

CITY OF ST. ROBERT

M I S S O U R I
P u b l i c W o r k s



Infrastructure Guidelines

- All Civil plans will be submitted to the City for review in the following formats: **one Engineer stamped hard copy and on CD in both PDF and DWF format.**
- Prior to any excavation the City's Public Works Department will be notified and the contractor will have a valid Dig-Rite. The City will conduct inspections on the newly installed mains. The contractor is cautioned not to backfill any ditches without the prior approval of the Public Works Department.
- After project completion all as-built plans, petition letter and all compaction testing documentation will be submitted on CD in the following format: **PDF, DWF and DWG**
- All valve boxes, manholes and water meter covers must be set to finished grade and care taken to avoid dislodgement, filling with debris or covering them during construction.
- All utility lines shall be plugged and storm water inlets must be barricaded to prevent debris from entering during construction.
- All sanitary sewer mains must be pressure tested and manholes must be vacuum tested before put into operation
- Under no circumstances should any newly installed water main or fire line be filled or flushed without a representative from the City being present, nor will any water main valves be turned on or off by anyone other than City personnel.
- Any fire line that is not put into service immediately after testing will have to be flushed at the time of turn on
- All fire hydrants installed on a main that is not in service should be marked OUT OF SERVICE with signage or by placing a black plastic trash bag over each hydrant until they are operational
- Any water main or fire line being connected to a City main should follow the guidelines listed in this section

Mayor: George Sanders
City Administrator: Alan Clark
City Attorney: Debbie Moore
City Clerk: Debra A. Adkins

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Water Mains

Disinfection:

All wells, pipes, tanks, and equipment (including fire lines) which can convey or store potable water shall be disinfected in accordance with the current AWWA procedures.

Pipe Cleaning During Laying Operations:

The pipe, if furnished from the factory with dust covers over the ends, shall be examined carefully during laying operations to insure that such covers are not lost inside the pipe. At anytime pipe installation stops, the open end of the pipeline shall be closed off by a suitable cover until installation resumes. No pipe shall be placed in the trench unless it is to be immediately installed. Calcium hypochlorite (HTH) granules shall be placed in each pipe section during construction. In order to achieve total bacterial kill, all components of the system must be in a clean condition. Chlorine is unable to kill bacteria entrapped within mud, rust, or other solids.

Filling:

A representative from the City will assist with filling the main with water. Under no circumstances will a contractor operate City owned valves to fill mains.

Testing, Disinfecting and Flushing:

- Testing:

Installed water mains will be hydrostatically tested. Prior to filling and conducting the test, the water line and fittings shall be backfilled. All air shall be expelled from the pipeline prior to the test by use of air release valves, hydrants, or taps. Taps shall be plugged after testing is completed.

The pipeline shall be pressurized using a hand or motor-operated pump equipped with a shut-off valve, pressure relief valve, and a gauge located to read the line pressure when the pump valve is closed.

The pressure test shall be performed in the presence of a City representative.

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- Disinfecting:

The completed water distribution system shall be flushed and disinfected in accordance with AWWA C651-86.

The chlorinated water shall be allowed to stand in the new water line for at least 24 hours, All valving on the new main shall remain open during disinfection. During disinfection the new main will remain isolated from existing mains to prevent contamination of the City water supply. At the end of the 24-hour period, water in all portions of the line shall have a residual of not less than 10 mg/l free chlorine. If a concentration less than 10 mg/l is found after the 24-hour period, the entire disinfection procedure may have to be repeated by the Contractor at his expense.

- Flushing:

Upon satisfactory completion of the disinfection procedure, the heavily chlorinated water shall be flushed from the system until the chlorine concentration throughout the entire system is no higher than one mg/l or the chlorine concentration of the water source. **Do not** directly dispose of the chlorinated water into a stream or pond as it will kill aquatic life.

The velocity of flow, rather than the flow duration, is the most critical factor in flushing water lines. The velocity within the pipe should exceed 3 feet per second (fps). To achieve this flow rate, the size of the flushing point may need to be increased or multiple faucets opened simultaneously. The blowoff size should be approximately as large as the pipe being flushed.

After final flushing and filling of the system and prior to placing the system in service, the installer shall arrange with a lab certified by the Missouri Department of Natural Resources for collecting samples for required tests. The installer shall be available to assist the lab in collecting samples if required.

A copy of the test results must be sent or delivered to the City of St. Robert Public Works Clerk.

If bacteriological test results are unsatisfactory, the entire disinfection procedure shall be repeated by the Contractor at his expense.

Upon receipt and review of the passing water sample, the contractor will request the Public Works Department to turn on the new main into the existing water system.

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WHAT CHEMICAL TO USE TO DISINFECT

Chlorine is the standard chemical used to disinfect all components of a water system. Chlorine comes in two common forms: 5¼ percent sodium hypochlorite, a liquid; and 70% HTH calcium hypochlorite, a solid. The liquid can be purchased at supermarkets and is commonly known as chlorine bleach (sodium hypochlorite). Read the label to ensure purchase of only sodium hypochlorite. The solid HTH can be purchased from swimming pool supply dealers in granular form and is preferred to achieve total concentration.

VOLUME IN DISTRIBUTION PIPES

(Approximate Volume of Water in <u>100 Linear Feet</u> of Pipe.) <u>Inside Pipe Diameter (inches)</u>	<u>Gallons per 100 Linear Feet</u>
1	4
2	17
3	37
4	63
6	147
8	261
10	406
12	588

CONCENTRATION OF CHLORINE TO USE

The chlorine concentration used to disinfect water facilities can be varied based on the bacterial contamination level expected. If the water system is believed to be reasonably clean (no pipe breaks, no pipe replacement), then 5 parts per million (ppm) is a good disinfecting concentration. If stronger contamination is expected, then a 50 ppm concentration, or higher, should be used. In either case, flushing is a critical step before beginning the disinfection. For an additional reference, see American Water Works Association AWWA Specification C651-86 concerning disinfecting water works facilities.

Shown below are amount of chlorine to achieve various residual concentrations. Desired Concentration (ppm)	Store Bleach	Raw Water (gallons)
1 ppm	1 gallon of 5.25%	50,000
5 ppm	1 gallon of 5.25%	10,000
50 ppm	1 gallon of 5.25%	1,000

HOW TO TIME THE ADDITION OF CHLORINE

As a typical rule of thumb, the chlorine should be in contact with the system components for a 24 hour period. The more contact time, the more assured the bacterial kill. This allows the chlorine ample contact time for all facilities before being flushed out the next day.

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