland Water facilities are accurately noted, and so Cleveland Water has a record of the project if problems occur.

Plans submitted should include the Title Page and index of sheets, all plan and profile pages for work taking place in the right of way or water main easement, general notes, general summary pages that include water items, and water standard details (available at [clevelandwater.com/construction](http://clevelandwater.com/construction)). You may exclude other pages such as non-water details, additional notes, and other pages not relevant to the water review. Please see plan format guidelines for more information. It is expected that all submitted plans will already indicate Cleveland Water facilities as well as other underground utilities. To obtain available records prior to submission, please submit a design ticket to the Ohio Utilities Protection Service and put in a design ticket.

If you are planning a project involving significant paving, we suggest contacting the Planning and Hydraulics unit of Cleveland Water to obtain a break analysis to determine if replacement of the main may also be recommended.

**SUBMIT PLANS TO:**            **Cleveland Water, Engineering - 2nd Floor**  
   **1201 Lakeside Avenue**  
   **Cleveland, Ohio 44114**

Please allow at least 30 days for review of each submission. However, during periods of high review volume, reviews may take longer to process. Plan Review is often iterative, with multiple rounds of submissions and comments. As such, we recommend submitting initial drawings for plan review a minimum of 120 before a proposed bid opening.

### Water Main Extension Projects (Including Subdivisions)

Please submit the following:

- Two (2) full size hard copy sets and one digital set (on CD, DVD, USB Drive, or link to download) of preliminary plans
- Proposed dedicated plat or original standard water main easement (with copy of resolution and drawing)
- Peak demand requirements for domestic and fire protection calculated and sealed by a professional engineer (a.k.a. ISO calculations)
- A completed Cleveland Water Project Questionnaire

Cleveland Water will review the drawings, and return 1 set of marked up preliminary plans along with any additional requirements will be returned to the design engineer for their use in preparing the final plans.

Once corrections have been made, submit one set of revised final plans along with any information previously requested (either digital or hard copy, per the Cleveland review engineer's preference) for final approval. Any changes to water work and plan and profile pages must be indicated with a revision cloud in the review set.

If the plans are approved, the Cleveland review engineer will request 8 sets of hardcopy drawings be provided. They will be stamped as approved. Four copies will be provided to the design engineer. One will be provided to

the contractor at the preconstruction meeting. One is provided for the Cleveland Water inspector. The remaining copies are kept on file by Cleveland Water.

Water main extension projects also require Ohio EPA approval per the Ohio Administrative Code 3745-91-02. The additional copies of the stamped plans provided to the design engineer are to be used to submit for this review. The Ohio EPA will notify Cleveland Water of the results of their review.

Once all approvals are complete and a contractor is hired, please call (216) 664-2342 to speak with the Inspection and Enforcement Department to set up a preconstruction meeting. Once the meeting is scheduled, Cleveland Water Permits and Sales will provide a quote for both construction related charges and for any new accounts that may be approved. Please note that approval does not mean that an inspector may request changes based on observed field conditions.

## Water Main Replacement or Rehabilitation Projects

Please submit the following:

- One full size hard copy set and one digital set (on CD, DVD, USB Drive, or link to download) of plans
- A completed Cleveland Water Project Questionnaire

A Cleveland Water Engineer will submit comments to the designated contact. Please keep submitting plans for each stage of design. Any changes to water work and plan and profile pages must be indicated with a revision cloud. Once all comments are incorporated, you may send a final set in (either digital or hard copy, per the Cleveland review engineer's preference) for final approval.

Once Cleveland Water approves a plan, a letter will be provided indicating approval. The letter will also include a summary of Cleveland Water charges. Six additional sets of plans will be requested to stamp as approved and keep on file, as well as provide the design engineer and contractor a record of what Cleveland Water approved.

Once all approvals are complete and a contractor is hired, please call (216) 664-2342 to speak with the Inspection and Enforcement Department to set up a preconstruction meeting. Please note all fees must be paid at the start of the project. Please note that approval does not mean that an inspector may request changes based on observed field conditions.

## Projects That Do Not Propose Any Water Work

This includes projects that only involve casting adjustments. Please submit the following:

- One half size (11x17) or larger hard copy set and one digital set (on CD, DVD, USB Drive, or link to download) of plans
- A completed Cleveland Water Project Questionnaire

Cleveland Water will review the plans to ensure our facilities are accurately represented based on available records. If approved, Cleveland Water will issue a letter indicating approval as well as steps to take if a conflict is found in the field that will require water work.

Only one set of preliminary drawings (~30% Design) need submitted if there is no water work proposed. No additional sets are required unless there is an impact to the water system.

# Water Main Design Guidelines

## Plan Format

### Title sheet

1. Title block should contain name of street, easement, or project, name of consultant, name of the sponsoring agency, name of the municipalities the work takes place in, scale and date of preparation.
2. If more than one sheet, sheets should be numbered consecutively with each sheet containing definite match lines. A drawing reference should be included with descriptions on title sheet. (Cleveland Water may ask to omit sheets that are not needed)
3. A location map must be provided on title sheet. The site plan or location map shall have a scale of 1"= 400'.

### Scales

Use a scale graduation of 1"=20', 30', 40' or 50' for horizontal and 1"= 5' on vertical. The use of architect's scale is not permitted.

### General

1. Sheets are to be between 22" X 34" and 34" x 44" with ANSI D or Arch D preferred. (11"x17" if no water work is proposed) and must show water main and sewers in plan and profile.
2. All sheets of plans should be provided with a directional arrow indicating north.
3. Street or easements must have stationing noted along the center line with appurtenances and bends referenced to center line and stationing. Planned measurements may be used along main instead of stations.
4. Parcel boundary lines must be shown on drawing with frontage dimensions given.
5. Proposed and existing connections with connection numbers should be noted on drawings for connections involved in project. However, any new connections are not approved as part of the plan review process.
6. A measurement tie-in between the location of the proposed street/easement and the closest intersecting street or thoroughfare centerline and the proposed water main and visible water main appurtenances must be noted.
7. Plans of water main installations through easements for apartments, office buildings, factories, or condominiums shall follow scheme for normal installation in right-of-way.
8. Revision Clouds shall be used to indicate changes on all plan and profile pages for all submissions subsequent to the initial submittal.

## Water Mains

### 10 States Standard

All distribution system piping and appurtenances shall be designed in accordance with Part 8 of the latest revision of the Recommended Standards For Water Works by the Water Supply Committee of the Great Lakes, also known as the 10 States Standards. The standards are available at <http://10statesstandards.com/>.

### Sizing

1. Water mains to be sized in accordance with Codified Ordinance Section 535.34.
2. Distribution mains shall be not less than eight inches and no more than sixteen inches in nominal diameter.

3. For streets within residential areas, mains shall be at least eight inches, provided such streets do not exceed 1500 feet in length between intersecting streets improved with water mains.
4. In county roads, crossings under freeways and railroads, crossing in bridges and in streets adjoining commercial or industrial developments, mains shall be at least twelve inches.
5. In streets extending through several municipalities and designated as State or county streets, roads or highways, mains shall be sixteen inches.

### Depth

Cover over all 8" and 12" pipe should nominally be at least 6'-0" from established centerline grade and from the top of ground over the water main to the top of the pipe. All 16" pipe should have 5' of cover. A variance of 1'-0" above and 2' below is only permissible while crossing over or under obstructions.

### Location

1. Water mains must be located a minimum of 9'-0" from the property line or 10'-0" from the easement line in the street or easement in which it is to be installed. Under this provision, service stop boxes (curb boxes) or meter vault manhole ring and covers will not fall within proposed sidewalk areas. ("9'-Rule) In no case should any portion of the water main or hydrants fall less than 5' from an easement or right-of-way line.
2. In all allotment layouts, water mains in proposed streets must be extended to the further most limits of the allotments.
3. Intersection pipe for future streets must be installed to the abutting property line, and a line valve and box or flush pipe installed at the property line, as directed by Cleveland Water's Engineer

### Dead-Ends/Looping

All dead-end pipes must have a plug and complete 2" flushing pipe assembly with box or hydrant installed. (Tee hydrants may be installed with a plug on the hydrant tee)

### Utility/Obstruction Clearances

1. For Sanitary and Storm Sewers

**Horizontal Clearance:** Water mains shall be laid at least 10 feet horizontally from any existing or proposed gravity sanitary or storm sewer, sewer manhole, or sewer force main. The distance shall be measured edge to edge. In cases where it is not practical to maintain a 10 foot separation, the Cleveland Water may allow deviation on a case-by-case basis, if supported by data from the design engineer.

**Vertical clearance:** Water mains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer with preference to the water main located above the sewer. At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. Special structural support for the water and sewer pipes may be required.

Where such separations are not possible, an exception may be made provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the gravity sewer.

2. Depths over 8 Feet: To clear obstructions which result in main being 8 feet or greater, bends to be used. Valves are to be installed at both ends to be used in the event of a water main break. When determined by Cleveland Water Engineer, usually large streams, rivers, large culverts, freeways.

## Valves

### *General Location*

1. Line valves should be provided between 1,000 feet and 1,500 feet along run of pipe between intersecting streets. (For example, if run between 2 streets is 1800' then put a valve at 900')
2. Valves installed between intersections shall be located one length of pipe from hydrant tee on the run of the pipe.
3. For new mains, there must be a minimum of two (2) valves at tee intersecting streets and a minimum of three (3) valves installed at cross intersecting streets. When looping is an issue you can install three (3) valves at tee intersections and four (4) valves at cross intersection.

### *Tapping Sleeves & Valves*

1. An existing tee at an intersection of proposed project shall not be used. Normally the existing tee is removed and a new cut-in-anchor tee and valve are installed. A tapping sleeve and valve shall be installed so that service to users will be maintained whenever possible. Boxes for tapping sleeves and valves are to be supplied by the contractor.
2. Where a branch sleeve and valve with valve box is installed on an existing main, if said main is over 8 lineal feet from the abutting property line, then a line valve and box must be installed at said property line.
3. Where a tapping sleeve, valve and box are installed, the connecting run of pipe must be installed at right angles from the distribution main to the line valve located at the property line. A bend will then be installed, if necessary, to align the run of pipe in the proposed street or easement.

### *Service Divides*

Where a change of service occurs in an existing street or allotment in which a water main is to be installed, Cleveland Water Engineering will determine the location of the point of service change and a standard gate valve and box will be required at that point in the run of pipe. This valve will then be kept closed during normal service. In regulated zones a pressure regulator may be required.

## Pipe Fittings

Vertical Bends: the maximum vertical bend shall be 22 1/2° (1/16). Offsets may be used in place of bends where possible. 90° bends shall not be used.

Horizontal Bends: Where right angle turns occur in run of pipe, if main may be extended in the future, a tee should be installed and the unused branch plugged and clamped. 90° bends are not permitted.

### *Thrust Restraints*

1. Thrust blocks (concrete piers) are required behind all tees, horizontal bends, and hydrant elbows, the contractor shall also install a concrete thrust block behind all tapping sleeves in which the nominal tap is one half or greater than the nominal diameter of the pipe to be tapped. The concrete pier behind the tapping sleeve, as herein stated, is required on all connecting mains and service connections.
2. Thrust blocks normally installed where access for concrete trucks is available.

## Hydrants

### *Spacing*

Hydrants shall be to be sized in accordance with Codified Ordinance Section 535-34. Hydrant spacing is 300' on average (325' maximum) in accordance with ordinance Section 535 .36 in residential areas. Commercial and industrial streets shall have an average spacing of 250' to 280'.

### *Location and Setting*

All hydrants must be contained within the dedicated right-of-way or easement lateral limits, no closer than 5' from an easement or right-of-way line.

### *Abandoning Hydrants*

Where existing hydrants are to be abandoned, they must be spooled out at the distribution main. They cannot be plugged at the hydrant valves. Before any hydrants may be abandoned, the local fire department must provide written approval.

## New Connections as Part of Main Installation

Any new connection must be separately approved and are not included in any plan review. A separate application is required. However, as part of a new subdivision, new one inch service connections will be permitted if certain criteria are met. Please see notes 21-23 on STD-011.

Cleveland Water shall perform all taps 1.5" and larger on active, in service water mains. Contractors may install tees and valves in lieu of taps for connections 3" and larger.

If an abandoned intersection of pipe is to be converted to a service connection feed in the future, then a valve and box must be installed on this line at a point where the curb valve would normally fall, as determined by Cleveland Water Engineer. The use of this pipe for such purpose must be approved by the Commissioner of Water. If refused, then a separate tap must be made for the connection and unused intersection pipe plugged at the main.

Where a hydrant is located at the end of a run of pipe, as in cul-de-sacs, connections must be taken off ahead of the reducer on the hydrant branch. No connection can be taken off of the hydrant branch on feed hydrants.

## Other Agency Approvals

Ohio Environmental Protection Agency (OEPA) must review and approve plans for "substantial change in a public water system" as defined by Ohio Administrative Code 3745-91-02. Construction is, by law, not permitted to start until approval by OEPA is granted. However, projects where the increase in main size is not greater than four inches in diameter, the replacement of the waterline complies with the requirements of sections 8.0 through 8.12 of the 10 States Standards, and pipe replacement does not take place in an area of known water or soil contamination, the project is exempted from review.