# HYDRANT INSPECTION, TESTING, AND MAINTENANCE SOP

SOP #321

Rev: 0.0

Date: 01/31/2018

# SOP VERSION CONTROL

| Revision No | Revision Date | Page No(s) | Description | Approved by |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# STAFF ACKNOWLEDGEMENT

I certify that the requirements of this SOP have been communicated to me and that I am trained in its use. A copy of this page will be distributed to the employee training record file.

| Name | Date |
|---|---|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

# APPROVAL SIGNATURES

Prepared by: Arcadis U.S., Inc. Date: 01/31/2018

Approved by: _____ Date: _____

# 1 DEFINITIONS AND ACRONYMS

| | |
|---|---|
| AWWA | American Water Works Association |
| EAM | enterprise asset management |
| GIS | geographic information system |
| GPS | global positioning system |
| PPE | personal protective equipment |

# 2 KEY PERSONNEL AND RESPONSIBILITIES

- Water Distribution Superintendent:
  - Maintain schedule and generate work orders for hydrant inspection, testing and maintenance.
  - Identify additional planning/scheduling activities and resources for each hydrant (such as establishing additional traffic control measures, coordinating with valve exercising, performing customer notification, and assessing the hydraulic impact).
  - Maintain records of hydrant maintenance.
  - Ensure all repairs, map discrepancies, and other issues are properly communicated to the responsible parties and ensure identified repairs/replacements are executed within a timely manner.
- Water Distribution Operator (2):
  - Perform field inspection, testing and maintenance of hydrants as generated by work orders.
  - Prepare records of field testing, inspection and maintenance for each hydrant and enter into enterprise asset management (EAM) system.

# 3 SCOPE/PURPOSE

The purpose of this SOP is to ensure regular and consistent execution of the preventive maintenance, inspection, and testing of hydrants throughout the distribution system. The hydrant maintenance program shall be conducted in accordance with the American Water Works Association (AWWA) Manual M17 Fire Hydrants: Installation, Field Testing, and Maintenance. Per the referenced publication, “all hydrants should be inspected regularly, at least once a year, to ensure their satisfactory operation (most manufacturers recommend twice per year).” In addition, “it is good practice to conduct flow tests on all parts of the distribution system approximately every 10 years to identify the service areas affected by significant changes in the distribution system. An accurate and digital record should be kept of each flow test so it is readily available.”

The City of Flint owns a number of different fire hydrant models; therefore, maintenance and testing practices may vary. Service personnel should apply maintenance practices consistent with the make and model of the hydrant in accordance with manufacturer's recommendations.

This SOP should be used in coordination with a comprehensive asset management plan and hydraulic model. Any updates to condition, status, or operation of valves shall be relayed to the appropriate staff so that information is consistent across distribution system operations.

This SOP does not cover hydrant installation and replacement procedures, which would include inspection before installation, installation or replacement, and testing and/or inspection after installation.

# 4 HEALTH AND SAFETY

One of the most significant health and safety risks during hydrant maintenance is vehicle traffic. The field service team should use trucks, temporary signs, and traffic cones to prevent automotive accidents and injury to staff. In addition, a flag crew may be needed to direct traffic in some locations. Trucks should be parked between oncoming traffic and the work area to provide a barrier. In addition, the following personal protective equipment (PPE) should be worn during maintenance activities:

- City employee identification
- Hard hat
- High visibility safety vest
- Knee pads (as needed)
- Safety glasses
- Steel-toed boots
- Work gloves

# 5 PROCEDURE

**Equipment Required:**

- Water system map (with clear labels for pipe diameter, street names, parcel addresses, critical water users, and all hydrant/appurtenance identification numbers)
- Traffic cones
- Temporary signs/arrow boards (warning lights, strobe lights, arrow boards, traffic maintenance signs)
- Pruning shears
- Wrench
- Approved lubricating oil (and funnel)
- Spare parts (cap, stem, nut, bonnet, etc.)
- Scraper, wire brush, and/or sand-paper

- Spray paint and primer (if applicable)
- Plastic tarp or newspaper
- Approved cleaning agent and paper towels
- GPS unit (optional)
- Digital camera (optional)

**Procedure:**

Once a work order is received from the Water Distribution Superintendent, identify the 2-person maintenance crew to perform the hydrant maintenance.

1. Prior to driving to the site, perform the necessary pre-planning activities. This includes reviewing system maps, GIS, as-builts, and asset history to identify hydrants that are in busy intersections, high-profile of sensitive customers, or may result in a potential hydraulic impact as well as reviewing the manufacturer's manual for the specific hydrants to be inspected. Notify the Water Service Center Supervisor if additional planning/coordination is needed.
2. Identify the best route to conduct the work. This includes identifying the starting and ending point (hydrant location), sequence of hydrants to be completed for the day, and potential parking areas.
3. Upon arrival to the site, assess the site for safety (including the appropriate PPE) and set up the appropriate traffic control measures. This may include: warning lights, strobe lights, arrow boards, traffic maintenance signs, cones, flagmen (if necessary), safety vests and/or other PPE. Document the following information on the work order:
    - Operator last name
    - Inspection date
    - Arrival time
4. Locate and access the fire hydrant identified on the work order. Identify the unique identification number for the hydrant on the appropriate water system map and confirm the actual field location is a correct match. Verify the following information in the field and document it on the work order:
    - Hydrant ID number
    - Map grid/page number
    - Street
    - Cross street
    - Address
    - GPS position (if applicable)
    - Other location notes (i.e. measurements from the property line)
    - Hydrant source main size
    - Map discrepancies (if applicable)
5. Clear the area of excessive debris, vegetation, or dirt (within a 3-foot clearance). There should be no obstructions, including the ground, preventing easy coupling of hoses or turning of spanners. The hydrant should be visible from all approaches. There should be

no brush or tree limbs that could interfere with anyone approaching the hydrant and attempting to connect to it or operate it. Where needed, perform minor corrections, such as pruning and minor digging. Document more significant work on a new work order.

6. Check hydrant information against records (to be provided on work order) and note any discrepancies. Document the following information on the work order:
    - Manufacturer[1]
    - Model
    - Year
7. Visually inspect hydrant for leaks, rust, or any obvious cap/chain defects. Caps should be free from cracks and turn freely. Chains should be attached to caps and the hydrant body and turn freely.
8. Loosen the top cap and open the hydrant a few turns to allow air to vent, and then tighten the cap and open the hydrant fully. A full tear down is required to look for internal damage, gasket, and tread conditions. Pay special attention to all seals and threads, and note any wear.
9. Replace any components, if required.
10. Before putting the hydrant back together, make sure the operating nut, all nozzle outlets, and all seals/threads are cleaned and lubricated (in compliance with manufacturer recommendations).
11. Re-assemble the hydrant and fully tighten all caps.
12. Locate, access, and exercise the fire hydrant isolation valve in accordance with manufacturer recommendations. Valves should open and close properly and should not leak at either the stem or the nozzle. Tighten leaky packings on older hydrants. Document any valves that are difficult to operate, have bent stems, or do not open/close fully on the work order for follow-up.
13. Turn on the hydrant fully and test for adequate, sustained water pressure and proper drainage. Also check for any leaks around the operating stem, nozzles, any seals or packing, and at the flanges. Replace the o-rings if necessary.
14. Open and close the hydrant with the nozzle caps in place to check for seal leakage. Verify that hydrant main (bottom) valve completely closes. Refer to appropriate manufacturer's manual for step by step instructions.
15. If a wet barrel hydrant, drain the hydrant in accordance with manufacturer's instructions.
16. Thoroughly clean the exterior of the hydrant, washing off any dirt, bird droppings, or loose debris.
17. Confirm paint is in good condition. Touch up hydrants with chips or rust using an approved spray paint. A plastic tarp or newspaper should use used to protect sidewalk or nearby vegetation. Remove any surface rust using scraper or wire brush. Roughen

[1] The City of Flint estimates approximately six various hydrant manufacturers are currently in-use (all dry barrel). This includes the following: A.P. Smith, Darling, E.J., Mueller, T.C. and Waterous.

any shiny surfaces with light sanding (to improve paint adhesion). Apply spot primer to coat areas of bare metal. Apply a top coat with a polyurethane enamel compatible paint as directed by the hydrant manufacturer (typically sprayed to minimum 4 mil dry coat thickness).

18. Visually inspect the hydrant for damaged or missing parts. Document any operational deficiencies, leaks, vandalism, and other relevant observations in addition to the following information on the work order:

    - Operated (yes/no)
    - Drained (yes/no)
    - Flow observed (yes/no)
    - Close direction
    - Number of turns
    - Fire hydrant condition (operable/inoperable)
    - Specific hydrant discrepancy (by category and details)
    - Specific repair activity required to return the hydrant to full operability
    - Picture taken (for raises or other conditions)
    - Time work order completed
    - Comments (other relevant observations or items requiring additional maintenance on the work order)

19. Restore the area to a clean and safe condition. This includes clearing the area of any tools/materials used and any traffic control devices.

# 6 DATA RECORDING AND MANAGEMENT

Following completion of a hydrant test, inspection or maintenance work order, enter all necessary information, including the date of maintenance, hydrant identification, condition, test results and personnel completing the maintenance, into the EAM system.

The Water Distribution Superintendent must be notified of any additional required maintenance or if the hydrant is inoperable or in disrepair. The Water Distribution Superintendent shall assign work orders for any follow-up items and coordinate updates to the asset management plan.

# 7 REFERENCES

American Water Works Association. (2016). *M17 Fire Hydrants: Installation, Field Testing, and Maintenance, Fifth Edition.* Denver, CO: AWWA