

Engineer's Report

for

2536 Rochester Road / NYS Route 332

Town of Canandaigua, Ontario County, New York

Prepared for:

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Project No. 2759

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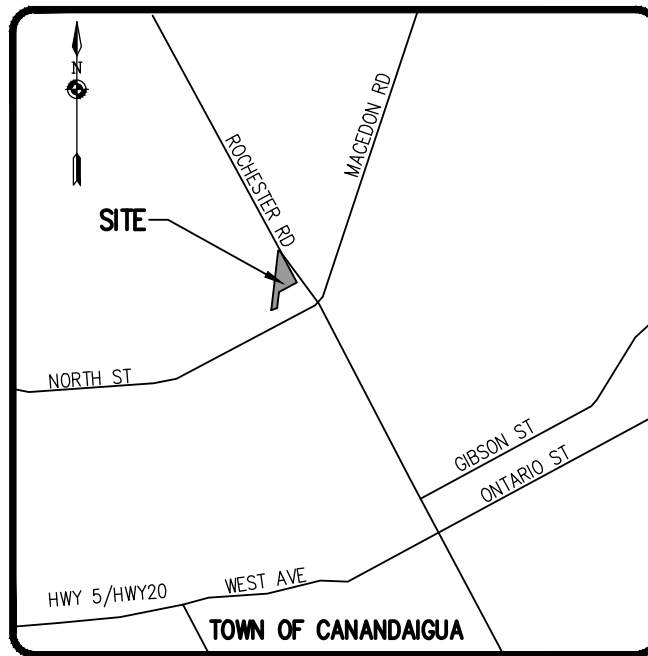


FIGURE 01 – LOCATION MAP
NOT TO SCALE

A. Introduction

Apogee Development LLC is proposing a new 2-story 9,000 sf (6,400 footprint) commercial building. The building is planned to include 1,700 sf of commercial space, 4,000 sf of retail space, and 2,100 sf for a tasting room. The project site is approximately 1.68 acres and is located at 2536 Rochester Road (NYS RTE-332) in the Town of Canandaigua, Ontario County. The property is zoned CC-Community Commercial which allows for the proposed use.

Access to the site will be provided by an existing curb cut onto Rochester Road in the northern portion of the site. A second access point will be provided through the existing curb cut at the Monroe Muffler property located immediately to the south of the site. There is an existing access easement in place to allow for access through the adjacent property.

The proposed sanitary sewer service for the building will be provided with a connection to the existing gravity sanitary sewer main through the site. Water supply to the site will be provided with a connection to the public water main along Rochester Road. Stormwater drainage will be managed through the installation of storm sewers, open swales, bio-retention areas, and temporary ponding areas.

The following report provides the technical data to support the proposed overall development. The report includes discussion on the water and sanitary sewer service, stormwater management, construction erosion control, environmental setting, and other site design components.

B. Water Supply System

The public water main along Rochester Road is operated by the Town of Farmington Water and Sewer Department. Water supply will be provided from a proposed private combined 4" DIP CI-52 water service which will extend from the existing 20" ductile iron public watermain located along the western side of Rochester Road and into the mechanical room of the proposed building. Per a conversation with Robin McDonald with the Town of Farmington Water and sewer Department, the existing size of the watermain which the project will connect to is 20".

Within the mechanical room the service will be split, and the domestic service will be metered (1" Badger Recordall Disc Meter) and protected against backflow with an RPZ (1" Watts LF009). The fire service will also be metered (4" Badger Fire Meter with Itron Communication Module) and protected with a RPDA (4" Watts 957RPDA) and serve the building's sprinkler system for fire protection. The mechanical room will be heated and lighted, and have a floor drain for the equipment which will discharge to into the proposed storm sewer network to be installed at the site.

The estimated daily water usage for the development is 1,550 gpd and was calculated using the New York State Design Standards for Intermediate Sized Wastewater Treatment Systems 2014, Table B-3, and is summarized below.

| | |
|--|-------------|
| 1,700 sf of Commercial (15 gpd/employee * 10 employees) | = 150 gpd |
| 4,000 sf of Retail Space (0.1 gpd/sf + 15 gpd/employee * 10 employees) | = 550 gpd |
| 2,100 sf for a Tasting Room (20 gpd/seat * 90 seats) | = 1,800 gpd |
| <hr/> | |
| Estimated Daily Water Use | = 2,500 gpd |

The fire flow demand for the sprinkler systems of the building was estimated at 300 gpm.

The water supply calculations, meter specifications, backflow specifications, flow test information and record mapping have been included in Appendix 1. The calculations show adequate water pressure is available at the project site for both domestic and fire conditions, which has been summarized below.

Domestic Demand = 25 gpm
Approximate Domestic Pressure after RPZ and Meter= 50 psi

Fire Demand = 300 gpm
Approximate Pressure after RPDA Fire Conditions = 52 psi

C. Sanitary Sewer System

The proposed building will be served by a new 6" PVC SDR-21 sanitary lateral. The proposed service will connect to an existing 18" ACP sewer main which is routed through the site and maintained by Ontario County Department of Public Works. The estimated daily sewage generated from the site is 2,500 gpd (see Water Supply System for calculations).

D. Stormwater Management Analysis

D.1 Overview

Stormwater runoff associated with the proposed project will be treated during and after construction to meet New York State Department of Environment Conservation (NYSDEC) water quality and quantity requirements. Two temporary ponding areas with outlet structures will be constructed to capture and detain runoff from the developed and offsite areas of the property, then release the runoff to a downstream area at a controlled rate. Offsite runoff entering the project site will be bypassed through the project site and continue to drain to the NYSDOT storm sewer system. Water quality treatment for the project site will be provided with bio-retention filtering practices and a centripetal deflection system (CDS) unit. The stormwater management plan for the project is designed in accordance with the current rules and regulations set in the NYSDEC Stormwater Management Design Manual (January 2015) and the Town of Canandaigua requirements.

D.2 Methodology

The NYSDEC Stormwater Management Design Manual provides specifications and sizing criteria for stormwater management practices for stormwater discharges. The proposed stormwater management for this project has been designed to meet the five key criteria outlined in the Design Manual:

- Water quality volume (WQv) to meet pollutant removal goals;
- Runoff reduction volume (RRv) by application of runoff reduction practices to replicate pre-development flows;
- Channel protection volume (Cpv) to reduce channel erosion;
- Overbank flood protection (Qp) to prevent overbank flooding; and
- Extreme storm protection (Qf) to help control extreme floods.

The existing and proposed drainage conditions at the project site were analyzed following the methods outlined in Soil Conservation Service Technical Release No. 20 & 55. Peak runoff rates for existing and post-development conditions were modeled for the 1, 2, 5, 10, 25, 50, and 100-year design storm events using the HydroCAD V10 software. Runoff rates were determined based on the hydrologic characteristics of the site (soil conditions, existing and proposed land cover, time of concentration for the contributing drainage areas) and the hydraulic characteristics of the proposed stormwater management facility (type of storage, size of facility and outlet structure features and sizing as applicable). Twenty-four (24) hour extreme storm event precipitation amounts were obtained from Northeast Regional Climate Center online web tool and have been included in Appendix 2 for reference.

Appendix 3 contains the stormwater hydrographs and subarea information. These stormwater hydrograph reports show the subarea routings, subarea data, stormwater management facility and outlet structure sizing, estimated detention times, storage volumes, peak ponding elevations, and discharge rates.

D.3 Soils

The Natural Resources Conservation Service (NRCS) indicates that the project site, and all offsite areas which drain to the project site directly contains soils of hydrologic class “D”. Soils within the property limits are composed of Lakemont Silty Clay Loam and Odessa Silt Loam. A soils map has been included in Appendix 2 for reference.

D.4 Existing Conditions

The analyzed watershed for the project totals approximately 23.17 acres and under existing conditions consist of 3 drainage areas and 1 analysis point (see Figure 03 in Appendix 4). Table 1 below provides a summary of the existing subareas, which are described in further detail following the table.

Table 1: SCS Hydrologic Data, Existing Conditions

| Subarea | Area | Curve Number (CN) | Time of Concentration (Tc) |
|---------------------|-------------|--------------------------|-----------------------------------|
| EX Subarea ‘A’ | 6.3 acres | 84.6 | 20.4 mins |
| EX/PR Subarea ‘B’ | 5.7 acres | 80.0 | 29.1 mins |
| EX/PR Subarea Tops* | 11.17 acres | 91.0 | 12.5 mins |

** Subarea information obtained from Engineer's Report for Proposed Retail North Street and NYS RTE 332 Canandaigua NY prepared by Camina & Wood, P.C. (Received by Town of Canandaigua 10-5-2001)*

Existing Subarea ‘A’ (6.3 acres)

This subarea consists of the majority of the subject property and the offsite drainage areas which flow directly into it. Runoff entering into this subarea generally flows toward an existing drainage ditch which drains runoff into an existing 24” storm sewer and into the NYSDOT storm sewer system along Rochester Road. Two existing storm sewers discharge additional offsite runoff into the existing drainage ditch, one from both Existing/Proposed Subarea B and Existing/Proposed Subarea Tops. The NYSDOT Storm Sewer system was utilized as the analysis point for the stormwater calculations.

Existing/Proposed Subarea ‘B’ (5.7 acres)

This subarea includes the offsite area located to the west of the project site and the existing railroad tracks and was delineated using available lidar topography and current aerial imagery. Runoff from this subarea generally flows overland or along the existing drainage ditches adjacent to the railroad tracks and ultimately reaches an existing 12” culvert which conveys runoff below the embankment and into the existing drainage ditch in Existing Subarea A. The storage area behind the tracks was modeled as a pond in the hydraulic calculations since it provides temporary runoff storage until the 12” culvert can pass the runoff.

Existing/Proposed Subarea Tops (11.17 acres)

This subarea data was obtained from the Engineer's Report for Proposed Retail North Street and NYS RTE 332 Canandaigua NY prepared by Camina & Wood, P.C. (Received by Town of Canandaigua 10-5-2001). Runoff from the Tops development flow into the constructed stormwater pond and discharges

through a storm sewer network and into the existing drainage ditch within Existing Subarea A. Ponding volumes for this facility were obtained from the report and the outlet structure was surveyed, which were both used to model the existing pond which received runoff from this subarea within the hydraulic calculations. It should be noted the outlet structure and downstream piping constructed deviates from the design plans and the report obtained from the Town of Canandaigua. A field survey of the existing outlet structure and downstream piping was completed and was utilized in the hydraulic model for the project with the storage volumes provided in the Engineer's Report by Camina & Wood, P.C. Excerpts from the report and the current survey information obtained and utilized have been included in Appendix 2.

D.5 Proposed Conditions

The drainage subareas for the post-development conditions (see Figure 04 in Appendix 3) have been delineated per the proposed grading of the site development. The analyzed drainage area includes approximately 23.17 acres, which matches the existing conditions, and is composed of 4 subareas. Drainage under the proposed conditions will continue to drain toward the analysis point to allow for a comparison to pre-development flow rates.

Table 2: SCS Hydrologic Data, Proposed Conditions

| Subarea | Area | Curve Number (CN) | Time of Concentration (Tc) |
|----------------------|-------------|-------------------|-----------------------------------|
| Proposed Subarea A-1 | 3.43 acres | 86.2 | 14.8 min |
| Proposed Subarea A-2 | 0.81 acres | 90.8 | 6.0 min (Minimum allowable Tc) |
| Proposed Subarea A-3 | 1.67 acres | 91.4 | 11.1 min |
| Proposed Subarea A-4 | 0.15 acres | 98.0 | 6.0 min (Minimum allowable Tc) |
| Proposed Subarea A-5 | 0.24 acres | 89.0 | 6.0 min (Minimum allowable Tc) |
| EX/PR Subarea 'B' | 5.7 acres | 80.0 | 29.1 mins |
| EX/PR Subarea Tops* | 11.17 acres | 91.0 | 12.5 mins |

** Subarea information obtained from Engineer's Report for Proposed Retail North Street and NYS RTE 332 Canandaigua NY prepared by Camina & Wood, P.C. (Received by Town of Canandaigua 10-5-2001)*

Proposed Subarea 'A-1' (3.43 acres)

This subarea contains all the remaining areas of Existing Subarea A, composed of mainly offsite drainage areas from the south which will be routed through the site and into the NYSDOT storm sewer system to the analysis point as it does under existing conditions.

Proposed Subarea 'A-2' (0.81 acres)

This subarea contains the southern half of the development. Runoff from this subarea will sheet flow overland and be directed into a bio-retention practice for quality treatment and then be routed to the southern ponding area where it combines with Subarea A-1 for quantity control prior, prior to being routed through the site and into the NYSDOT storm sewer system to the analysis point.

Proposed Subarea 'A-3' (1.67 acres)

This subarea contains the northern half of the development and a portion of the offsite area which drains into the property. Runoff from the developed portion of this subarea will sheet flow overland and be directed into a bio-retention practice for quality treatment and then be routed to the northern ponding area for quantity control prior, prior to being routed through the site and into the NYSDOT storm sewer system to the analysis point. Runoff leaving the northern ponding area is directed through a proposed CDS unit for additional quality treatment.

Proposed Subarea 'A-4' (0.15 acres)

This subarea contains only the building roof, which connected to the proposed storm sewer system and through the CDS unit prior to being discharged to the Analysis Point.

Proposed Subarea 'A-5' (0.24 acres)

This subarea the eastern portion of the property which will sheet flows toward the NYSDOT right-of-way and enter the existing storm sewer system along Rochester Road (Analysis Point).

Existing/Proposed Subarea 'B' (5.7 acres)

See description in previous section for additional information.

Existing/Proposed Subarea Tops (11.17 acres)

See description in previous section for additional information.

D.6 Stormwater Management Areas

Two temporary ponding areas with engineered outlet structures will used to control the runoff rates from the developed portions of the property. The southern area will receive runoff from Subareas A-1, A-2, B, and the Tops subarea. The northern area will receive runoff from Subarea A-3. The facilities will detain and treat the post-development runoff and discharge it to the Analysis Point at controlled peak flow rates. Sufficient storage volume is provided to effectively detain the 1, 2, 5, 10, 25, 50 and 100-year storms and release them below pre-development runoff rates. Table 3 and 4 contains the ponding elevation data for both areas.

Southern Area

The proposed outlet structure is designed to control the rate at which runoff is discharged from the site, reducing the runoff rates to remain at or below the existing conditions. The outlet structure consists of a 3'x3' catch basin, 18" inlet pipe, and a 24" main outlet pipe. Details of the outlet structure are also provided on the design plans.

Table 3: Southern Stormwater Area Summary

| Design Storm Event | Post-Dev. Inflow (cfs) | Post Deve. Outflow (cfs) | Time to Peak Outflow (hrs) | Ponding Elevation (ft) | Storage Volume Used (cf) |
|---------------------------|---------------------------------------|---|---|---------------------------------------|---|
| 1-yr | 4.84 | 4.41 | 12.20 | 774.36 | 1,567 |
| 2-yr | 6.86 | 6.25 | 12.24 | 774.61 | 2,305 |
| 5-yr | 10.92 | 9.13 | 12.34 | 775.16 | 4,440 |
| 10-yr | 14.78 | 11.02 | 12.43 | 775.79 | 7,685 |
| 25-yr | 20.08 | 12.85 | 12.52 | 776.66 | 13,541 |
| 50-yr | 24.43 | 14.44 | 12.42 | 777.22 | 18,064 |
| 100-yr | 29.38 | 16.84 | 12.36 | 777.62 | 21,708 |
| 24" Outlet Pipe Invert | 773.26 | | Total Available Storage Volume @ Elev=778.0 | | 25,503 cf |
| 18" Inlet Pipe Invert | 773.26 | | | | |
| 3'x3' Grate | 777.00 | | | | |

Northern area

The proposed outlet structure is designed to control the rate at which runoff is discharged from the site, reducing the runoff rates to remain at or below the existing conditions. The outlet structure consists of a 2'x2' catch basin, 8" inlet pipe with a cap and 3" orifice, and a 15" main outlet pipe. The 3" orifice is designed to provide the Channel Protection Volume for the development. Details of the outlet structure are also provided on the design plans.

Table 4: Northern Stormwater Area Summary

| Design Storm Event | Post-Dev. Inflow (cfs) | Post Deve. Outflow (cfs) | Time to Peak Outflow (hrs) | Ponding Elevation (ft) | Storage Volume Used (cf) |
|---------------------------|---------------------------------------|---|---|---------------------------------------|---|
| 1-yr | 2.70 | 0.33 | 12.49 | 775.94 | 2,923 |
| 2-yr | 3.31 | 0.37 | 12.53 | 776.30 | 3,706 |
| 5-yr | 4.38 | 2.25 | 12.15 | 776.47 | 4,095 |
| 10-yr | 5.37 | 4.09 | 12.10 | 776.57 | 4,337 |
| 25-yr | 6.91 | 5.37 | 12.10 | 776.74 | 4,763 |
| 50-yr | 8.32 | 5.42 | 12.12 | 777.05 | 5,597 |
| 100-yr | 9.96 | 5.53 | 12.14 | 777.41 | 6,782 |
| 15" Outlet Pipe Elev. | 773.82 | | Total Available Storage Volume @ Elev=778.0 | | 9,486 cf |
| 3" Low Flow Orifice | 773.82 | | | | |
| 2'x2' Grate | 776.30 | | | | |

D.7 Stormwater Quality:

The August 2015 NYSDEC Stormwater Management Design Manual outlines numerous practices that can be constructed to improve the water quality and reduce the runoff volume of stormwater runoff. Reduced Runoff Volume (RRv) is the reduction of the total Water Quality Volume (WQv) by application of green infrastructure techniques and standard management practices to replicate pre-development hydrology. To meet the WQv and minimum allowable RRv requirements, the stormwater plan includes a bio-retention area which receives runoff from most of the project site and some offsite areas.

The intent of the new green infrastructure measures is to replicate the pre-construction infiltration, peak runoff flow and discharge volume, as well as minimization of concentrated flow by using runoff control techniques to provide treatment in a distributed manner before runoff reaches offsite discharge locations. The green infrastructure practices have been designed to comply with the NYSDEC guidelines. Calculations were completed to show that the project site can effectively meet the overall WQv and minimum allowable RRv requirements, and these calculations have been provided in Appendix 3.

Bioretention #01 is located in the central area of the parking lot behind the proposed building and receives runoff from the surrounding area. Runoff entering the bio-retention practices will be filtered and collected within an underdrain pipe then discharged through the storm sewer system into southern ponding area for quantity control prior to being release toward the analysis point. Pretreatment for the bioretention practice will be provided within a stone diaphragm surrounding the perimeter of the media.

Bioretention #02 is in the northern portion of the project site and receives runoff from the surrounding area. Runoff entering the bio-retention practices will be filtered and collected within an underdrain pipe then discharged into the northern ponding area for quantity control prior to being release toward the analysis point. Pretreatment for the bioretention practice will be provided within a stone diaphragm surrounding the perimeter of the media.

Dry Swale #01 is located along the southern property line and treats a small area of the pavement near the entrance/exit located on Monroe Muffler. This practice also receives runoff from a portion of the existing pavement located on the Monroe Muffler property which drains into the property. Runoff entering this swale will drain into the proposed storm sewer bypass system and to the analysis point.

Centripetal Deflection System (CDS) Unit is located in the lawn area southeast of the proposed building. This unit will treat runoff being discharge from the northern ponding area and roof leaders before being directed to the analysis point. The Stormwater Hydrographs in Appendix 3, include a scenario for the 1.0" rainfall event (WQv Event) which indicate the CDS unit should be sized to provide a minimum treatment flow rate of 0.19 cfs and be able to bypass greater than 5.53 cfs (100-year flow rate).

Figure 05 in Appendix 3 shows the approximate drainage area to each of the practices described above. Detailed calculations for the site requirements and this practice have been included in Appendix 3 and summarized below.

Bioretention #1

WQv Provided by Bio-Retention = 1,032 cf

RRv Provided = 696 cf

Bioretention #2

WQv Provided by Bio-Retention = 402 cf

RRv Provided = 331 cf

Dry Swale #1

WQv Provided by Dry Swale = 262 cf

RRv Provided = 87 cf

CDS Unit

WQv Provided by CDS Unit = 3,191 cf

Stormwater Quality Summary

The proposed stormwater management facility satisfy both of the NYSDEC's Stormwater Design Manual key criteria relating to stormwater quality. The total provided WQv and RRv are summarized below;

WQv Required = 3,407 cf

Minimum allowable RRv = 655 cf

Total WQv Provided = 4,887 cf

Total RRv Provided = 1,114 cf

Total WQv + RRv Provided = 6,001 cf

Due to hydrologic soil groups, the property being previously developed and grading restraints; it is necessary to use filtering "Green Infrastructure" practices for the project site, which do not meet 100% runoff reduction requirements. However, the above green infrastructure practices show the total runoff reduction volume is greater than the minimum allowable RRv. The proposed stormwater management practices treat more than the total impervious area to be constructed as part of the project, prior to being conveyed to the Analysis Point, and therefore complies with the NYSDEC requirements for water quality.

D.8 Channel Protection:

The 2015 NYSDEC Stormwater design manual defines the CPv requirement as extended detention of the post-developed 1-Year, 24-hour storm event. This requirement is intended to protect stream channels from erosion. To show compliance with the current standards the required Channel Protection Volume was calculated and is provided in the northern ponding area between the bottom of facility and grate elevation of the outlet structure, which will discharge runoff through a 3.0" orifice. These calculations are provided in Appendix 3 and summarized below.

CPv Calculated = 3,574 cf

Total CPv Provided = 3,696 cf

D.9 Stormwater Quantity and Quality Analysis and Results:

The calculations provided within the appendices show that the proposed project results in a reduction of stormwater runoff rates at the Analysis Points for both the 10-year and 100-year events as required by the NYSDEC Stormwater Design Manual quantity criteria. A summary of the existing vs. proposed runoff rates at the Analysis Points has been summarized with Table 5 below. The previous sections showed that the project also satisfies the other key criteria, including WQv, RRv and CPv. These values have been summarized in Table 6 below.

Table 5: Comparison of Existing and Proposed Peak Runoff Rates

| Analysis Point | Design Storm | Existing Peak Runoff Rate (cfs) | Proposed Peak Runoff Rate (cfs) |
|------------------|--------------|---------------------------------|---------------------------------|
| ‘Analysis Point’ | 1 | 6.03 | 4.85 |
| | 2 | 8.51 | 6.74 |
| | 5 | 12.73 | 11.07 |
| | 10 | 15.44 | 13.31 |
| | 25 | 18.62 | 16.02 |
| | 50 | 20.71 | 17.71 |
| | 100 | 22.62 | 20.87 |

Table 6. Compliance with NYSDEC Sizing Requirements

| New York Stormwater Sizing Criteria | Compliance |
|--|--|
| Water Quality Volume (WQv) | WQv Required: 3,407 cf WQv+RRv Provided: 6,001 cf > 3,407 cf <u>OK</u> |
| Runoff Reduction Volume (RRv) | Minimum allowable RRv: 655 cf RRv Provided: 1,114 cf > 655 cf <u>OK</u> |
| Channel Protection Volume (Cpv) | Cpv Required 3,574 cf Cpv Provided: 3,696 cf > 3,574 cf <u>OK</u> |
| Overbank Flood Protection (Qp) <i>Control peak discharge from 10-year storm to 10-year pre-development rates</i> | Total Flows from Site (Analysis Point) 13.31 cfs (Proposed) < 15.44 cfs (Existing) <u>OK</u> |
| Extreme Storm Protection (Qf) <i>Control peak discharge from 100-year storm to 100-year pre-development rates</i> | Total Flows from Site (Analysis Point) 20.87 cfs (Proposed) < 22.62 cfs (Existing) <u>OK</u> |

Based on the above information, the proposed stormwater management design for the project satisfies the key criteria of the Stormwater Management Design Manual guidelines and will require a five-day Notice of Intent review to acquire permit coverage from NYSDEC under General Permit GP-0-20-001.

E. Erosion and Sediment Control

The proposed stormwater management facility and a comprehensive erosion control plan have been designed to control sediment runoff and provide water quality treatment during and after the site construction. As required by the NYSDEC, the project will include a Stormwater Pollution Prevention Plan (SWPPP) that will combine the design presented in this report and on the plans with the requirements of NYSDEC GP-0-20-001 to outline how the owner will address the construction and post construction stormwater condition. The construction erosion control plan has been designed per the New York Standards and Specifications for Erosion and Sediment Control.

Additional erosion control measures will be implemented during construction to control silt and minimize disturbance to the existing swales and drainage conditions. Typical practices include the installation and maintenance of silt fence, stone check dams, rip rap inlet protection, and filter fabric inlet protection. The disturbed areas will be seeded and mulched as soon as possible to control erosion. Pipe inlet inlet control rip-rap measures are also proposed at the end sections of the proposed storm sewers to help reduce erosion. A stabilized construction entrance will be installed from the existing curb cut onto Rochester Road where the proposed entrance will also be located.

The design plans include the sequence of construction notes along with specific construction erosion control notes and details. The design plans will be reviewed at the pre-construction meeting with all involved parties. They include a construction erosion control plan that outlines a sequence of construction along with erosion control measures and details. The erosion control practices proposed are shown on the design plans and detailed on the detail sheets. The details are per the New York State Standards and Specifications for Erosion and Sediment Control.

The final component of the erosion control plan will be maintenance. The contractor will be responsible for installing the erosion control features, as well as maintaining and replacing them as necessary throughout construction. An owner's representative and the Town of Canandaigua will review the erosion control measures to determine their efficiency, need for replacement, or need for additional measures. A SWPPP will be prepared for the project and is to be kept on-site throughout the soil disturbing activities and until groundcover is established.

G. NY State Historic Preservation Office (SHPO)

Per the New York State Office of Parks, Recreation & Historic Preservation (NYSOPRHP), Cultural Resource Information System (CRIS), the property is located within an archaeological sensitive area. The site was previously the site of a car maintenance business, then remained vacant for several years after the facility has been removed. Based upon the previous location of the building and the existing drainage ditch and underground utilities which are located through the site, it has been completely disturbed and the proposed development poses no impact on existing cultural resources.

The project was submitted through the CRIS system and an "No Impact Letter" was received from NYSOPRHP for the project, which has been included in Appendix 1 for reference.

H. NYS Natural Heritage Program

Per the NYSDEC EAF Mapper Summary Report and the NYSDEC Environmental Resource Mapper, the property does not include rare plants or animals, nor any endangered or threatened species. The EAF Mapper Summary Report and a copy of the Environmental Resource Mapper included Appendix 1 for reference.

I. Wetlands

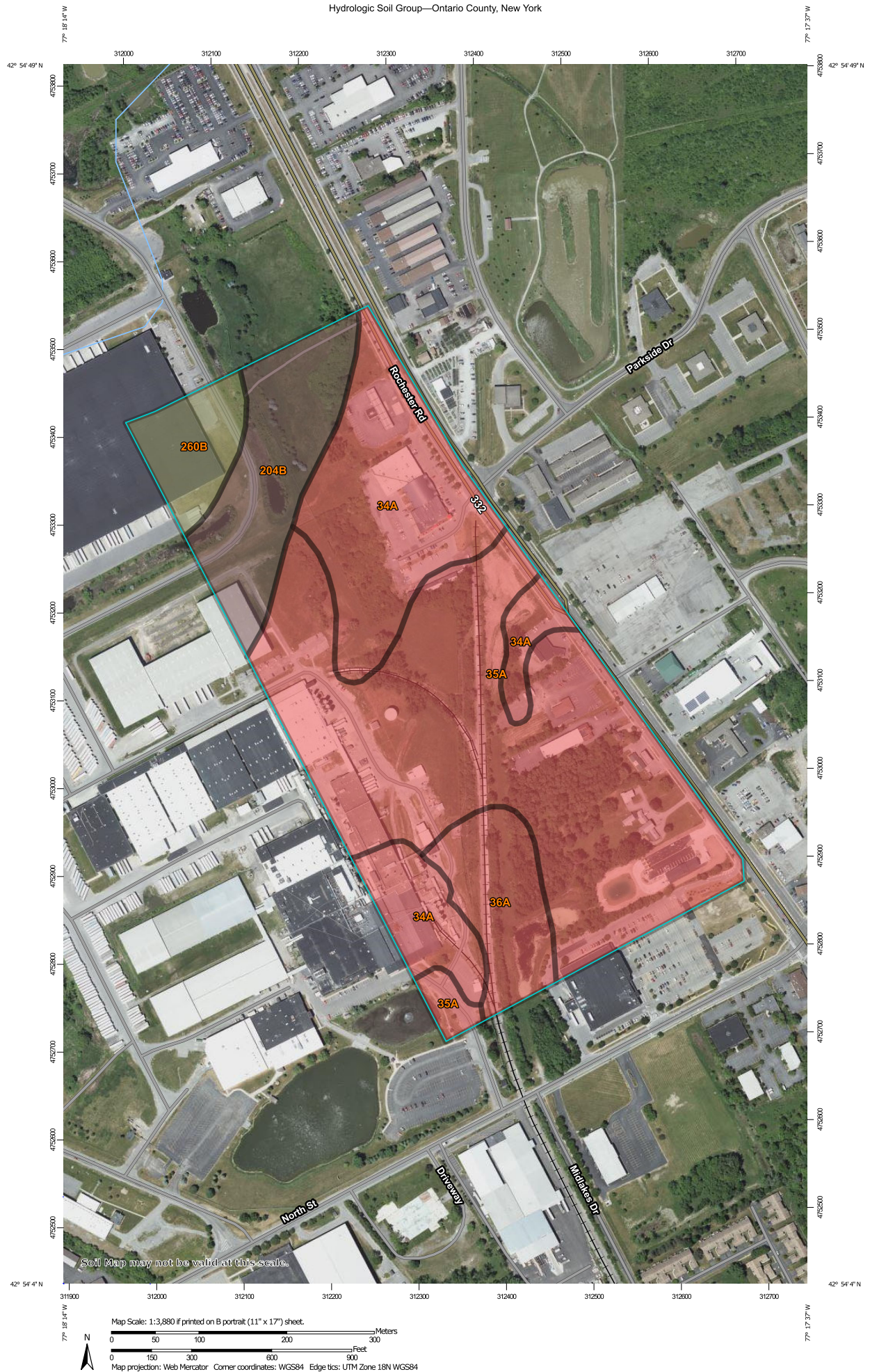
BME Associates completed a review of available wetland mapping and an on-site evaluation of potential wetland areas within the project site limits. No existing regulated wetlands were identified on the site, which was confirmed by the on-site evaluation and through available wetland mapping.

Appendix 1

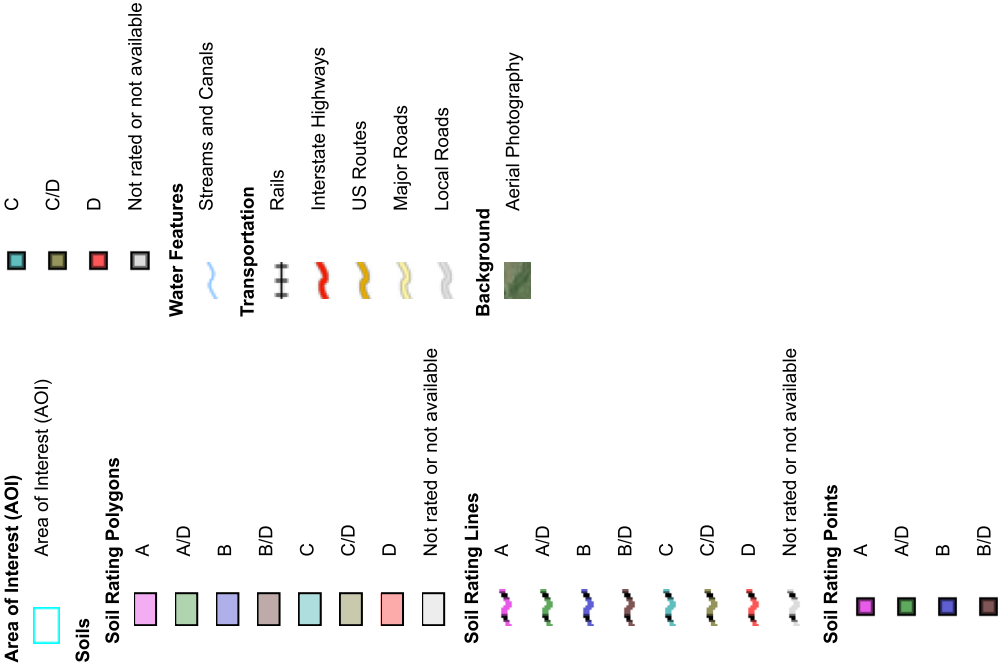
Background Information

**Figure 02-Soils Map
Rainfall Data**

**“No Impact” Letter from NYSOPRHP dated, 05/28/2021
NYSDEC EAF Mapper Summary Report & NYSDEC Environmental Resource Map**



MAP LEGEND



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Ontario County, New York
Survey Area Data: Version 18, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 4, 2020—Jun 17, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|------------------------------------|--|--------|--------------|----------------|
| 34A | Lakemont silty clay loam, 0 to 3 percent slopes | D | 17.0 | 25.2% |
| 35A | Odessa silt loam, 0 to 3 percent slopes | D | 33.6 | 49.8% |
| 36A | Schoharie silty clay loam, 0 to 3 percent slopes | D | 5.1 | 7.6% |
| 204B | Lima loam, 3 to 8 percent slopes, lower clay surface | B/D | 8.3 | 12.2% |
| 260B | Cayuga silt loam, 3 to 8 percent slopes | C/D | 3.5 | 5.2% |
| Totals for Area of Interest | | | 67.5 | 100.0% |

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

| | |
|-----------|---------------------------------|
| Smoothing | Yes |
| State | New York |
| Location | |
| Longitude | 77.298 degrees West |
| Latitude | 42.908 degrees North |
| Elevation | 0 feet |
| Date/Time | Fri, 14 May 2021 10:26:53 -0400 |

Extreme Precipitation Estimates

| | 5min | 10min | 15min | 30min | 60min | 120min | | 1hr | 2hr | 3hr | 6hr | 12hr | 24hr | 48hr | | 1day | 2day | 4day | 7day | 10day | |
|-------|------|-------|-------|-------|-------|--------|-------|------|------|------|------|------|------|------|-------|------|------|------|-------|-------|-------|
| 1yr | 0.24 | 0.37 | 0.46 | 0.61 | 0.76 | 0.94 | 1yr | 0.65 | 0.88 | 1.07 | 1.30 | 1.57 | 1.89 | 2.11 | 1yr | 1.67 | 2.03 | 2.44 | 2.89 | 3.32 | 1yr |
| 2yr | 0.31 | 0.47 | 0.58 | 0.77 | 0.97 | 1.19 | 2yr | 0.84 | 1.08 | 1.34 | 1.60 | 1.88 | 2.18 | 2.45 | 2yr | 1.93 | 2.36 | 2.78 | 3.27 | 3.75 | 2yr |
| 5yr | 0.36 | 0.56 | 0.70 | 0.94 | 1.20 | 1.48 | 5yr | 1.03 | 1.32 | 1.68 | 1.99 | 2.32 | 2.68 | 3.01 | 5yr | 2.38 | 2.90 | 3.41 | 3.96 | 4.53 | 5yr |
| 10yr | 0.40 | 0.63 | 0.79 | 1.08 | 1.41 | 1.75 | 10yr | 1.22 | 1.53 | 1.99 | 2.36 | 2.74 | 3.14 | 3.53 | 10yr | 2.78 | 3.39 | 3.99 | 4.58 | 5.23 | 10yr |
| 25yr | 0.47 | 0.75 | 0.95 | 1.31 | 1.75 | 2.18 | 25yr | 1.51 | 1.89 | 2.48 | 2.93 | 3.39 | 3.86 | 4.35 | 25yr | 3.42 | 4.18 | 4.89 | 5.55 | 6.32 | 25yr |
| 50yr | 0.53 | 0.85 | 1.09 | 1.52 | 2.05 | 2.58 | 50yr | 1.77 | 2.21 | 2.93 | 3.46 | 3.99 | 4.52 | 5.09 | 50yr | 4.00 | 4.90 | 5.72 | 6.41 | 7.29 | 50yr |
| 100yr | 0.60 | 0.97 | 1.25 | 1.77 | 2.42 | 3.06 | 100yr | 2.09 | 2.59 | 3.48 | 4.09 | 4.70 | 5.29 | 5.97 | 100yr | 4.68 | 5.74 | 6.68 | 7.42 | 8.41 | 100yr |
| 200yr | 0.68 | 1.11 | 1.44 | 2.07 | 2.85 | 3.61 | 200yr | 2.46 | 3.03 | 4.11 | 4.83 | 5.52 | 6.19 | 7.01 | 200yr | 5.48 | 6.74 | 7.80 | 8.58 | 9.72 | 200yr |
| 500yr | 0.82 | 1.34 | 1.75 | 2.54 | 3.55 | 4.51 | 500yr | 3.06 | 3.74 | 5.13 | 6.01 | 6.84 | 7.63 | 8.65 | 500yr | 6.75 | 8.32 | 9.59 | 10.41 | 11.76 | 500yr |

Lower Confidence Limits

| | 5min | 10min | 15min | 30min | 60min | 120min | | 1hr | 2hr | 3hr | 6hr | 12hr | 24hr | 48hr | | 1day | 2day | 4day | 7day | 10day | |
|-------|------|-------|-------|-------|-------|--------|-------|------|------|------|------|------|------|------|-------|------|------|------|------|-------|-------|
| 1yr | 0.18 | 0.28 | 0.35 | 0.47 | 0.57 | 0.67 | 1yr | 0.50 | 0.65 | 0.75 | 0.99 | 1.31 | 1.75 | 1.95 | 1yr | 1.55 | 1.87 | 2.29 | 2.56 | 3.08 | 1yr |
| 2yr | 0.30 | 0.46 | 0.56 | 0.76 | 0.94 | 1.05 | 2yr | 0.81 | 1.03 | 1.16 | 1.43 | 1.71 | 2.14 | 2.40 | 2yr | 1.89 | 2.31 | 2.71 | 3.20 | 3.67 | 2yr |
| 5yr | 0.33 | 0.51 | 0.64 | 0.87 | 1.11 | 1.24 | 5yr | 0.96 | 1.22 | 1.35 | 1.64 | 2.02 | 2.46 | 2.87 | 5yr | 2.18 | 2.76 | 3.22 | 3.75 | 4.27 | 5yr |
| 10yr | 0.36 | 0.56 | 0.69 | 0.97 | 1.25 | 1.40 | 10yr | 1.08 | 1.37 | 1.51 | 1.83 | 2.26 | 2.75 | 3.28 | 10yr | 2.44 | 3.15 | 3.65 | 4.21 | 4.78 | 10yr |
| 25yr | 0.41 | 0.63 | 0.78 | 1.12 | 1.47 | 1.64 | 25yr | 1.27 | 1.60 | 1.75 | 2.12 | 2.61 | 3.19 | 3.90 | 25yr | 2.82 | 3.75 | 4.29 | 4.92 | 5.53 | 25yr |
| 50yr | 0.45 | 0.69 | 0.86 | 1.23 | 1.66 | 1.85 | 50yr | 1.43 | 1.81 | 1.96 | 2.38 | 2.91 | 3.55 | 4.46 | 50yr | 3.14 | 4.29 | 4.86 | 5.56 | 6.19 | 50yr |
| 100yr | 0.49 | 0.74 | 0.93 | 1.35 | 1.85 | 2.09 | 100yr | 1.59 | 2.04 | 2.20 | 2.66 | 3.27 | 4.38 | 5.13 | 100yr | 3.88 | 4.93 | 5.51 | 6.27 | 6.94 | 100yr |
| 200yr | 0.54 | 0.81 | 1.03 | 1.49 | 2.07 | 2.38 | 200yr | 1.79 | 2.33 | 2.48 | 3.00 | 3.67 | 4.43 | 5.88 | 200yr | 3.92 | 5.65 | 6.26 | 7.07 | 7.76 | 200yr |
| 500yr | 0.61 | 0.90 | 1.16 | 1.69 | 2.40 | 2.83 | 500yr | 2.08 | 2.77 | 2.92 | 3.52 | 4.28 | 5.14 | 7.07 | 500yr | 4.55 | 6.80 | 7.41 | 8.31 | 9.03 | 500yr |

Upper Confidence Limits

| | 5min | 10min | 15min | 30min | 60min | 120min | | 1hr | 2hr | 3hr | 6hr | 12hr | 24hr | 48hr | | 1day | 2day | 4day | 7day | 10day | |
|-------|------|-------|-------|-------|-------|--------|-------|------|------|------|------|------|-------|-------|-------|------|------|-------|-------|-------|-------|
| 1yr | 0.27 | 0.42 | 0.51 | 0.68 | 0.84 | 0.98 | 1yr | 0.72 | 0.96 | 1.10 | 1.36 | 1.69 | 2.02 | 2.26 | 1yr | 1.79 | 2.18 | 2.60 | 3.04 | 3.52 | 1yr |
| 2yr | 0.32 | 0.50 | 0.61 | 0.83 | 1.03 | 1.14 | 2yr | 0.89 | 1.11 | 1.24 | 1.52 | 1.86 | 2.27 | 2.53 | 2yr | 2.01 | 2.43 | 2.88 | 3.36 | 3.88 | 2yr |
| 5yr | 0.39 | 0.59 | 0.74 | 1.01 | 1.29 | 1.47 | 5yr | 1.11 | 1.43 | 1.59 | 1.92 | 2.32 | 2.92 | 3.17 | 5yr | 2.59 | 3.05 | 3.61 | 4.21 | 4.80 | 5yr |
| 10yr | 0.45 | 0.69 | 0.86 | 1.20 | 1.54 | 1.78 | 10yr | 1.33 | 1.74 | 1.92 | 2.29 | 2.77 | 3.55 | 3.77 | 10yr | 3.14 | 3.62 | 4.32 | 4.98 | 5.67 | 10yr |
| 25yr | 0.56 | 0.85 | 1.06 | 1.52 | 1.99 | 2.30 | 25yr | 1.72 | 2.25 | 2.46 | 2.89 | 3.52 | 4.58 | 4.75 | 25yr | 4.06 | 4.57 | 5.50 | 6.20 | 7.05 | 25yr |
| 50yr | 0.66 | 1.01 | 1.25 | 1.80 | 2.42 | 2.79 | 50yr | 2.09 | 2.73 | 2.98 | 3.46 | 4.24 | 5.56 | 5.65 | 50yr | 4.92 | 5.44 | 6.59 | 7.34 | 8.34 | 50yr |
| 100yr | 0.78 | 1.18 | 1.48 | 2.14 | 2.94 | 3.39 | 100yr | 2.53 | 3.31 | 3.60 | 4.13 | 5.10 | 5.99 | 6.75 | 100yr | 5.30 | 6.49 | 7.90 | 8.68 | 9.84 | 100yr |
| 200yr | 0.92 | 1.39 | 1.76 | 2.55 | 3.56 | 4.12 | 200yr | 3.07 | 4.03 | 4.36 | 4.93 | 6.12 | 8.19 | 8.02 | 200yr | 7.25 | 7.71 | 9.47 | 10.25 | 11.61 | 200yr |
| 500yr | 1.16 | 1.73 | 2.22 | 3.23 | 4.59 | 5.33 | 500yr | 3.96 | 5.21 | 5.61 | 6.24 | 7.82 | 10.59 | 10.11 | 500yr | 9.37 | 9.72 | 12.01 | 12.80 | 14.47 | 500yr |



Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

May 28, 2021

James Cretekos
Project Engineer
BME Associates
10 Lift Bridge Lane East
Fairport, NY 14450

Re: DEC
New Commercial Building Construction Project
2536 Rochester Rd, Canandaigua, Ontario County, NY
21PR03262
2759

Dear James Cretekos:

Thank you for requesting the comments of the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the project in accordance with the New York State Historic Preservation Act of 1980 (Section 14.09 of the New York Parks, Recreation and Historic Preservation Law). These comments are those of the OPRHP and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8) and its implementing regulations (6 NYCRR Part 617).

Based upon this review, it is the opinion of OPRHP that no properties, including archaeological and/or historic resources, listed in or eligible for the New York State and National Registers of Historic Places will be impacted by this project.

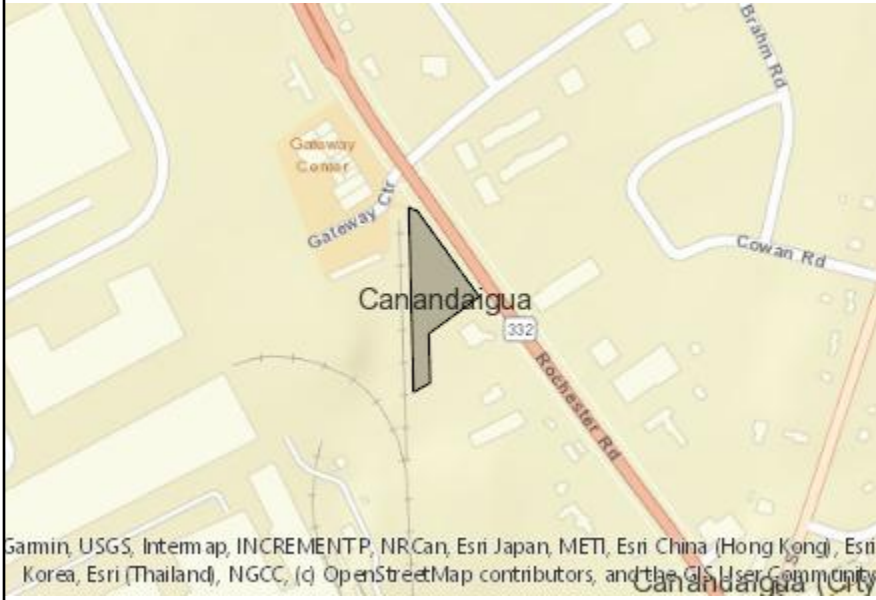
If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

A handwritten signature in black ink, reading "R. Daniel Mackay".

R. Daniel Mackay

Deputy Commissioner for Historic Preservation
Division for Historic Preservation



Disclaimer: The EAF Mapper is a screening tool intended to assist project sponsors and reviewing agencies in preparing an environmental assessment form (EAF). Not all questions asked in the EAF are answered by the EAF Mapper. Additional information on any EAF question can be obtained by consulting the EAF Workbooks. Although the EAF Mapper provides the most up-to-date digital data available to DEC, you may also need to contact local or other data sources in order to obtain data not provided by the Mapper. Digital data is not a substitute for agency determinations.



| | |
|--|--|
| B.i.i [Coastal or Waterfront Area] | No |
| B.i.ii [Local Waterfront Revitalization Area] | No |
| C.2.b. [Special Planning District] | Digital mapping data are not available or are incomplete. Refer to EAF Workbook. |
| E.1.h [DEC Spills or Remediation Site - Potential Contamination History] | Digital mapping data are not available or are incomplete. Refer to EAF Workbook. |
| E.1.h.i [DEC Spills or Remediation Site - Listed] | Digital mapping data are not available or are incomplete. Refer to EAF Workbook. |
| E.1.h.i [DEC Spills or Remediation Site - Environmental Site Remediation Database] | Digital mapping data are not available or are incomplete. Refer to EAF Workbook. |
| E.1.h.iii [Within 2,000' of DEC Remediation Site] | Yes |
| E.1.h.iii [Within 2,000' of DEC Remediation Site - DEC ID] | 835010 |
| E.2.g [Unique Geologic Features] | No |
| E.2.h.i [Surface Water Features] | No |
| E.2.h.ii [Surface Water Features] | No |
| E.2.h.iii [Surface Water Features] | No |
| E.2.h.v [Impaired Water Bodies] | No |
| E.2.i. [Floodway] | Digital mapping data are not available or are incomplete. Refer to EAF Workbook. |
| E.2.j. [100 Year Floodplain] | Digital mapping data are not available or are incomplete. Refer to EAF Workbook. |
| E.2.k. [500 Year Floodplain] | Digital mapping data are not available or are incomplete. Refer to EAF Workbook. |
| E.2.l. [Aquifers] | No |
| E.2.n. [Natural Communities] | No |

| | |
|--|--|
| E.2.o. [Endangered or Threatened Species] | No |
| E.2.p. [Rare Plants or Animals] | No |
| E.3.a. [Agricultural District] | No |
| E.3.c. [National Natural Landmark] | No |
| E.3.d [Critical Environmental Area] | No |
| E.3.e. [National or State Register of Historic Places or State Eligible Sites] | Digital mapping data are not available or are incomplete. Refer to EAF Workbook. |
| E.3.f. [Archeological Sites] | Yes |
| E.3.i. [Designated River Corridor] | No |













May 13, 2021 | 12:07 pm

COVID-19 Updates

The COVID-19 vaccine is here. It is safe, effective and free. Walk in to get vaccinated at sites across the state. Continue to mask up and stay distant where directed.

GET THE FACTS >

Environmental Resource Mapper

| | |
|--|---|
| Search | |
| Tools | |
| Layers and Legend | |
| <input checked="" type="checkbox"/> All Layers | |
| <input checked="" type="checkbox"/> ★ Unique Geological Features | |
| <input checked="" type="checkbox"/> — Waterbody Classifications for Rivers/Streams |  |
| <input checked="" type="checkbox"/> Waterbody Classifications for Lakes |  |
| <input checked="" type="checkbox"/> State Regulated Freshwater Wetlands (Outside of the Adirondack Park) |  |
| <input type="checkbox"/> State Regulated Wetland Checkzone |  |
| <input checked="" type="checkbox"/> Impervious Mussels |  |
| <input type="checkbox"/> Mussel Screening Ponded Waters |  |
| <input type="checkbox"/> Mussel Screening Streams |  |
| <input checked="" type="checkbox"/> Significant Natural Communities |  |
| <input type="checkbox"/> Natural Communities Near This Location |  |
| <input checked="" type="checkbox"/> Rare Plants or Animals |  |
| <input type="checkbox"/> Base Flood Elevation Plus 72/75 Inches Sea-level Rise |  |
| <input type="checkbox"/> Limit to Moderate Wave Action |  |
| Other Wetland Layers | |
| Reference Layers | |
| Tell Me More... | |
| Need A Permit? | |
| Contacts | |



Appendix 2

Water Supply

Water Supply Calculations

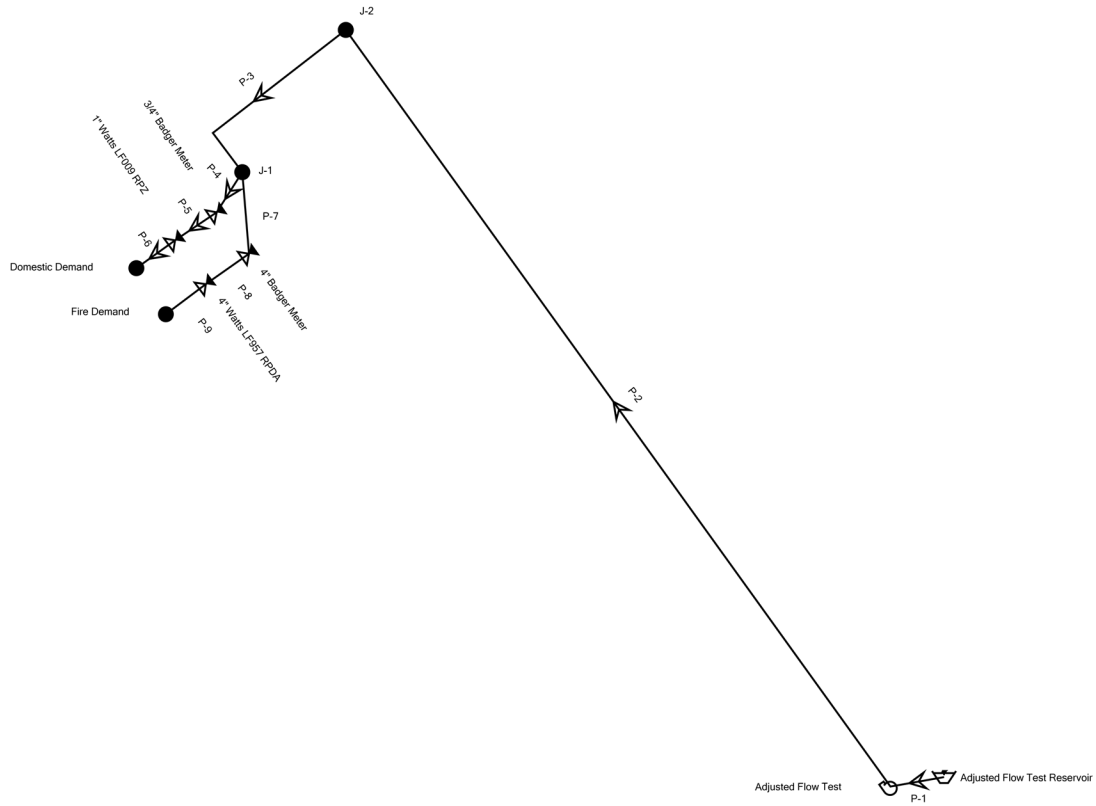
Domestic

Fire

RPZ, RPDA, and Meter Information

Town of Farmington Flow Test and Mapping

Scenario: Domestic



Scenario: Domestic
Current Time Step: 0.000 h
FlexTable: Junction Table

| ID | Label | Elevation (ft) | Zone | Demand Collection | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|----|-----------------|-------------------|--------|-----------------------|-----------------|-------------------------|-------------------|
| 41 | Domestic Demand | 780.20 | <None> | <Collection: 1 item> | 25 | 894.97 | 50 |
| 40 | Fire Demand | 780.20 | <None> | <Collection: 0 items> | 0 | 913.91 | 58 |
| 32 | J-1 | 780.20 | <None> | <Collection: 0 items> | 0 | 937.01 | 68 |
| 33 | J-2 | 778.00 | <None> | <Collection: 0 items> | 0 | 937.05 | 69 |

P:\2759\Calcs\Water\2759 Water Calculations COMPELTE 2021-06-02.wtg

Scenario: Domestic
Current Time Step: 0.000 h
FlexTable: Pipe Table

| ID | Label | Length (Scaled) (ft) | Start Node | Stop Node | Diameter (in) | Material | Hazen- Williams C | Has Check Valve? | Minor Loss Coefficient (Local) | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|----|-------|----------------------------|------------------------------|---------------------|------------------|--------------|-------------------------|------------------------|--------------------------------------|---------------|--------------------|---------------------------------|
| 34 | P-1 | 20 | Adjusted Flow Test Reservoir | Adjusted Flow Test | 48.0 | Ductile Iron | 150.0 | False | 0.000 | 25 | 0.00 | 0.000 |
| 35 | P-2 | 350 | Adjusted Flow Test | J-2 | 20.0 | Ductile Iron | 130.0 | False | 0.000 | 25 | 0.03 | 0.000 |
| 36 | P-3 | 82 | J-2 | J-1 | 4.0 | Ductile Iron | 130.0 | False | 0.000 | 25 | 0.64 | 0.001 |
| 42 | P-4 | 18 | J-1 | 3/4" Badger Meter | 1.0 | Copper | 135.0 | False | 0.000 | 25 | 10.21 | 0.460 |
| 43 | P-5 | 19 | 3/4" Badger Meter | 1" Watts LF009 RPZ | 1.0 | Copper | 135.0 | False | 0.000 | 25 | 10.21 | 0.461 |
| 44 | P-6 | 18 | 1" Watts LF009 RPZ | Domestic Demand | 1.0 | Copper | 135.0 | False | 0.000 | 25 | 10.21 | 0.460 |
| 45 | P-7 | 31 | J-1 | 4" Badger Meter | 4.0 | Ductile Iron | 130.0 | False | 0.000 | 0 | 0.00 | 0.000 |
| 58 | P-8 | 20 | 4" Badger Meter | 4" Watts LF957 RPDA | 4.0 | Ductile Iron | 130.0 | False | 0.000 | 0 | 0.00 | 0.000 |
| 59 | P-9 | 19 | 4" Watts LF957 RPDA | Fire Demand | 4.0 | Ductile Iron | 130.0 | False | 0.000 | 0 | 0.00 | 0.000 |

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Scenario: Domestic
Current Time Step: 0.000 h
FlexTable: Pump Table

| ID | Label | Elevation (ft) | Pump Definition | Status (Initial) | Hydraulic Grade (Suction) (ft) | Hydraulic Grade (Discharge) (ft) | Flow (Total) (gpm) | Pump Head (ft) |
|----|--------------------|-------------------|-------------------------------|---------------------|---|---|--------------------------|----------------------|
| 30 | Adjusted Flow Test | 780.00 | Adjusted Flow Test 2021-05-24 | On | 780.00 | 937.05 | 25 | 157.05 |

P:\2759\Calcs\Water\2759 Water Calculations COMPELTE 2021-06-02.wtg

Scenario: Domestic
Current Time Step: 0.000 h
FlexTable: GPV Table

| ID | Label | Elevation (ft) | Diameter (Valve) (in) | Minor Loss Coefficient (Local) | General Purpose Valve Headloss Curve | Flow (gpm) | Hydraulic Grade (From) (ft) | Hydraulic Grade (To) (ft) | Headloss (ft) |
|----|---------------------|-------------------|-----------------------------|---|---|---------------|--------------------------------------|---------------------------------|------------------|
| 37 | 3/4" Badger Meter | 780.20 | 0.8 | 0.000 | 0.75" Badger Recordal Disc Meter Model 35 | 25 | 934.70 | 921.99 | 12.72 |
| 38 | 1" Watts LF009 RPZ | 780.20 | 1.0 | 0.000 | 1" Watts LF009 RPZ | 25 | 921.53 | 897.27 | 24.26 |
| 39 | 4" Badger Meter | 780.20 | 4.0 | 0.000 | 4" Badger Recordall Fire Meter | 0 | 937.01 | 937.01 | 0.00 |
| 57 | 4" Watts LF957 RPDA | 780.20 | 4.0 | 0.000 | 4" Watts LF957 RPDA | 0 | 937.01 | 913.91 | 23.10 |

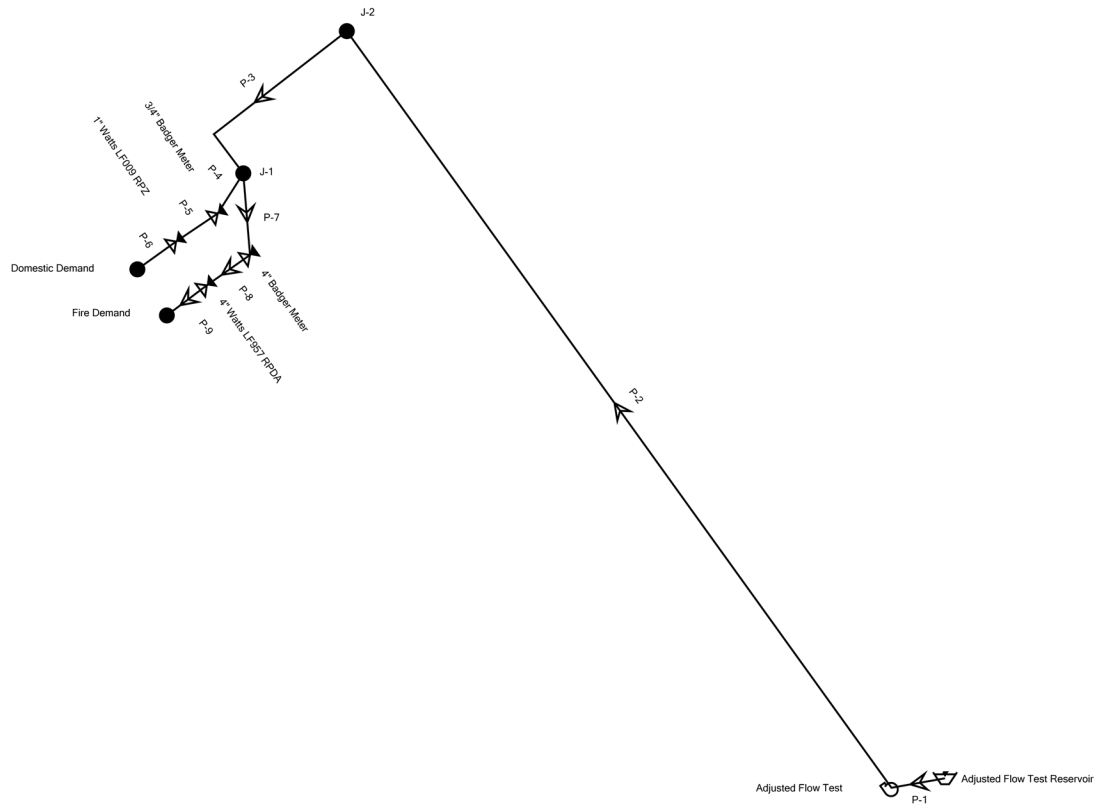
P:\2759\Calcs\Water\2759 Water Calculations COMPELTE 2021-06-02.wtg

Scenario: Domestic
Current Time Step: 0.000 h
FlexTable: Reservoir Table

| ID | Label | Elevation (ft) | Zone | Flow (Out net) (gpm) | Hydraulic Grade (ft) |
|----|------------------------------|-------------------|--------|-------------------------------|-------------------------|
| 31 | Adjusted Flow Test Reservoir | 780.00 | <None> | 25 | 780.00 |

P:\2759\Calcs\Water\2759 Water Calculations COMPELTE 2021-06-02.wtg

Scenario: Fire



Scenario: Fire
Current Time Step: 0.000 h
FlexTable: Junction Table

| ID | Label | Elevation (ft) | Zone | Demand Collection | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|----|-----------------|-------------------|--------|-----------------------|-----------------|-------------------------|-------------------|
| 41 | Domestic Demand | 780.20 | <None> | <Collection: 0 items> | 0 | 909.02 | 56 |
| 40 | Fire Demand | 780.20 | <None> | <Collection: 1 item> | 300 | 901.07 | 52 |
| 32 | J-1 | 780.20 | <None> | <Collection: 0 items> | 0 | 929.81 | 65 |
| 33 | J-2 | 778.00 | <None> | <Collection: 0 items> | 0 | 934.50 | 68 |

P:\2759\Calcs\Water\2759 Water Calculations COMPELTE 2021-06-02.wtg

Scenario: Fire
Current Time Step: 0.000 h
FlexTable: Pipe Table

| ID | Label | Length (Scaled) (ft) | Start Node | Stop Node | Diameter (in) | Material | Hazen- Williams C | Has Check Valve? | Minor Loss Coefficient (Local) | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|----|-------|----------------------------|------------------------------|---------------------|------------------|--------------|-------------------------|------------------------|--------------------------------------|---------------|--------------------|---------------------------------|
| 34 | P-1 | 20 | Adjusted Flow Test Reservoir | Adjusted Flow Test | 48.0 | Ductile Iron | 150.0 | False | 0.000 | 300 | 0.05 | 0.000 |
| 35 | P-2 | 350 | Adjusted Flow Test | J-2 | 20.0 | Ductile Iron | 130.0 | False | 0.000 | 300 | 0.31 | 0.000 |
| 36 | P-3 | 82 | J-2 | J-1 | 4.0 | Ductile Iron | 130.0 | False | 0.000 | 300 | 7.66 | 0.057 |
| 42 | P-4 | 18 | J-1 | 3/4" Badger Meter | 1.0 | Copper | 135.0 | False | 0.000 | 0 | 0.00 | 0.000 |
| 43 | P-5 | 19 | 3/4" Badger Meter | 1" Watts LF009 RPZ | 1.0 | Copper | 135.0 | False | 0.000 | 0 | 0.00 | 0.000 |
| 44 | P-6 | 18 | 1" Watts LF009 RPZ | Domestic Demand | 1.0 | Copper | 135.0 | False | 0.000 | 0 | 0.00 | 0.000 |
| 45 | P-7 | 31 | J-1 | 4" Badger Meter | 4.0 | Ductile Iron | 130.0 | False | 0.000 | 300 | 7.66 | 0.057 |
| 58 | P-8 | 20 | 4" Badger Meter | 4" Watts LF957 RPDA | 4.0 | Ductile Iron | 130.0 | False | 0.000 | 300 | 7.66 | 0.057 |
| 59 | P-9 | 19 | 4" Watts LF957 RPDA | Fire Demand | 4.0 | Ductile Iron | 130.0 | False | 0.000 | 300 | 7.66 | 0.057 |

P:\2759\Calcs\Water\2759 Water Calculations COMPELTE 2021-06-02.wtg

Scenario: Fire
Current Time Step: 0.000 h
FlexTable: Pump Table

| ID | Label | Elevation (ft) | Pump Definition | Status (Initial) | Hydraulic Grade (Suction) (ft) | Hydraulic Grade (Discharge) (ft) | Flow (Total) (gpm) | Pump Head (ft) |
|----|--------------------|-------------------|-------------------------------|---------------------|---|---|--------------------------|----------------------|
| 30 | Adjusted Flow Test | 780.00 | Adjusted Flow Test 2021-05-24 | On | 780.00 | 934.51 | 300 | 154.51 |

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Scenario: Fire
Current Time Step: 0.000 h
FlexTable: GPV Table

| ID | Label | Elevation (ft) | Diameter (Valve) (in) | Minor Loss Coefficient (Local) | General Purpose Valve Headloss Curve | Flow (gpm) | Hydraulic Grade (From) (ft) | Hydraulic Grade (To) (ft) | Headloss (ft) |
|----|---------------------|-------------------|-----------------------------|---|---|---------------|--------------------------------------|---------------------------------|------------------|
| 37 | 3/4" Badger Meter | 780.20 | 0.8 | 0.000 | 0.75" Badger Recordal Disc Meter Model 35 | 0 | 929.81 | 929.81 | 0.00 |
| 38 | 1" Watts LF009 RPZ | 780.20 | 1.0 | 0.000 | 1" Watts LF009 RPZ | 0 | 929.81 | 909.02 | 20.79 |
| 39 | 4" Badger Meter | 780.20 | 4.0 | 0.000 | 4" Badger Recordall Fire Meter | 300 | 929.52 | 919.89 | 9.63 |
| 57 | 4" Watts LF957 RPDA | 780.20 | 4.0 | 0.000 | 4" Watts LF957 RPDA | 300 | 919.83 | 901.35 | 18.48 |

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Scenario: Fire
Current Time Step: 0.000 h
FlexTable: Reservoir Table

| ID | Label | Elevation (ft) | Zone | Flow (Out net) (gpm) | Hydraulic Grade (ft) |
|----|------------------------------|-------------------|--------|-------------------------------|-------------------------|
| 31 | Adjusted Flow Test Reservoir | 780.00 | <None> | 300 | 780.00 |

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Badger Meter

Recordall® Disc Meters

Lead-Free Bronze Alloy, Sizes 5/8, 5/8 x 3/4, 3/4 & 1 inch
NSF/ANSI Standards 61 and 372 Certified



Model 25—5/8 in., 5/8 x 3/4 in.



Model 35—3/4 in.



Model 55—1 in.



Model 70—1 in.

DESCRIPTION

The Recordall Disc Series meters meet or exceed the most recent revision of AWWA Standard C700 and are available in a lead-free bronze alloy. The meters comply with the lead-free provisions of the Safe Drinking Water Act, are certified to NSF/ANSI Standards 61 and 372 (Trade Designations: M25-LL, M35-LL, M55-LL, M70-LL) and carry the NSF-61 mark on the housing. All components of the lead-free bronze alloy meter (housing, measuring element, seals, and so on) comprise the certified system.

Applications: For use in measurement of potable cold water in residential, commercial and industrial services where flow is in one direction only.

Operation: Water flows through the meter's strainer and into the measuring chamber where it causes the disc to nutate. The disc, which moves freely, nutates on its own ball, guided by a thrust roller. A drive magnet transmits the motion of the disc to a follower magnet located within the permanently sealed register. The follower magnet is connected to the register gear train. The gear train reduces the disc nutations into volume totalization units displayed on the register or encoder face.

Operating Performance: The Recordall Disc Series meters meet or exceed registration accuracy for the low flow rates (95%), normal operating flow rates ($100 \pm 1.5\%$), and maximum continuous operation flow rates as specifically stated in AWWA Standard C700.

Construction: Recordall Disc meter construction, which complies with ANSI/AWWA standard C700, consists of three basic components: meter housing, measuring chamber and permanently sealed register or encoder. The meter is available in a lead-free bronze alloy with externally-threaded spuds. A corrosion-resistant engineered polymer material is used for the measuring chamber.

Magnetic Drive: Direct magnetic drive, through the use of high-strength magnets, provides positive, reliable and dependable register coupling for straight-reading or AMR/AMI meter reading options.

Tamper-Proof Features: Unauthorized removal of the register or encoder is inhibited by the option of a tamper detection seal wire screw, TORX® tamper-resistant seal screw or the proprietary tamper-resistant keyed seal screw. Each can be installed at the meter site or at the factory.

Maintenance: Badger Meter Recordall Disc Series meters are designed and manufactured to provide long-term service with minimal maintenance. When maintenance is required, it can be performed easily either at the meter installation or at any other convenient location.

To simplify maintenance, the register, measuring chamber, and strainer can be replaced without removing the meter housing from the installation. No change gears are required for accuracy calibration. Interchangeability of parts among like-sized meters and meter models also minimizes spare parts inventory investment. The built-in strainer has an effective straining area of twice the inlet size.

Connections: Tailpieces/Unions for installations of meters on various pipe types and sizes, including misaligned pipes, are available as an option.

Meter Spud and Connection Sizes

| Model | Size Designation (in.) | × | "L" Laying Length (in.) | "B" Bore Dia. (in.) | Coupling Nut and Spud Thread (in.) | Tailpiece Pipe Thread (NPT) (in.) |
|-------|------------------------|---|-------------------------|---------------------|------------------------------------|-----------------------------------|
| 25 | 5/8 | × | 7-1/2 | 5/8 | 3/4 (5/8) | 1/2 |
| | 5/8 x 3/4 | × | 7-1/2 | 5/8, 3/4 | 1 (3/4) | 3/4 |
| 35 | 3/4 | × | 7-1/2 | 3/4 | 1 (3/4) | 3/4 |
| | 3/4 | × | 9 | 3/4 | 1 (3/4) | 3/4 |
| | 3/4 x 1 | × | 9 | 3/4 | 1-1/4 (1) | 1 |
| 55 | 1 | × | 10-3/4 | 1 | 1-1/4 (1) | 1 |
| 70 | 1 | × | 10-3/4 | 1 | 1-1/4 (1) | 1 |

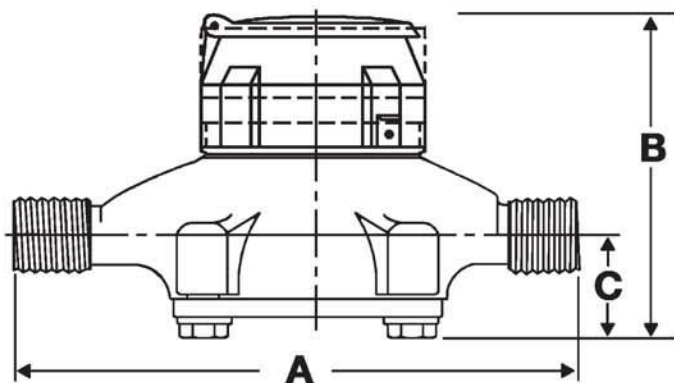
SPECIFICATIONS

| | Model 25 (5/8 in. & 5/8 x 3/4 in.) | Model 35 (3/4 in.) | Model 55 (1 in.) | Model 70 (1 in.) |
|--|--|--|--|---|
| Typical Operating Range (100% ± 1.5%) | 0.5...25 gpm (0.11...5.7 m³/hr) | 0.75...35 gpm (0.17...7.9 m³/hr) | 1...55 gpm (0.23...12.5 m³/hr) | 1.25...70 gpm (0.28...16 m³/hr) |
| Low Flow | 0.25 gpm (0.057 m³/hr) Min. 98.5% | 0.375 gpm (0.085 m³/hr) Min. 97% | 0.5 gpm (0.11 m³/hr) Min. 95% | 0.75 gpm (0.17 m³/hr) Min. 95% |
| Maximum Continuous Operation | 15 gpm (3.4 m³/hr) | 25 gpm (5.7 m³/hr) | 40 gpm (9.1 m³/hr) | 50 gpm (11.3 m³/hr) |
| Pressure Loss at Maximum Continuous Operation | 5/8 in. size: 3.5 psi @ 15 gpm (0.24 bar @ 3.4 m³/hr) 5/8 x 3/4 in. size: 2.8 psi @ 15 gpm (0.19 bar @ 3.4 m³/hr) | 5 psi @ 25 gpm (0.37 bar @ 5.7 m³/hr) | 3.4 psi @ 40 gpm (0.23 bar @ 9.1 m³/hr) | 6.5 psi @ 50 gpm (0.45 bar @ 11.3 m³/hr) |
| Maximum Operating Temperature | 80° F (26° C) | | | |
| Maximum Operating Pressure | 150 psi (10 bar) | | | |
| Measuring Element | Nutting disc, positive displacement | | | |
| Meter Connections | <i>Available in NL bronze and engineered polymer to fit spud thread bore diameter sizes:</i> | | | |
| | 5/8 in. size: 5/8 in. (DN 15 mm) 5/8 x 3/4 in. size: 3/4 in. (DN 15 mm) | 3/4 in. (DN 20 mm) | 1 in. (DN 25 mm) | 1 in. (DN 25 mm) |

MATERIALS

| | Model 25 (5/8 in. & 5/8 × 3/4 in.) | Model 35 (3/4 in.) | Model 55 (1 in.) | Model 70 (1 in.) |
|-------------------------|--|-----------------------------------|---------------------|---------------------|
| Meter Housing | Lead-free bronze alloy | | | |
| Housing Bottom Plates | Lead-free bronze alloy, cast iron, engineered polymer | Cast iron, lead-free bronze alloy | | |
| Measuring Chamber | Engineered polymer | | | |
| Disc | Engineered polymer | | | |
| Trim | Stainless steel | | | |
| Strainer | Engineered polymer | | | |
| Disc Spindle | Stainless steel | Stainless steel | Engineered polymer | Stainless steel |
| Magnet | Ceramic | Ceramic | Polymer bonded | Ceramic |
| Magnet Spindle | Stainless steel | Stainless steel | Engineered polymer | Stainless steel |
| Register Lid and Shroud | Engineered polymer, bronze | | | |

DIMENSIONS



| Meter Size | Model | A Laying Length | B Height Reg. | C Centerline Base | Width | Approx. Shipping Weight |
|---------------------------|-------|---------------------|----------------------|----------------------|--------------------|-------------------------|
| 5/8 in. (15 mm) | 25 | 7-1/2 in. (190 mm) | 4-15/16 in. (125 mm) | 1-11/16 in. (42 mm) | 4-1/4 in. (108 mm) | 4-1/2 lb (2 kg) |
| 5/8 in. x 3/4 in. (15 mm) | | 7-1/2 in. (190 mm) | 4-15/16 in. (125 mm) | 1-11/16 in. (42 mm) | 4-1/4 in. (108 mm) | 4-1/2 lb (2 kg) |
| 3/4 in. (20 mm) | 35 | 7-1/2 in. (190 mm) | 5-1/4 in. (133 mm) | 1-5/8 in. (41 mm) | 5 in. (127 mm) | 5-1/2 lb (2.5 kg) |
| 3/4 in. (20 mm) | | 9 in. (229 mm) | 5-1/4 in. (133 mm) | 1-5/8 in. (41 mm) | 5 in. (127 mm) | 5-3/4 lb (2.6 kg) |
| 3/4 in. x 1 in. (20 mm) | | 9 in. (229 mm) | 5-1/4 in. (133 mm) | 1-5/8 in. (41 mm) | 5 in. (127 mm) | 6 lb (2.7 kg) |
| 1 in. (25 mm) | 55 | 10-3/4 in. (273 mm) | 6 in. (152 mm) | 2-1/32 in. (52 mm) | 6-1/4 in. (159 mm) | 8-3/4 lb (3.9 kg) |
| 1 in. (25 mm) | 70 | 10-3/4 in. (273 mm) | 6-1/2 in. (165 mm) | 2-5/16 in. (59 mm) | 7-3/4 in. (197 mm) | 11-1/2 lb (5.2 kg) |

REGISTERS / ENCODERS

Standard—Sweep-Hand Registration

The standard register is a straight-reading, permanently sealed magnetic drive register. Dirt, moisture, tampering and lens fogging problems are eliminated. The register has a six-odometer wheel totalization display, 360° test circle with center sweep hand, and flow finder to detect leaks. Register gearing is made of self-lubricating engineered polymer, which minimizes friction and provides long life. The multi-position register simplifies meter installation and reading. The register capacity is 10,000,000 gallons (1,000,000 ft³, 100,000 m³).

A Model 25 register is used in the following example:



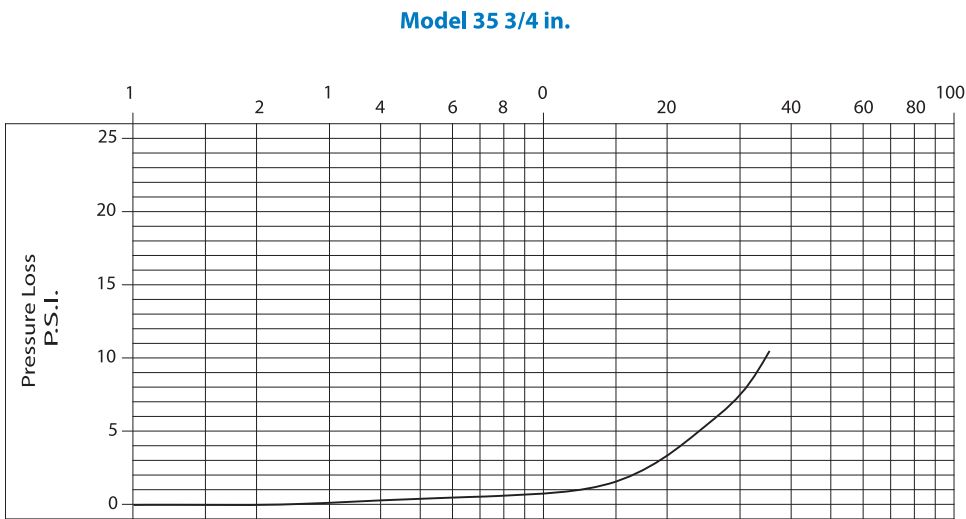
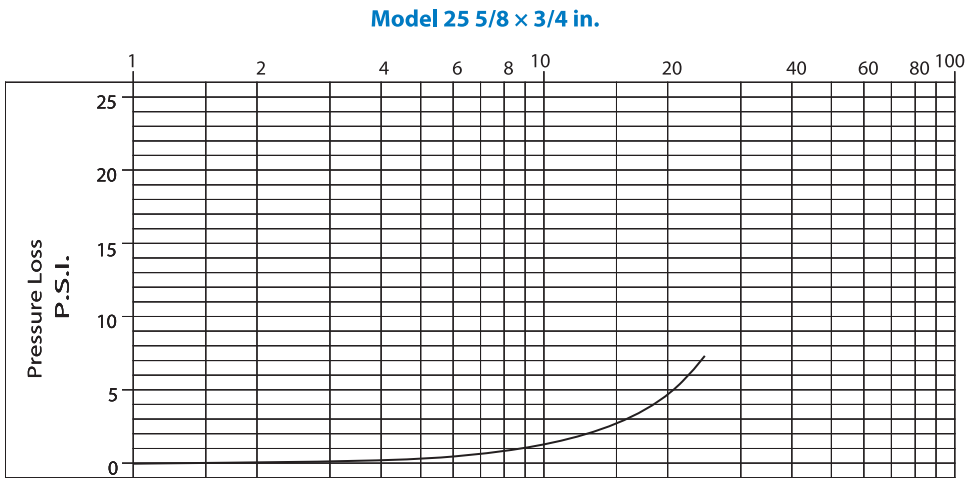
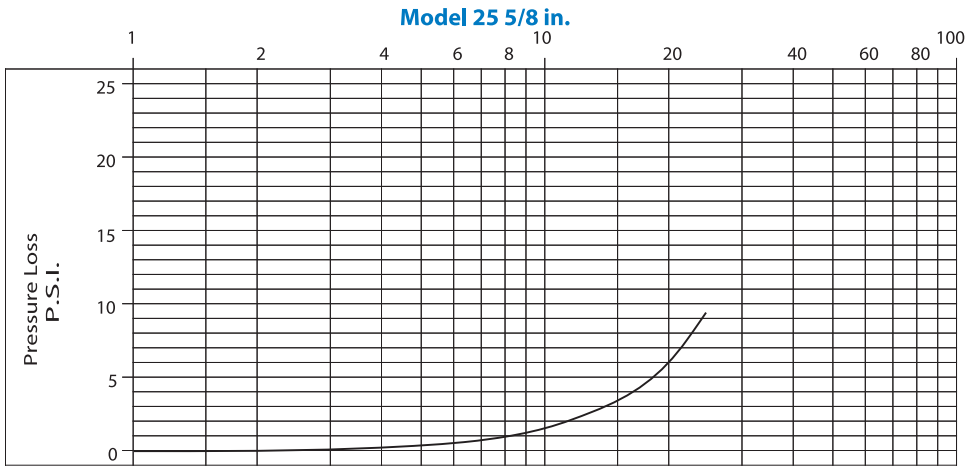
| Model | Gallon | Cubic Feet | Cubic Meter |
|--------------------|--------|------------|-------------|
| 25 (5/8 in.) | 10 | 1 | 0.1/0.01 |
| 25 (5/8 x 3/4 in.) | 10 | 1 | 0.1/0.01 |
| 35 | 10 | 1 | 0.1 |
| 55 | 10 | 1 | 0.1 |
| 70 | 10 | 1 | 0.1 |

Optional—Encoders for AMR/AMI Reading Solutions

AMR/AMI solutions are available for all Recordall Disc Series meters. All reading options can be removed from the meter without disrupting water service. Badger Meter encoders provide years of reliable, accurate readings for a variety of applications and are also available pre-wired to Badger Meter approved AMR/AMI solutions. See details at www.badgermeter.com.

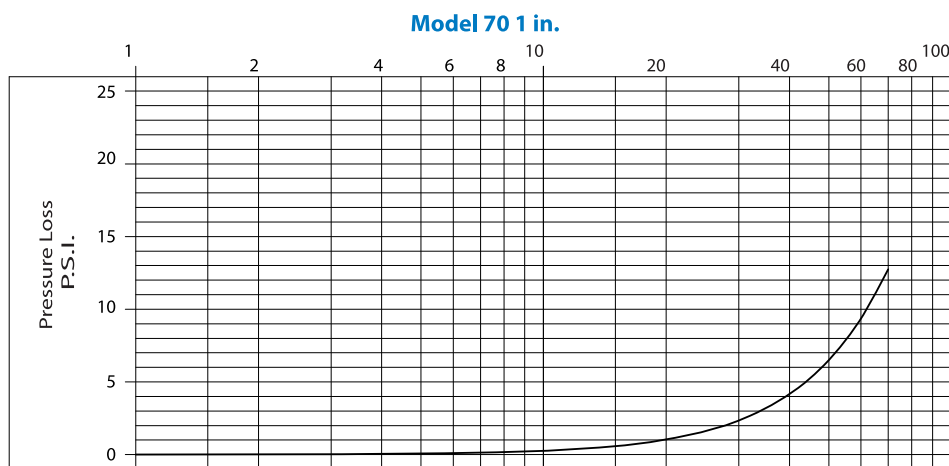
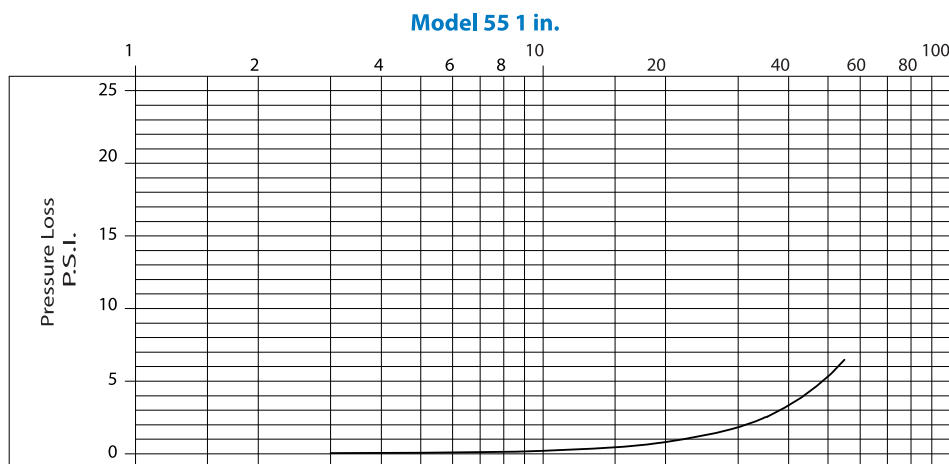
PRESSURE LOSS CHARTS

Rate of Flow in Gallons per Minute



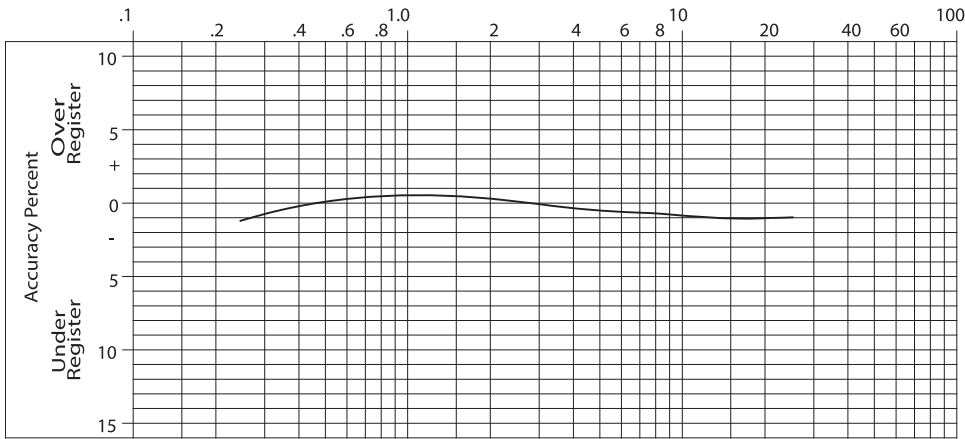
PRESSURE LOSS CHARTS (CONTINUED)

Rate of Flow in Gallons per Minute

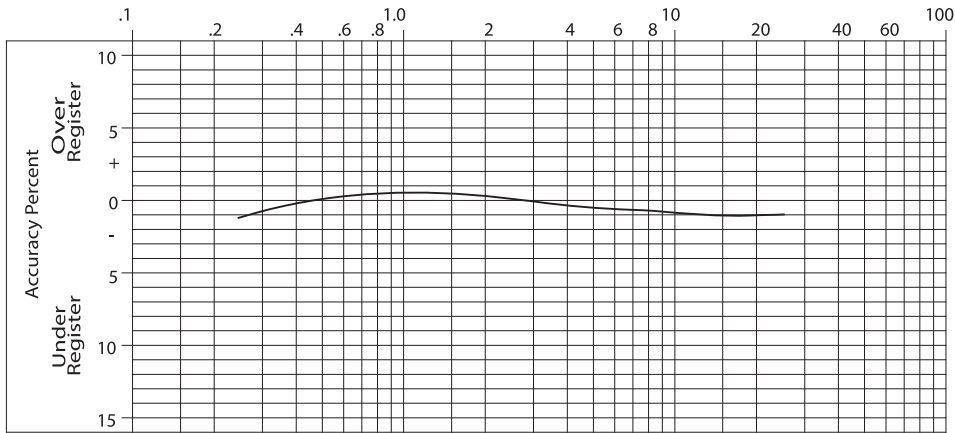


ACCURACY CHARTS

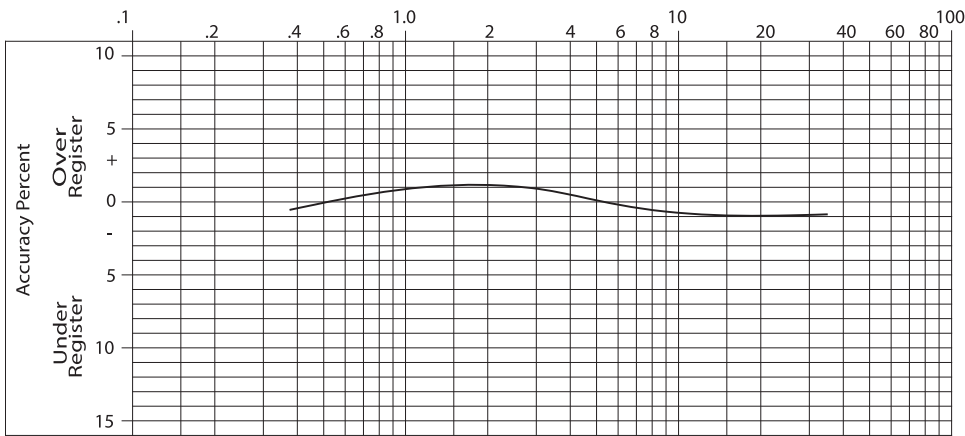
Model 25 5/8 in.



Model 25 5/8 x 3/4 in.

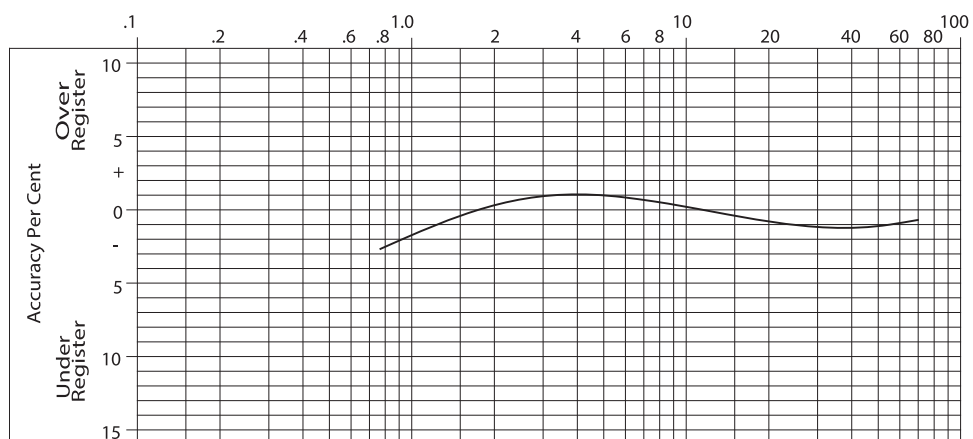


Model 35 3/4 in.

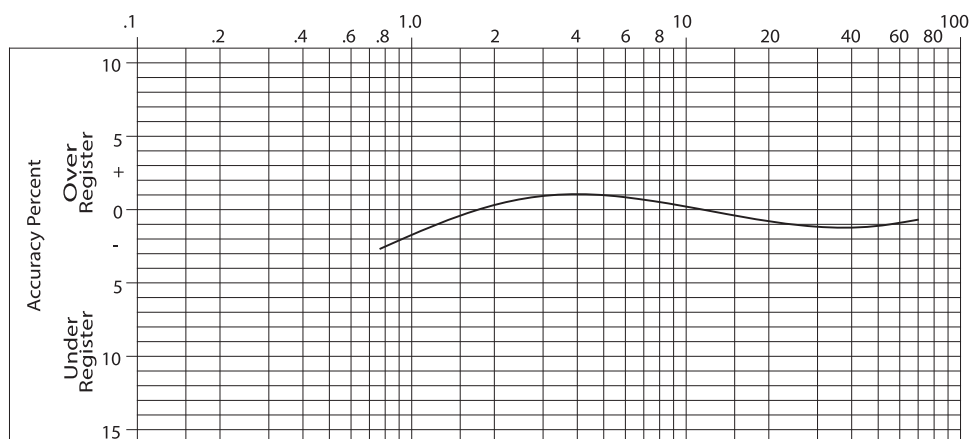


ACCURACY CHARTS (CONTINUED)

Model 55 1 in.



Model 70 1 in.



Making Water Visible®

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www.badgermeter.com

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For Health Hazard Applications

Job Name _____
 Job Location _____
 Engineer _____
 Approval _____

Contractor _____
 Approval _____
 Contractor's P.O. No. _____
 Representative _____

LEAD FREE*

Series LF009 Reduced Pressure Zone Assemblies

Sizes: 1/4" – 3" (8 – 80mm)

Series LF009 Reduced Pressure Zone Assemblies are designed to protect potable water supplies in accordance with national plumbing codes and water authority requirements. This series can be used in a variety of installations, including the prevention of health hazard cross-connections in piping systems or for containment at the service line entrance. The LF009 features Lead Free* construction to comply with Lead Free* installation requirements.

This series features two in-line, independent check valves, captured springs and replaceable check seats with an intermediate relief valve. Its compact modular design facilitates easy maintenance and assembly access. Sizes 1/4" – 1" (8 – 25mm) shutoffs have tee handles.

Features

- Single access cover and modular check construction for ease of maintenance
- Top entry – all internals immediately accessible
- Captured springs for safe maintenance
- Internal relief valve for reduced installation clearances
- Replaceable seats for economical repair
- Lead Free* cast copper silicon alloy body construction for durability 1/4" – 2" (8 – 50mm)
- Fused epoxy coated cast iron body 2 1/2" and 3" (65 and 80mm)
- Ball valve test cocks — screwdriver slotted 1/4" – 2" (8 – 50mm)
- Large body passages provides low pressure drop
- Compact, space saving design
- No special tools required for servicing

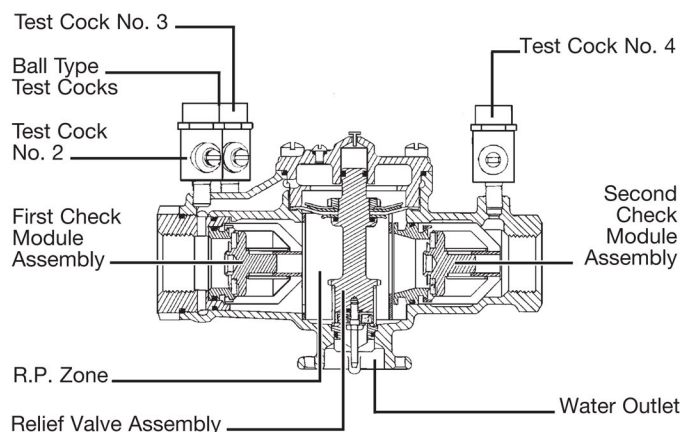
Specifications

A Reduced Pressure Zone Assembly shall be installed at each potential health hazard location to prevent backflow due to backsiphonage and/or backpressure. The assembly shall consist of an internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs and silicone seat discs. Seats and seat discs shall be replaceable in both check modules and the relief valve. There shall be no threads or screws in the waterway exposed to line fluids. Service of all internal components shall be through a single access cover secured with stainless steel bolts. Body and shutoffs shall be constructed using Lead Free* cast copper silicon alloy materials. Lead Free* reduced pressure zone assembly shall comply with state codes and standards, where applicable, requiring reduced lead content.

The assembly shall also include two resilient seated isolation valves, four resilient seated test cocks and an air gap drain fitting. The assembly shall meet the requirements of: USC; ASSE Std. 1013; AWWA Std. C511; CSA B64.4. Shall be a Watts Series LF009.



LF009



Now Available WattsBox Insulated Enclosures.

For more information, send for literature ES-WB.

NOTICE

Inquire with governing authorities for local installation requirements

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

Available Models: 1/4" – 2" (8 – 50mm)

Suffix:

- QT – quarter-turn ball valves
S – strainer
LF – without shutoff valves
PC – internal polymer coating
W/Press** – press inlet x press outlet (1/2" – 2" only)

Prefix:

- U – union connections

Available Models: 2 1/2" – 3" (65 – 80mm)

Suffix:

- NRS – non-rising stem resilient seated gate valves
OSY – UL/FM outside stem and yoke resilient seated gate valves
S-FDA – FDA epoxy coated strainer
QT-FDA – FDA epoxy coated quarter-turn ball valves
LF – without shutoff valves

Note: The installation of a drain line is recommended. When installing a drain line, an air gap is necessary (see ES-AG).

Materials: 1/4" – 2" (8 – 50mm)

Lead Free* cast copper silicon alloy body construction, silicone rubber disc material in the first and second check plus the relief valve. Replaceable polymer check seats for first and second checks. Removable Relief valve seats. Stainless steel cover bolts.

Standardly furnished with NPT body connections. Model LF009QT furnished with quarter-turn, full port, resilient seated, Lead Free* cast copper silicon alloy body ball valve shutoffs.

Materials: 2 1/2" and 3" (65 – 80mm)

- (FDA approved) Epoxy coated cast iron unibody with plastic seats
- Relief valve with stainless steel seat and trim
- Lead Free cast copper silicon alloy body ball valve test cocks

Pressure / Temperature

Sizes 1/4" – 2" (8 – 50mm) Suitable for supply pressure up to 175psi (12.1 bar). Water temperature: 33°F – 180°F (0.5° – 82°C).

Sizes 2 1/2" and 3" (65 and 80mm) are suitable for supply pressures up to 175psi (12.1 bar) and water temperature at 110°F (43°C) continuous, 140°F (60°C) intermittent.

Standards

USC
ASSE No. 1013
AWWA C511
CSA B64.4
IAPMO File No. 1563.



Approvals

ASSE, AWWA, CSA, IAPMO

Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.

Approval models QT, PC, NRS, OSY.

UL Classified

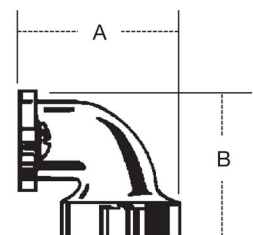
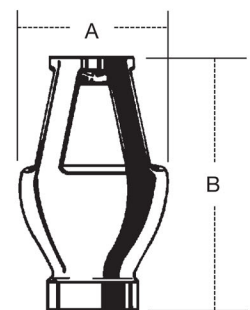
2 1/2" and 3" (65 and 80mm) with OSY gate valves.

3/4" – 2" (20-50mm) without shutoff valves (-LF)
(except LF009M3LF)

Air Gaps and Elbows

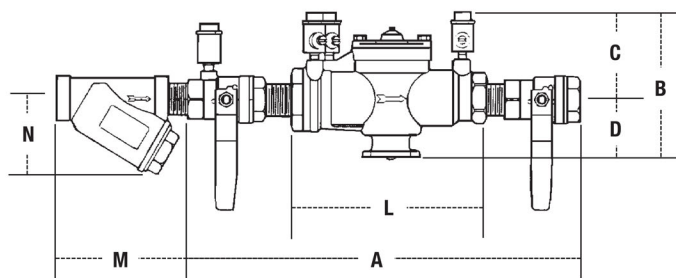
| MODEL | DRAIN OUTLET | DIMENSIONS | | | | WEIGHT | |
|----------------------|---|------------|-----|-------|-----|--------|------|
| | | A | | B | | lbs. | kgs. |
| | for 909, 009 and 993 sizes | in. | mm | in. | mm | | |
| 909AGA | 1/4"-1/2" 009, 3/4" 009M2/M3 | 1/2 | 13 | 2 3/8 | 60 | 0.625 | 0.28 |
| 909AGC | 3/4"-1" 009/909, 1"-1 1/2" 009M2 | 1 | 25 | 3 1/4 | 83 | 1.5 | 0.68 |
| 909AGF | 1 1/4"-2" 009M1, 1 1/4"-3" 009/909, 2" 009M2, 4"-6" 993 | 2 | 51 | 4 3/8 | 111 | 3.25 | 1.47 |
| 909AGK | 4"-6" 909, 8"-10" 909M1 | 3 | 76 | 6 3/8 | 162 | 6.25 | 2.83 |
| 909AGM | 8"-10" 909 | 4 | 102 | 7 3/8 | 187 | 15.5 | 7.03 |
| 909ELA | 1/4"-1/2" 009, 3/4" 009M2/M3 | – | – | – | – | – | – |
| 909ELC | 3/4"-1" 009/909 | – | – | 2 3/8 | 60 | 0.38 | 0.17 |
| * 909ELF | 1 1/4"-2" 009M1, 1 1/4"-2" 009/909, 2" 009M2, 4"-6" 993 | – | – | 3 3/8 | 92 | 2 | 0.91 |
| * 909ELH Vertical | 2 1/2"-3" 009/909 | – | – | – | – | – | – |

** Viega ProPress® connections are optional factory-installed fitting on each end of the approved/certified assembly.



Dimensions – Weight

Size: 1/4" – 2" (8 – 50mm) LF009

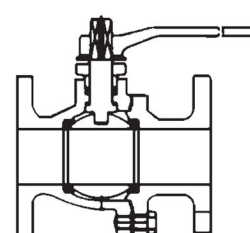
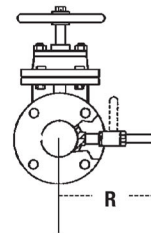
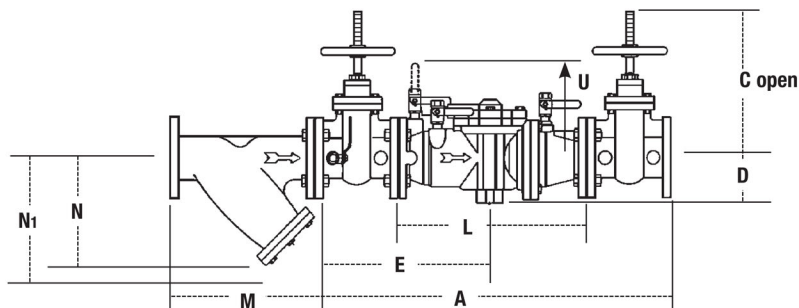


LF009 1/4" – 2"

| SIZE (DN) | | DIMENSIONS (APPROX.) | | | | | | | | | | | | WEIGHT | | | |
|------------|-----------|----------------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|
| | | A | | B | | C | | D | | L | | M | | N | | | |
| <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in</i> | <i>mm</i> | <i>in</i> | <i>mm</i> | <i>lbs.</i> | <i>kgs.</i> |
| ¼ | 8 | 10 | 250 | 4⅝ | 117 | 3⅝ | 86 | 1¼ | 32 | 5½ | 140 | 2⅝ | 60 | 2½ | 64 | 5 | 2 |
| ⅜ | 10 | 10 | 250 | 4⅝ | 117 | 3⅝ | 86 | 1¼ | 32 | 5½ | 140 | 2⅝ | 60 | 2½ | 64 | 5 | 2 |
| ½ | 15 | 10 | 250 | 4⅝ | 117 | 3⅝ | 86 | 1¼ | 32 | 5½ | 140 | 2⅝ | 70 | 2¼ | 57 | 5 | 2 |
| ¾ | 20 | 10¾ | 273 | 5 | 127 | 3½ | 89 | 1½ | 38 | 6¾ | 171 | 3⅞ | 81 | 2¾ | 70 | 6 | 3 |
| 1 | 25 | 14½ | 368 | 5½ | 140 | 3 | 76 | 2½ | 64 | 9½ | 241 | 3¾ | 95 | 3 | 76 | 12 | 5 |
| 1¼ | 32 | 17⅝ | 441 | 6 | 150 | 3½ | 89 | 2½ | 64 | 11⅝ | 289 | 4⅞ | 113 | 3½ | 89 | 15 | 6 |
| 1½ | 40 | 17⅞ | 454 | 6 | 150 | 3½ | 89 | 2½ | 64 | 11⅞ | 283 | 4⅞ | 124 | 4 | 102 | 16 | 7 |
| 2 | 50 | 21⅜ | 543 | 7¾ | 197 | 4½ | 114 | 3¼ | 83 | 13½ | 343 | 5⅞ | 151 | 5 | 127 | 30 | 13 |

Dimensions – Weight

Size: 2 1/2" and 3" (65 and 80mm) LF009



Watts G-4000 Series
QT – Ball Valves

| STRAINER SIZE | | DIMENSIONS (APPROX.) | | | | | | WEIGHT | |
|---------------|----|----------------------|-----|-------|-----|-------|-----|--------|------|
| in. | mm | M | | N | | N1† | | lbs. | kgs. |
| 2 1/2 | 65 | 10 | 254 | 6 1/2 | 165 | 9 3/4 | 248 | 28 | 12.7 |
| 3 | 80 | 10 1/8 | 257 | 7 | 178 | 10 | 254 | 34 | 15.4 |

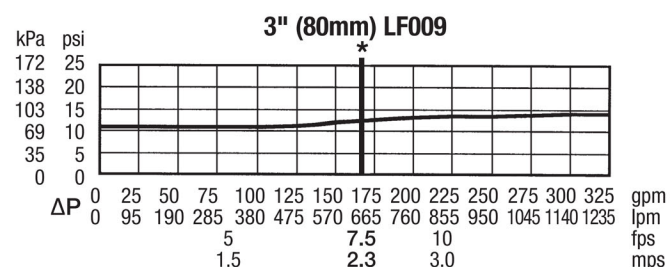
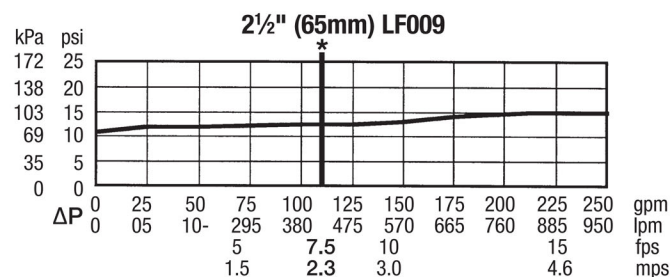
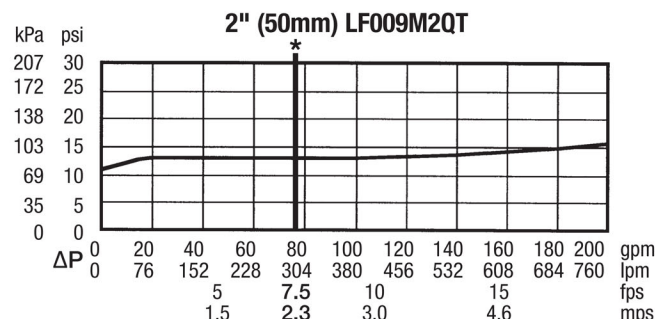
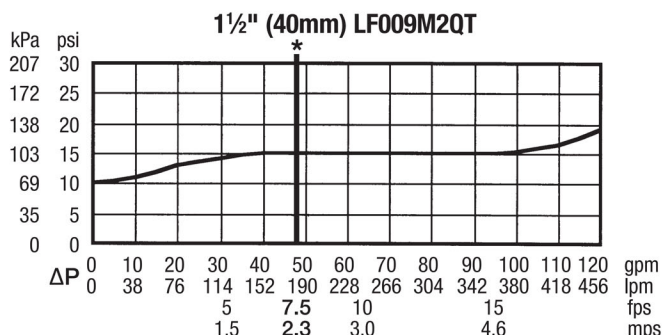
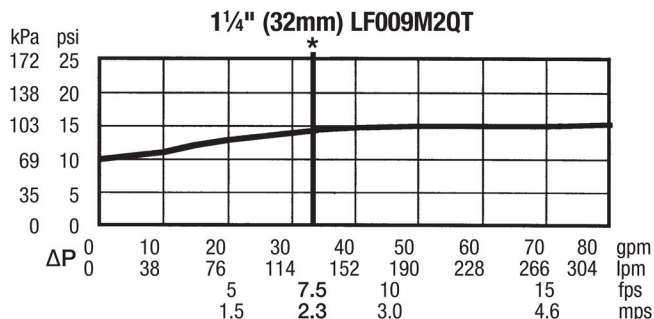
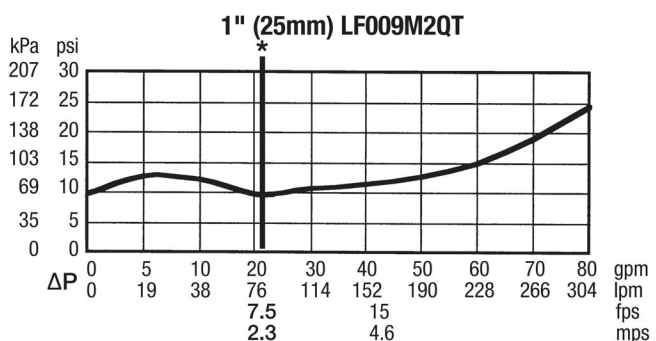
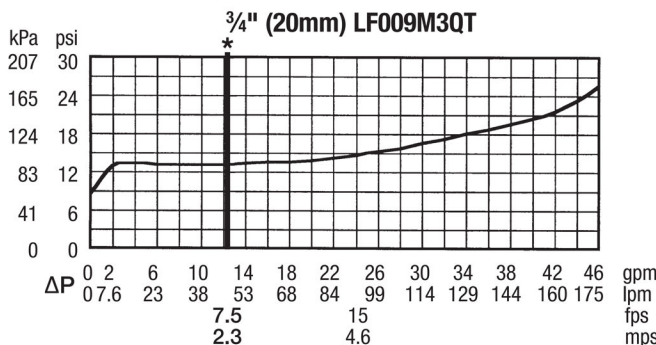
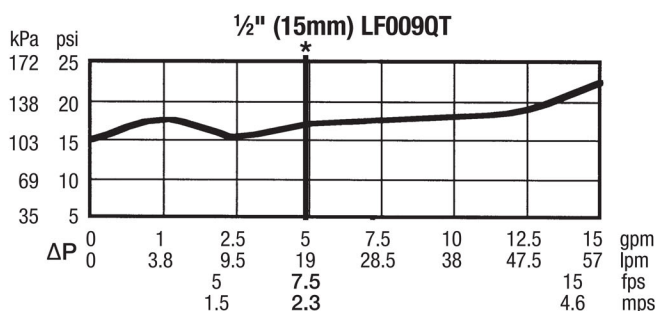
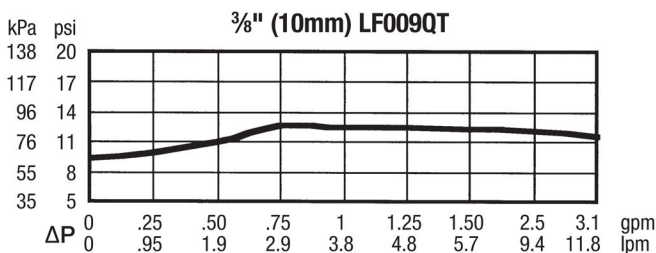
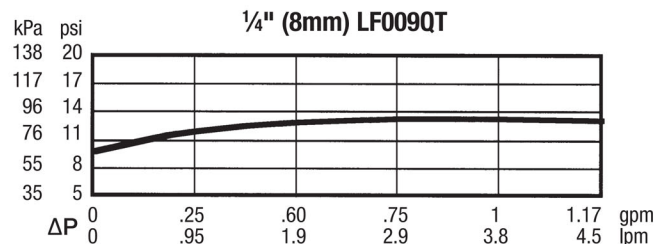
†Clearance for servicing

| MODEL | SIZE DN | | DIMENSIONS (APPROX.) | | | | | | | | | | WEIGHT | | | | | |
|------------|------------|-----------|----------------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|-------------|-------------|
| | | | A | | C | | D | | E | | L | | R | | U | | | |
| | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>lbs.</i> | <i>kgs.</i> |
| LF009LF | 2½ | 65 | — | — | — | — | 4½ | 114 | — | — | 18⅞ | 460 | — | — | 10⅝ | 270 | 76 | 34.5 |
| LF009OSY | 2½ | 65 | 33¼ | 845 | 15⅞ | 403 | 4½ | 114 | 16⅜ | 416 | 18⅞ | 460 | 7¾ | 197 | 10⅝ | 270 | 166 | 75.3 |
| LF009NRS | 2½ | 65 | 33¼ | 845 | 11⅞ | 289 | 4½ | 114 | 16⅜ | 416 | 18⅞ | 460 | 7¾ | 197 | 10⅝ | 270 | 161 | 73.0 |
| LF009QTFDA | 2½ | 65 | 33¼ | 845 | 6 | 152 | 4½ | 114 | 16⅜ | 416 | 18⅞ | 460 | 7¾ | 197 | 10⅝ | 270 | 150 | 68.0 |
| LF009LF | 3 | 80 | — | — | — | — | 4½ | 114 | — | — | 18⅞ | 460 | — | — | 10⅝ | 270 | 76 | 34.5 |
| LF009OSY | 3 | 80 | 34¼ | 870 | 18½ | 470 | 4½ | 114 | 16⅞ | 422 | 18⅞ | 460 | 8¾ | 222 | 10⅝ | 270 | 198 | 89.8 |
| LF009NRS | 3 | 80 | 34¼ | 870 | 12¾ | 324 | 4½ | 114 | 16⅞ | 422 | 18⅞ | 460 | 8¾ | 222 | 10⅝ | 270 | 191 | 86.6 |
| LF009QTFDA | 3 | 80 | 34¼ | 870 | 7 | 178 | 4½ | 114 | 16⅞ | 422 | 18⅞ | 460 | 8¾ | 222 | 10⅝ | 270 | 158 | 71.7 |

Capacity

Performance as established by an independent testing laboratory.

*Typical maximum system flow rate (7.5 feet/sec., 2.3 meters/sec.)





Recordall® Fire Series Assembly (FSAA)

Cold Water Meter & Strainer with Turbine Bypass

UL Certified & FM 1044 Standard Approved for Fire Service Applications

NSF/ANSI Standards 61 and 372 Certified

DESCRIPTION

Recordall® Fire Series assemblies meet or exceed all pressure and performance requirements as stated in the most recent revision of AWWA Standard C703. The assembly's primary turbine meter features cast iron housing, while the turbine bypass meter is cast in a lead-free bronze alloy. Fire Series assemblies comply with the lead-free provisions of the Safe Drinking Water Act and are also certified to NSF/ANSI Standards 61 and 372. These assemblies carry the NSF-61 Mark, Trade Designation: FSAA-01.

Badger Meter® Fire Series assemblies also conform to UL 327 and FM 1004. The strainer conforms to UL 321 and FM 5551. The valve conforms to UL 312 and FM 1045.

Offered in five sizes, Fire Series assemblies are designed for revenue-generating flexibility and control on high volume fire service water measurement applications and feature:

- Direct coupled turbine based on an exclusive "floating rotor" design that reduces bearing friction—and associated wear and tear
- Turbine meter bypass
- Low head loss for optimum pressure during fire extinguishing
- Integral fire service strainer to protect the meter element from debris and prevent downstream blockage
- Tamper-resistant calibration vane allowing in-line accuracy adjustments while under pressure
- Factory-calibrated and tested measuring elements that are unitized for simplified installation and inventory
- Meters and encoders are compatible with Badger Meter ORION® family of endpoints and other approved technologies

Applications

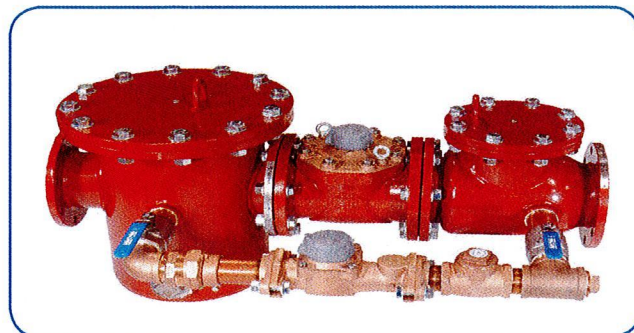
Use the Recordall Fire Series assembly for measuring potable cold water in your vital fire protection systems. Select this assembly when the fire service main is used for both high-volume fire applications, such as sprinkler systems, and low-volume domestic services, such as general purpose plumbing.

These assemblies use proven turbine technology to help provide accurate measurement and optimal performance during fire service events.

Operation & Performance

If water enters the meter at a low flow rate, a spring-loaded check valve on the downstream side holds the clapper assembly in a closed position. Water is diverted through a 2 inch turbine bypass meter. This enables accurate registration of domestic use, leakage or misuse of water intended for stand-by fire protection. When a major flow is required, the resulting water pressure opens the check valve and allows water to flow through the main turbine chamber at full pipe capacity. A small amount of water will continue to flow through the bypass when the clapper assembly is fully open.

FSA-DS-00703-EN-02 (October 2015)



Direct magnetic drive is achieved when the magnet carrier is driven by a gear train coupled to the rotor. The gear train consists of two sets of gears connected by a vertical transmission shaft. One gear set is at the magnet carrier, the other is a worm gear set at the rotor shaft. When water enters the main turbine chamber at high volume rates, it contacts a multi-vaned rotor. The resulting rotor rotation is then transmitted by magnetic coupling to a sealed register or encoder. The direct magnetic drive provides a reliable meter-to-registration coupling.

Construction

The Recordall Fire Series assembly's construction complies with AWWA C703 standards. It consists of the following basic components: meter housing, an AWWA Class II measuring chamber, a check valve with bypass piping, valve assembly, a 2 inch turbine bypass measuring chamber and sealed registers or encoders. The assembly also includes a strainer, which features an open area at least six times the area of the nominal pipe size. The strainer is equipped with a flushing outlet port (or optional valve) for flushing debris from the upstream side of the strainer screen.

To simplify maintenance, the registers or encoders and measuring elements can be removed without removing the meter housing. Interchangeability of certain parts between meters also minimizes spare parts inventory investment.

Tamper-Proof Features

Unauthorized removal of the register or encoder is inhibited by the optional tamper-detection seal wire screw, TORX® tamper-resistant seal screw or the proprietary tamper-resistant keyed seal screw. Each can be installed at the meter site or at the factory.

Meter Installation

The meter is designed for installations where flow is in one direction only. Companion flanges for installation of meters on various pipe types and sizes are available in cast iron or NL bronze as an option. See the "Recordall® Fire Series Assemblies (FSAA) User Manual" for installation guidelines.



Product Data Sheet

SPECIFICATIONS

| FSAA Model Includes 2 in. (50 mm) Turbine Bypass Meter | 4 in. (100 mm) | 6 in. (150 mm) | 8 in. (200 mm) | 10 in. (250 mm) | 12 in. (305 mm) |
|--|--|-----------------------------------|------------------------------------|------------------------------------|-------------------------------------|
| Meter Flanges, AWWA C207 Class D | 4 in. (100 mm) | 6 in. (150 mm) | 8 in. (200 mm) | 10 in. (250 mm) | 12 in. (305 mm) |
| Typical Operating Range (100% ± 1.5%) | 4...1250 gpm (0.91...284 m³/h) | 4...2500 gpm (0.91...568 m³/h) | 4...4500 gpm (0.91...1022 m³/h) | 4...7000 gpm (0.91...1590 m³/h) | 4...7000 gpm (0.908...1590 m³/h) |
| Typical Low Flow (95% minimum) | 2.5 gpm (0.57 m³/h) | 2.5 gpm (0.57 m³/h) | 2.5 gpm (0.57 m³/h) | 2.5 gpm (0.57 m³/h) | 2.5 gpm (0.57 m³/h) |
| Maximum Continuous Flow | 1000 gpm (227 m³/h) | 2000 gpm (454 m³/h) | 3500 gpm (795 m³/h) | 5500 gpm (1249 m³/h) | 5500 gpm (1249 m³/h) |
| Maximum Intermittent Flow | 1250 gpm (284 m³/h) | 2500 gpm (568 m³/h) | 4500 gpm (1022 m³/h) | 7000 gpm (1590 m³/h) | 7000 gpm (1590 m³/h) |
| Maximum Operating Pressure | 175 psi (12 bar) | | | | |
| Maximum Operating Temperature | 120° F (49° C) | | | | |
| Pressure Loss at Crossover | 3 psi (0.28 bar) | | | | |
| Check Valve | Valve body conforms to UL 312 and FM 1044. | | | | |
| Bypass Line | Specify right-facing (standard, as shown) or left-facing assembly. | | | | |
| Strainer | Screen open area is at least six times the area of the nominal pipe size. Equipped with a 2 in. (4 in. model) or 3 in. (all other models) flushing port to flush debris from upstream side of strainer screen. Optional flush valve assembly available. | | | | |
| Optional Equipment | Two isolation valves with test tee | | | | |

MATERIALS

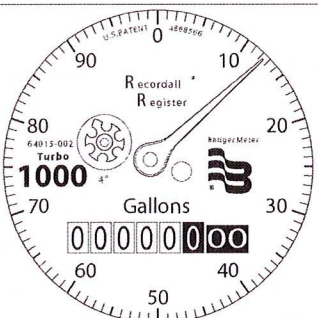
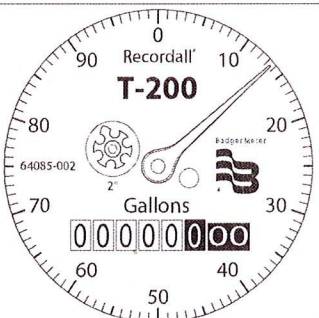
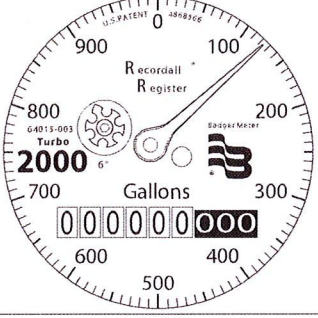
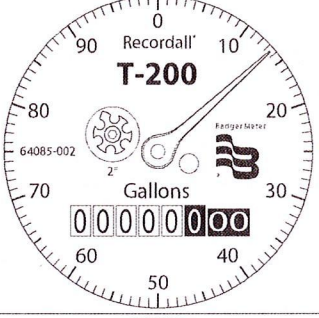
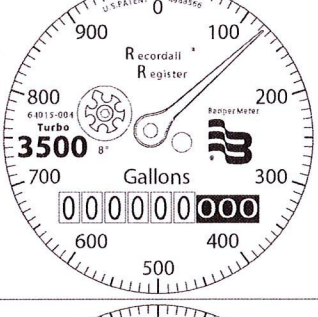
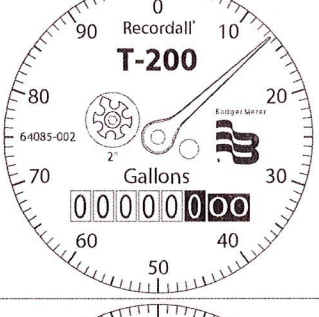
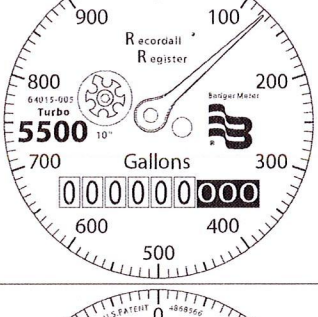
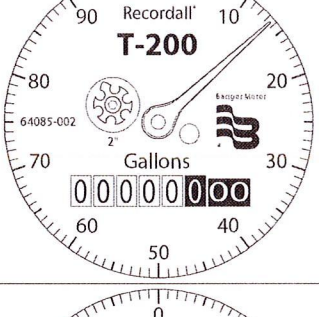
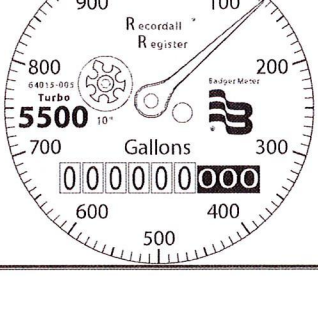
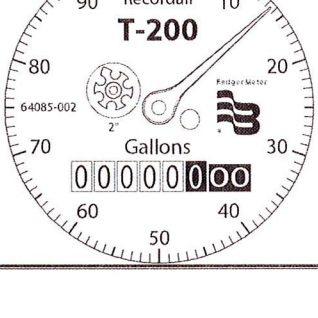
| | |
|---|---|
| Meter Housing | Fusion-bonded epoxy coated ductile cast iron |
| Bypass Meter Housing | Lead-free bronze alloy |
| Bypass Measuring Chamber | Injection-molded thermoplastic |
| Bypass | Water works brass piping conforming to AWWA C800 |
| Nose Cone & Straightening Vanes | Thermoplastic |
| Rotor | Thermoplastic |
| Rotor Radial Bearings | Lubricated thermoplastic |
| Rotor Thruster Bearing | Sapphire jewels |
| Rotor Bearing Pivots | Passivated 316 stainless steel |
| Calibration Mechanism | Stainless steel & thermoplastic |
| Magnet | Ceramic |
| Turbine Shaft & Bolts | Stainless steel |
| Clapper Assembly (clapper, spring, hinge & pins) | Stainless steel |
| Clapper Seal | Elastomeric, EPDM |
| Valve Seat | Stainless steel |
| Valve & Strainer Cover Plate | Fusion-bonded epoxy coated steel |
| Valve & Strainer Cover Plate Gasket | Elastomeric sheet / O-ring |
| Valve Body | Fusion-bonded epoxy coated steel / stainless steel |
| Strainer Screen & Trim | Stainless steel |
| Strainer Body | Fusion-bonded epoxy coated steel |
| Trim | Zinc-plated steel or (optional) all stainless steel |

REGISTERS / ENCODERS

Standard—Sweep-Hand Registration

The standard register is a straight-reading, permanently sealed magnetic drive register. Dirt, moisture, tampering and lens fogging problems are eliminated. The register has a six-odometer wheel totalization display, 360° test circle with center sweep hand, and flow finder to detect leaks. Register gearing is made of self-lubricating engineered polymer, which minimizes friction and provides long life. The multi-position register simplifies meter installation and reading. The register capacity is 10,000,000 gallons (1,000,000 ft³, 100,000 m³).

Registers—Gallons

| | High Flow | Low Flow |
|--------|--|---|
| 4 in. |  A circular flow meter with a scale from 0 to 100 Gallons. The needle points to 10. The register shows 00000000. The text "Recordall Register" and "Turbo 1000" are visible. |  A circular flow meter with a scale from 0 to 30 Gallons. The needle points to 10. The register shows 00000000. The text "Recordall Register" and "T-200" are visible. |
| 6 in. |  A circular flow meter with a scale from 0 to 300 Gallons. The needle points to 100. The register shows 00000000. The text "Recordall Register" and "Turbo 2000" are visible. |  A circular flow meter with a scale from 0 to 30 Gallons. The needle points to 10. The register shows 00000000. The text "Recordall Register" and "T-200" are visible. |
| 8 in. |  A circular flow meter with a scale from 0 to 300 Gallons. The needle points to 100. The register shows 00000000. The text "Recordall Register" and "Turbo 3500" are visible. |  A circular flow meter with a scale from 0 to 30 Gallons. The needle points to 10. The register shows 00000000. The text "Recordall Register" and "T-200" are visible. |
| 10 in. |  A circular flow meter with a scale from 0 to 300 Gallons. The needle points to 100. The register shows 00000000. The text "Recordall Register" and "Turbo 5500" are visible. |  A circular flow meter with a scale from 0 to 30 Gallons. The needle points to 10. The register shows 00000000. The text "Recordall Register" and "T-200" are visible. |
| 12 in. |  A circular flow meter with a scale from 0 to 300 Gallons. The needle points to 100. The register shows 00000000. The text "Recordall Register" and "Turbo 5500" are visible. |  A circular flow meter with a scale from 0 to 30 Gallons. The needle points to 10. The register shows 00000000. The text "Recordall Register" and "T-200" are visible. |

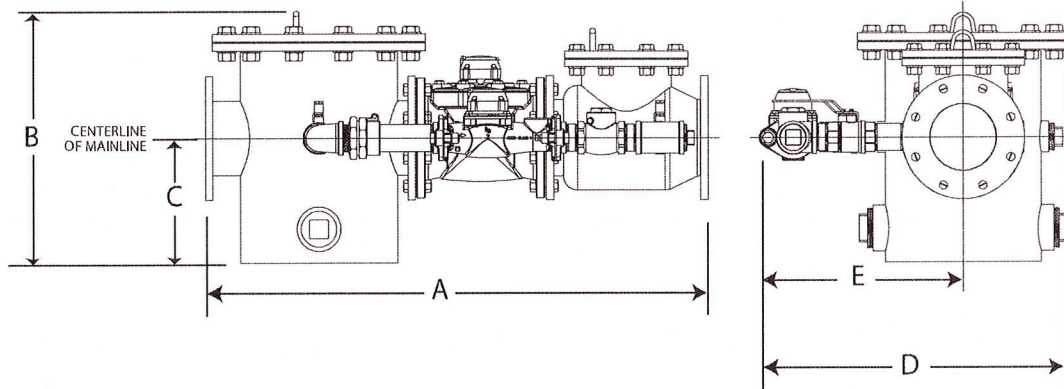
Registers—Cubic Feet

| | High Flow | Low Flow |
|--------|-----------|----------|
| 4 in. | | |
| 6 in. | | |
| 8 in. | | |
| 10 in. | | |
| 12 in. | | |

Optional—Encoders for AMR/AMI Reading Solutions

AMR/AMI solutions are available for all Recordall Disc Series meters. All reading options can be removed from the meter without disrupting water service. Badger Meter encoders provide years of reliable, accurate readings for a variety of applications and are also available pre-wired to Badger Meter approved AMR/AMI solutions. See details at www.badgermeter.com.

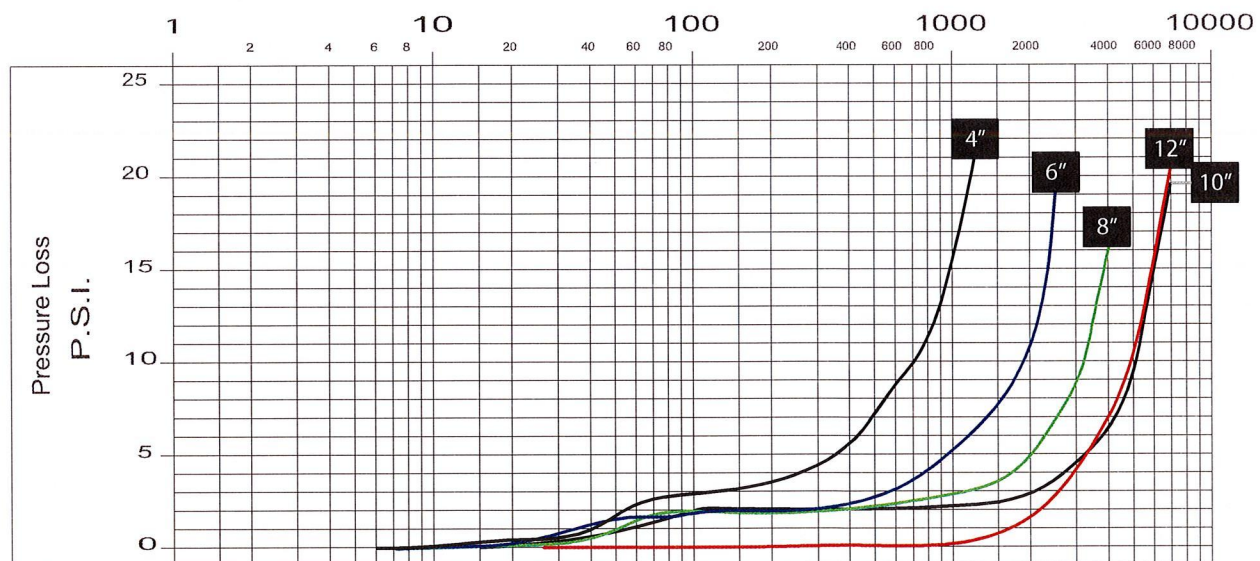
PHYSICAL DIMENSIONS



| Fire Series FSAA Model | 4 in. (100 mm) | 6 in. (150 mm) | 8 in. (200 mm) | 10 in. (250 mm) | 12 in. (305 mm) |
|-----------------------------------|---------------------|---------------------|----------------------|-----------------------|-----------------------|
| Meter & Pipe Size | 4 in. (100 mm) | 6 in. (150 mm) | 8 in. (200 mm) | 10 in. (250 mm) | 12 in. (305 mm) |
| Shipping Weight-Fully Assembled | 312 lb (142 kg) | 507 lb (230 kg) | 767 lb (348 kg) | 1073 lb (487 kg) | 1073 lb (487 kg) |
| Length (A) | 33 in. (838 mm) | 45 in. (1143 mm) | 53 in. (1346 mm) | 68 in. (1727 mm) | 68 in. (3727 mm) |
| Height (B) | 20-5/8 in. (524 mm) | 22-3/8 in. (mm) | 25-1/16 in. (637 mm) | 25-5/16 in. (643 mm) | 33 in. (838 mm) |
| Height (C) | 10-5/8 in. (270 mm) | 11-1/16 in. (mm) | 12-1/16 in. (306 mm) | 14-13/16 in. (mm) | 15-3/4 in. (mm) |
| Length (D) Standard Bypass | 22-7/8 in. (581 mm) | 25-7/8 in. (657 mm) | 29-5/8 in. (752 mm) | 33-7/16 in. (849 mm) | 33-7/16 in. (849 mm) |
| Length (D) Optional 2nd Bypass | N/A | 29 in. (737 mm) | 30-1/4 in. (368 mm) | 34-1/16 in. (865 mm) | 34-1/16 in. (865 mm) |
| Length (E) Standard Bypass | 16-1/8 in. (410 mm) | 16-3/8 in. (416 mm) | 17-1/8 in. (435 mm) | 19-11/16 in. (500 mm) | 19-11/16 in. (500 mm) |
| Length (E) Optional 2nd Bypass | N/A | 19-1/2 in. (241 mm) | 17-3/4 in. (451 mm) | 20-5/16 in. (516 mm) | 20-5/16 in. (516 mm) |

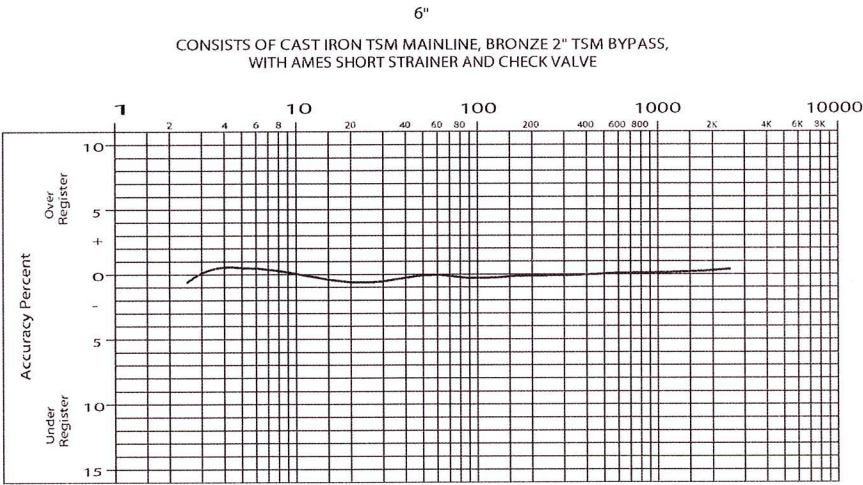
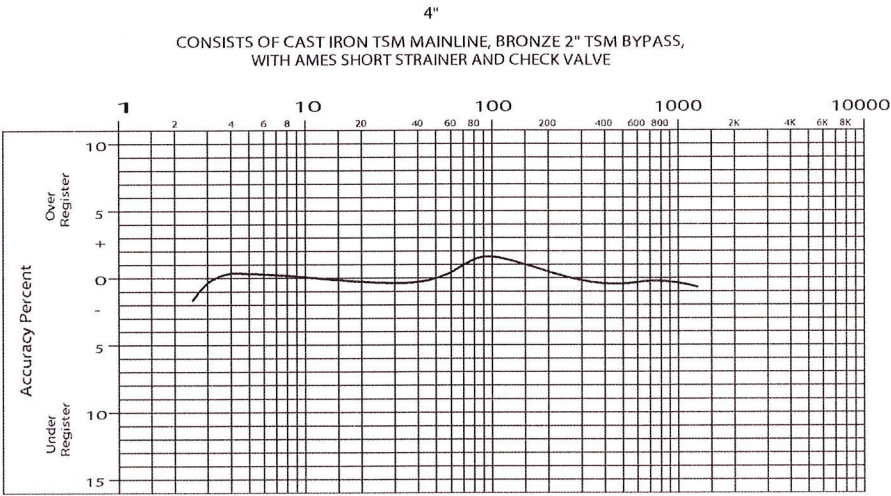
PRESSURE LOSS CHART

Rate of flow in gallons per minute (gpm).



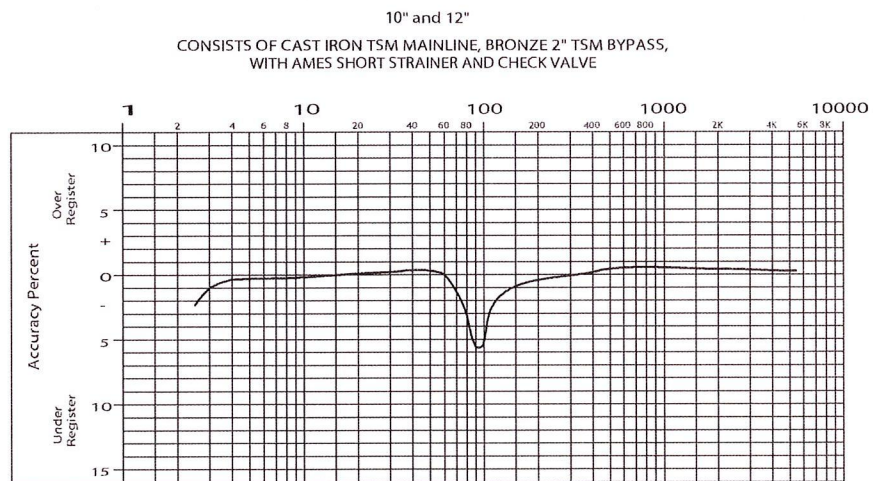
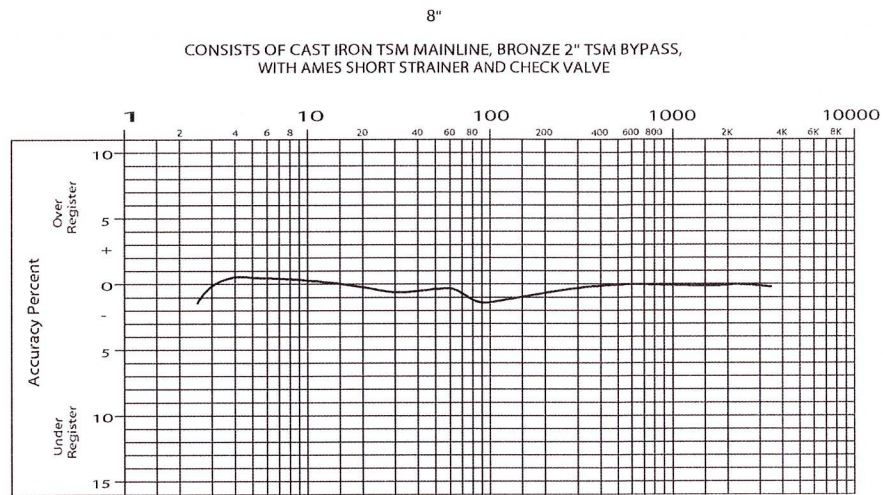
ACCURACY CHARTS

Rate of flow in gallons per minute (gpm).



ACCURACY CHARTS (CONTINUED)

Rate of flow in gallons per minute (gpm).



Making Water Visible®

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Legacy Document Number: FSAA-T-04, -06, -08, -10, -12

Job Name _____

Contractor _____

Job Location _____

Approval _____

Engineer _____

Contractor's P.O. No. _____

Approval _____

Representative _____

LEAD FREE*

Series LF957RPDA, LF957NRPDA, LF957ZRPDA

Reduced Pressure Detector Assemblies

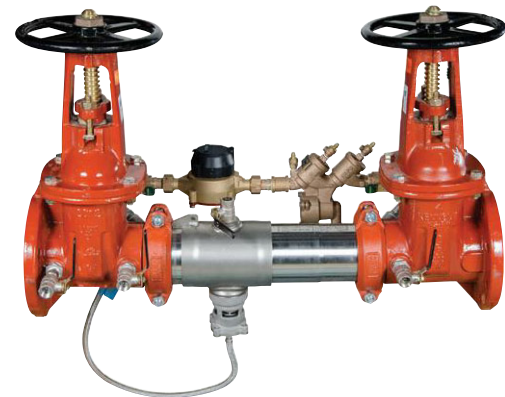
Sizes: 2½" – 10"

Series LF957RPDA, LF957NRPDA, LF957ZRPDA Reduced Pressure Detector Assemblies provide protection to the potable water system from contamination in accordance with national plumbing codes. The LF957RPDA, LF957NRPDA, LF957ZRPDA are normally used in health hazard applications to protect against backsiphonage and backpressure. The Watts LF957RPDA, LF957NRPDA, LF957ZRPDA are used to monitor unauthorized use of water from the fire protection system. They feature Lead Free* construction to comply with Lead Free* installation requirements.

Features

- Lead Free* construction
- Extremely compact design
- 70% lighter than traditional designs
- 304 (Schedule 40) stainless steel housing & sleeve
- Groove fittings allow integral pipeline adjustment
- Patented torsion spring check provides lowest pressure loss
- Unmatched ease of serviceability
- Replaceable check disc rubber
- Available with grooved butterfly valve shutoffs
- Bottom mounted cast stainless steel relief valve
- Metered bypass to detect leakage or theft of water from the fire sprinkler system

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

**LF957RPDA-OSY**

Specifications

The Lead Free* Reduced Pressure Detector Assembly shall consist of two independent torsion spring check modules, a differential pressure relief valve located between and below the two modules, two drip tight shutoff valves, and required torsion spring check modules and relief valve shall be contained within a sleeve accessible single housing constructed from 304 (Sch 40) stainless steel pipe with groove end connections. Torsion spring checks shall have reversible elastomer discs and in operation produce drip tight closure against reverse flow caused by backpressure or backsiphonage. The Lead Free* Reduced Pressure Detector Assemblies shall comply with state codes and standards, where applicable, requiring reduced lead content. The bypass assembly consists of a meter registering either gallon or cubic measurements, a double check assembly and required test cocks. Assembly shall be Watts Series LF957RPDA, LF957NRPDA, LF957ZRPDA.

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

Available Models

Suffix:

OSY – UL/FM outside stem and yoke, resilient seated gate valves

BFG – UL/FM grooved gear operated butterfly valves with tamper switch

*OSY FxG – Flanged inlet gate connection and grooved outlet gate connection

*OSY GxF – Grooved inlet gate connection and flanged outlet gate connection

*OSY GxG – Grooved inlet gate connection and grooved outlet gate connection

Available with grooved NRS gate valves - consult factory†

Post indicator plate and operating nut available - consult factory†

†Consult factory for dimensions

Dimensions — Weight

Materials

Housing & Sleeve: 304 (Schedule 40) Stainless Steel

Elastomers: EPDM, Silicone and Buna 'N'

Torsion Spring Checks: Noryl®, Stainless Steel

Check Discs: Reversible Silicone or EPDM

Test Cocks: Lead Free* Bronze Body

Pins & Fasteners: 300 Series Stainless Steel

Springs: Stainless Steel

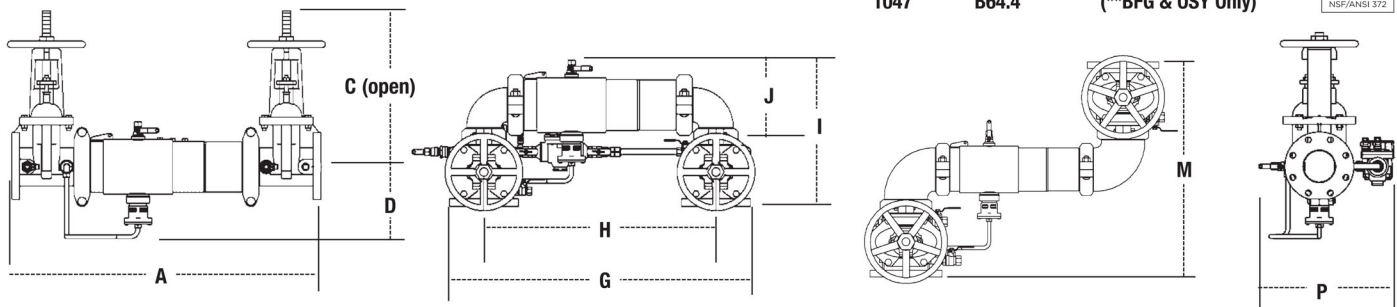
Pressure — Temperature

Temperature Range: 33°F – 110°F (0.5°C – 43°C)

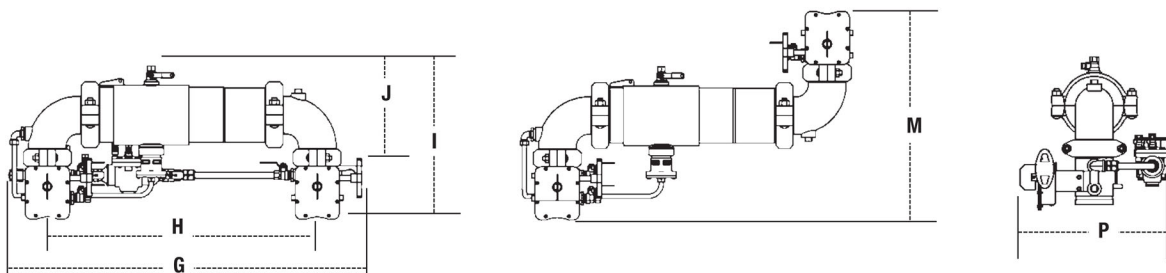
Maximum Working Pressure: 175psi (12.1 bar)

Approvals

- Approved by the Foundation for Cross-Connection Control and Hydraulic Research at The University of Southern California (FCCCHR-USC)
(Excluding 6", 8", and 10" 'N' and 'Z' Pattern)
- AWWA C511-97



| SIZE | | | DIMENSIONS | | | | | | | | | | WEIGHT | | | | | | | | | |
|------------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|-------------|-------------|-------------|-------------|
| | A | | C (OSY) | | D | | G | | H | | I | | J | | M | | P | | 957RPDA | | 957NRPDA | |
| <i>in.</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>lbs.</i> | <i>kgs.</i> | <i>lbs.</i> | <i>kgs.</i> |
| 2½ | 30¾ | 781 | 16¾ | 416 | 6½ | 165 | 29⅞ | 738 | 21½ | 546 | 15½ | 393 | 8⅜ | 223 | 21¼ | 540 | 13⅜ | 335 | 142 | 64 | 150 | 68 |
| 3 | 31¾ | 806 | 18⅞ | 479 | 6⅞ | 170 | 30¼ | 768 | 22¼ | 565 | 17⅞ | 435 | 9⅞ | 233 | 23 | 584 | 14½ | 368 | 162 | 73 | 175 | 79 |
| 4 | 33¾ | 857 | 22¾ | 578 | 7 | 178 | 33 | 838 | 23½ | 597 | 18½ | 470 | 9⅞ | 252 | 26¼ | 667 | 15⅞ | 386 | 178 | 81 | 201 | 91 |
| 6 | 43½ | 1105 | 30⅞ | 765 | 8½ | 216 | 44¾ | 1137 | 33¼ | 845 | 23⅞ | 589 | 13⅞ | 332 | 32¼ | 819 | 19 | 483 | 312 | 142 | 353 | 160 |
| 8 | 49¾ | 1264 | 37¾ | 959 | 9⅞ | 246 | 54⅞ | 1375 | 40⅞ | 1019 | 27⅞ | 697 | 15⅞ | 399 | 36⅞ | 937 | 21⅞ | 538 | 497 | 225 | 572 | 259 |
| 10 | 57¾ | 1467 | 45¾ | 1162 | 11⅞ | 285 | 66 | 1676 | 49½ | 1257 | 32½ | 826 | 17⅞ | 440 | 44½ | 1124 | 24 | 610 | 797 | 362 | 964 | 437 |



LF957NRPDABFG, LF957ZRPDABFG

| SIZE | | | DIMENSIONS | | | | | | | | WEIGHT | | | |
|------------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|-------------|-------------|
| | G | | H | | I | | J | | M | | P | | 957RPDABFG | |
| <i>in.</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>in.</i> | <i>mm</i> | <i>lbs.</i> | <i>kgs.</i> |
| 2½ | 32½ | 826 | 23 | 584 | 15½ | 394 | 9½ | 241 | 19¾ | 502 | 15⅓ | 402 | 81 | 37 |
| 3 | 34 | 864 | 24 | 610 | 16⅙ | 414 | 10⅙ | 256 | 21¼ | 540 | 16⅘ | 410 | 84 | 38 |
| 4 | 35⅝ | 905 | 25½ | 648 | 17⅙ | 437 | 10⅕ | 279 | 23½ | 597 | 16⅘ | 422 | 101 | 46 |
| 6 | 46½ | 1181 | 35¼ | 895 | 20½ | 521 | 13½ | 343 | 27¼ | 692 | 19 | 483 | 174 | 79 |

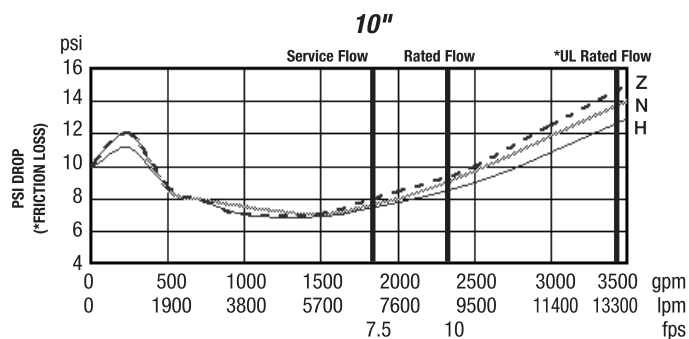
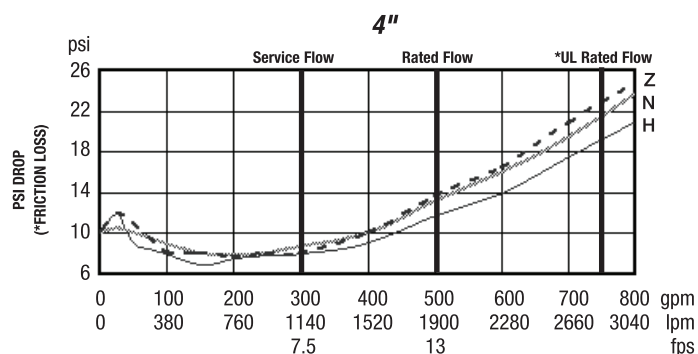
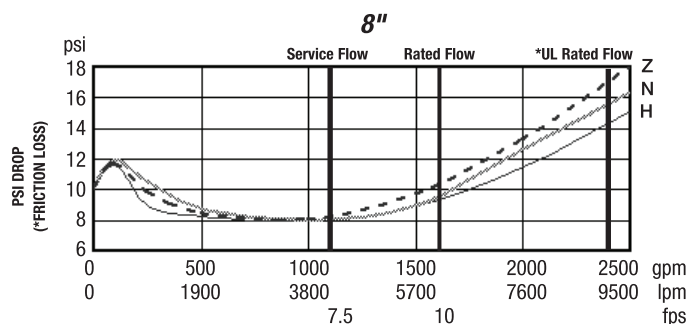
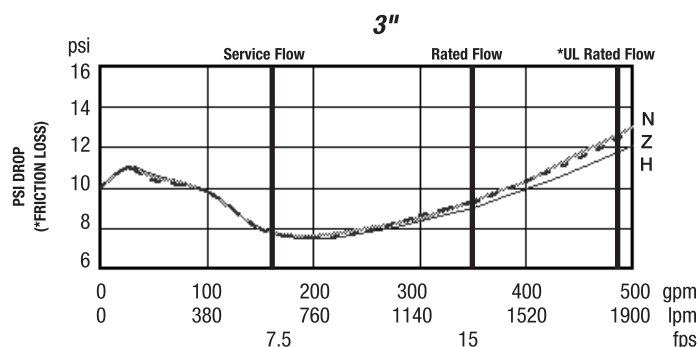
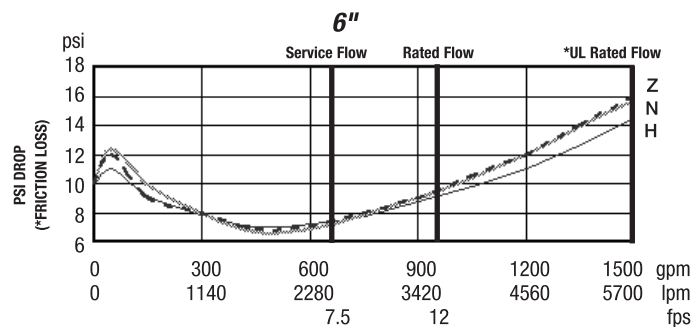
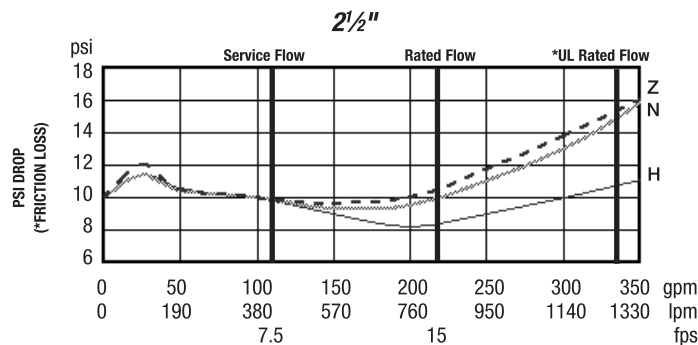
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Capacity

Series LF957RPDA, LF957NRPDA, LF957ZRPDA flow curves as tested by Underwriters Laboratory.
(Excluding 6" Z Pattern configuration)

Flow characteristics collected using butterfly shutoff valves

—— Horizontal ——— N-Pattern - - - - - Z-Pattern



NOTICE

Inquire with governing authorities for local installation requirements



USA: Tel: (978) 689-6066 • Fax: (978) 975-8350 • Watts.com
Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 55-4122-0138 • Watts.com

WATER FLOW TEST

NAME OF RISK. _____ FILE NO. _____

LOCATION 2121 State Route 332, Canandaigua N.Y.

SIZE OF STREET MAIN 12 inch Ductile Iron Pipe DEAD END

INDICATE RESIDUAL PRESSURES REQUIRED FOR T.L.S. (15 LBS. PLUS HEAD PRESSURE)

LBS. T.L.S. FOR BLOG.

Figure 1

NOTE: ADJUST ALL STATIC AND RESIDUAL PRESSURE RECORDINGS TO REFLECT CONDITIONS AT GRADE LEVEL FOR RISK.

[illegible]

WERE TESTS CONDUCTED DURING PERIODS OF (UNDERLINE) HEAVY--NORMAL--LIGHT CONSUMPTION?

INDICATE IF SEASONAL OR OTHER DEMANDS OVERTAX THE PUBLIC SUPPLY AND DISTRIBUTION SYSTEM. IF NORMAL PRESSURES AND WATERFLOWS ARE AFFECTED, THEN BRIEFLY STATE CONDITIONS AND DURATION.

REMARKS

TESTS CONDUCTED, DATE: 07/11/2018 BY: Robin MacDonald and Tom Simonds

CALCULATIONS:

Project: 2536 Rochester Road

Flow Test Adjustment

Project No.: 2759

Date: 5/24/21

By: JGL

Sheet 1 of 2

Adjust Flow Test provided by Town of Farmington Water & Sewer Department on 5/21/21. Per Robin McDonald feed is from Canandaigua. Therefore adjusting test for elevation only is conservative, since additional friction loss between the project site and Flow Test Location is still included in the calculations but it's not in actual field conditions. Per Robin McDonald, record mapping provided does not accurately reflect constructed conditions.

Flow Test (7/11/2018) (see Attached)

Static Pressure = 71 psi
Residual Pressure = 53 psi
Flow = 1350 gpm

Elevation Residual Hydrant = ± 775'

Adjusted Flow Test (Used for Service Calculations)

Elevation to be adjusted to Hydrant in front of Monroe Muffler (2544 State Rt 332)

Elevation @ Adjusted Hyd = 780'

Elev Flow Hyd - Elevation Adj Hyd = 775' - 780' = -5.0 ft

$$-5.0 \text{ ft} \left(\frac{1 \text{ psi}}{2.31 \text{ ft}} \right) = -2.16 \text{ psi}$$
Use -3 psi to be conservativeAdjusted

Static Pressure = 68 psi
Residual Pressure = 50 psi
Flow = 1350 gpm

CALCULATIONS:

Project: 2536 Rochester Road

Project No.: 2759

Date: 5/24/21

By: JGL

Sheet 2 of 2

Adjusted Flow Test -

Flow @ 20 psi. Calculation

$$Q_p = Q_R \left(\frac{P_s - P_p}{P_s - P_R} \right)^{0.54}$$

$$Q_{20} = 1350 \text{ gpm} \left(\frac{68 \text{ psi} - 20 \text{ psi}}{68 \text{ psi} - 50 \text{ psi}} \right)^{0.54}$$

$$Q_{20} = 2293 \text{ gpm}$$

Appendix 3

Drainage Analysis Calculations

Quantity Calculations (Q_p , Q_f)

Figure 03 - Existing Conditions Drainage Map

**Figure 04 - Proposed Conditions Drainage Map
Stormwater Hydrographs**

Quality Calculations (WQ_v , RR_v , CP_v)

Figure 05 – WQ_v/RR_v Exhibit

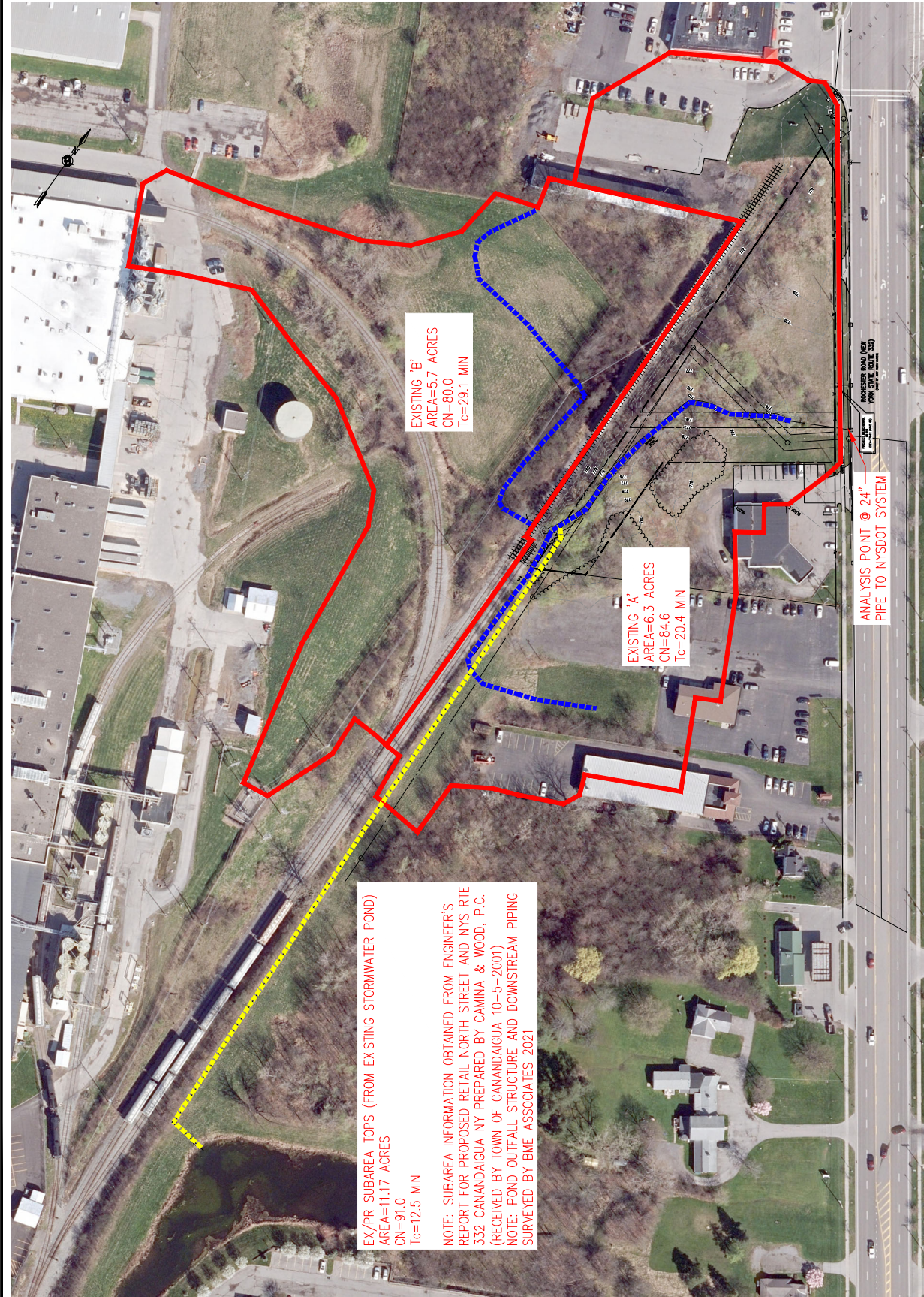
**Water Quality and Runoff Reduction Calculations
Channel Protection Volume, Orifice and Spillway Calculations**

Drainage Analysis Calculations

Quantity Calculations

Figure 03 - Existing Conditions Drainage Map

Figure 04 - Proposed Conditions Drainage Map
Stormwater Hydrographs



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| REVISIONS | DATE | BY |
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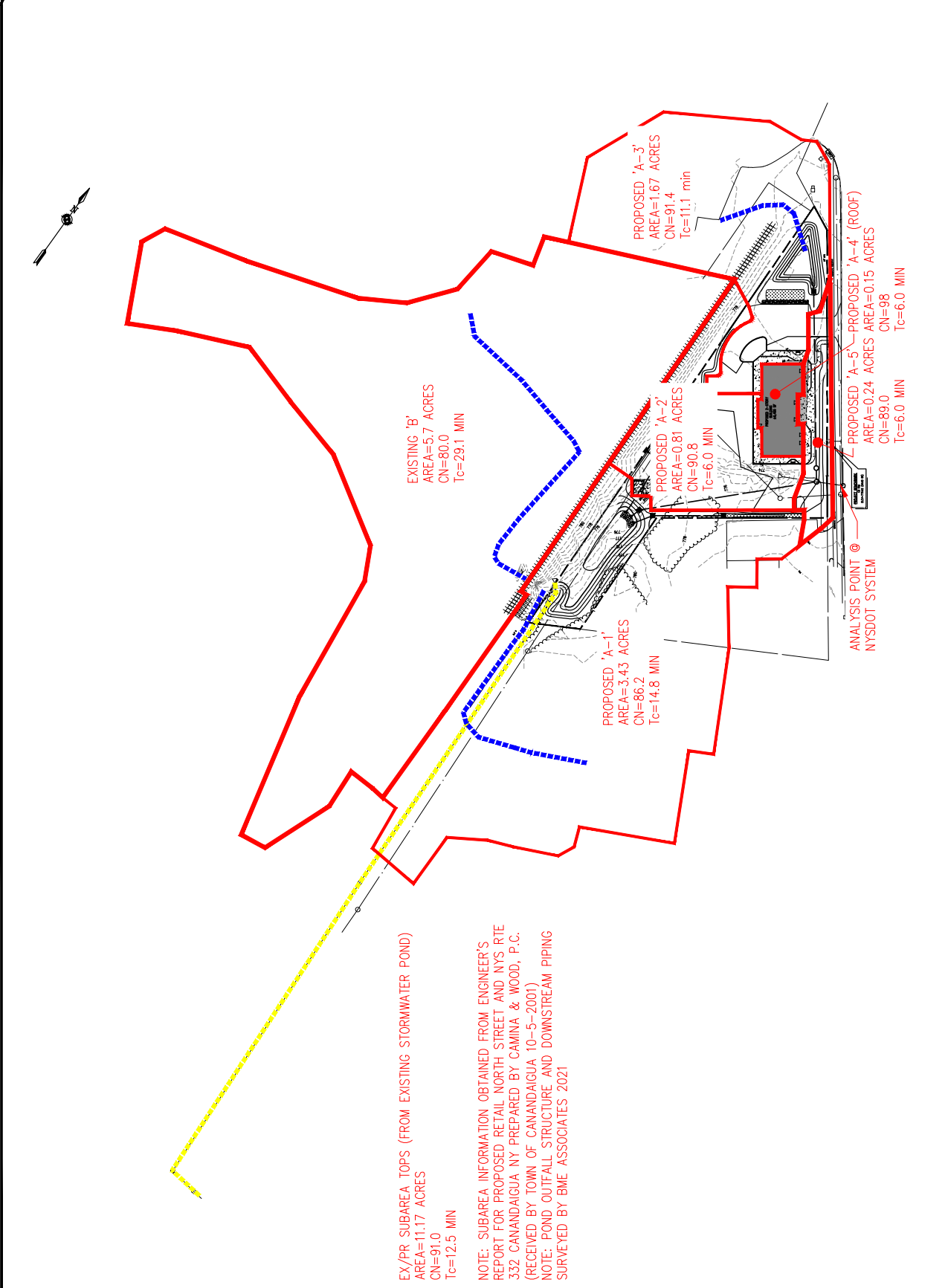
PROJECT
2536 ROCHESTER RD
TOWN OF CANANDAIGUA, DRUMBO COUNTY, NEW YORK STATE
APPROX DEVELOPMENT LTD.

EXISTING DRAINAGE MAP
PROJECT NO. 2759
DATE 10/20/21
SCALE 1"=40'

FIGURE-03
DRAWING NO. 2759

P:\2759\Drawings\2759 Drainage from R5503.dwg

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DRAINAGE MAP

2536 ROCHESTER RD

APPOSE DEVELOPMENT LTD.

TOWN OF CANANDAIGUA, DRUMBO COUNTY, NEW YORK STATE

FINAL DESIGN

PROJECT NO.

DATE ISSUED

DATE N.Y. SET

PROJECT NO.

2759

FIGURE-04

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| 6 | | |
| 7 | | |

REVISED FOR GRATED LAYOUT

DRIVING TITLE

CLIENT

LOCATION

PROJECT

PROJECT MANAGER

PROJECT NUMBER

PROJECT NO.

SCALE

DATE ISSUED

DATE N.Y. SET

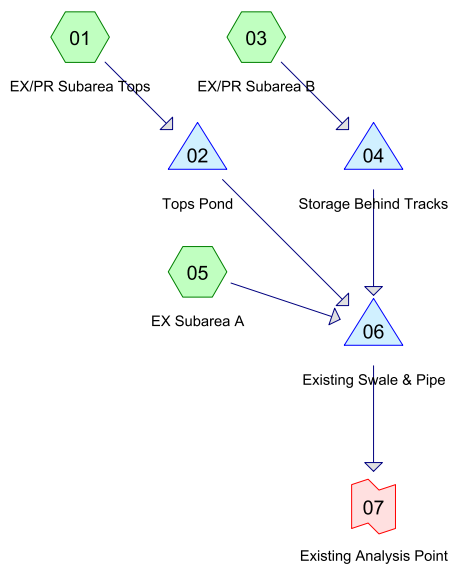
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2759

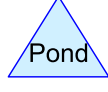
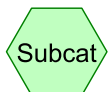
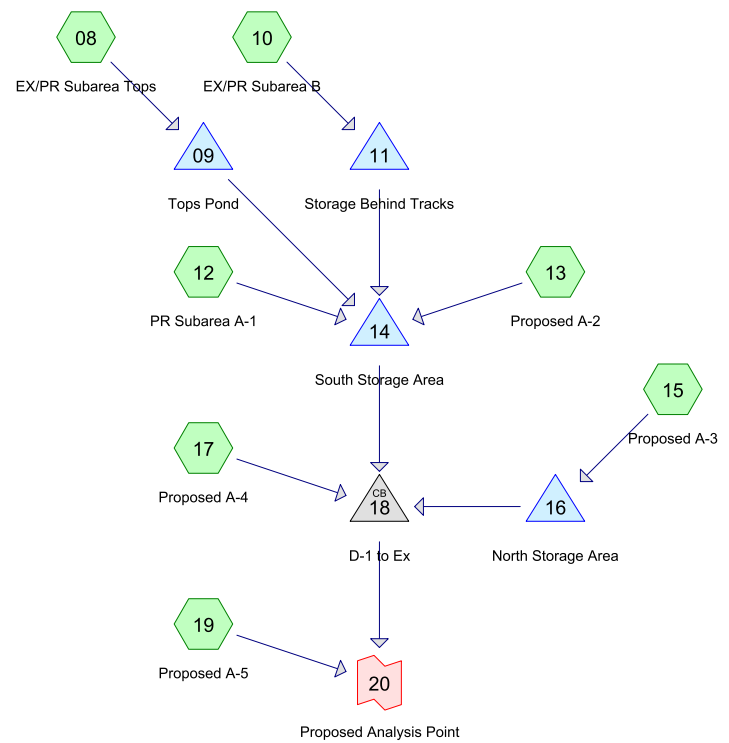
FIGURE-04

Nothing is shown here that is not shown on the site plan. The site plan is the only document that shows the location of the property and the location of the proposed stormwater pond. The site plan is the only document that shows the location of the property and the location of the proposed stormwater pond.

Existing Conditions



Proposed Conditions



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Page 2

Rainfall Events Listing

| Event# | Event Name | Storm Type | Curve | Mode | Duration (hours) | B/B | Depth (inches) | AMC |
|--------|------------|---------------|-------|---------|------------------|-----|----------------|-----|
| 1 | 1-YEAR | Type II 24-hr | | Default | 24.00 | 1 | 1.89 | 2 |
| 2 | 2-YEAR | Type II 24-hr | | Default | 24.00 | 1 | 2.18 | 2 |
| 3 | 5-YEAR | Type II 24-hr | | Default | 24.00 | 1 | 2.68 | 2 |
| 4 | 10-YEAR | Type II 24-hr | | Default | 24.00 | 1 | 3.14 | 2 |
| 5 | 25-YEAR | Type II 24-hr | | Default | 24.00 | 1 | 3.86 | 2 |
| 6 | 50-YEAR | Type II 24-hr | | Default | 24.00 | 1 | 4.52 | 2 |
| 7 | 100-YEAR | Type II 24-hr | | Default | 24.00 | 1 | 5.29 | 2 |
| 8 | WQV | Type II 24-hr | | Default | 24.00 | 1 | 1.00 | 2 |

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Type II 24-hr 1-YEAR Rainfall=1.89"

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Page 3

Summary for Subcatchment 01: EX/PR Subarea Tops

Runoff = 16.80 cfs @ 12.04 hrs, Volume= 0.994 af, Depth= 1.07"

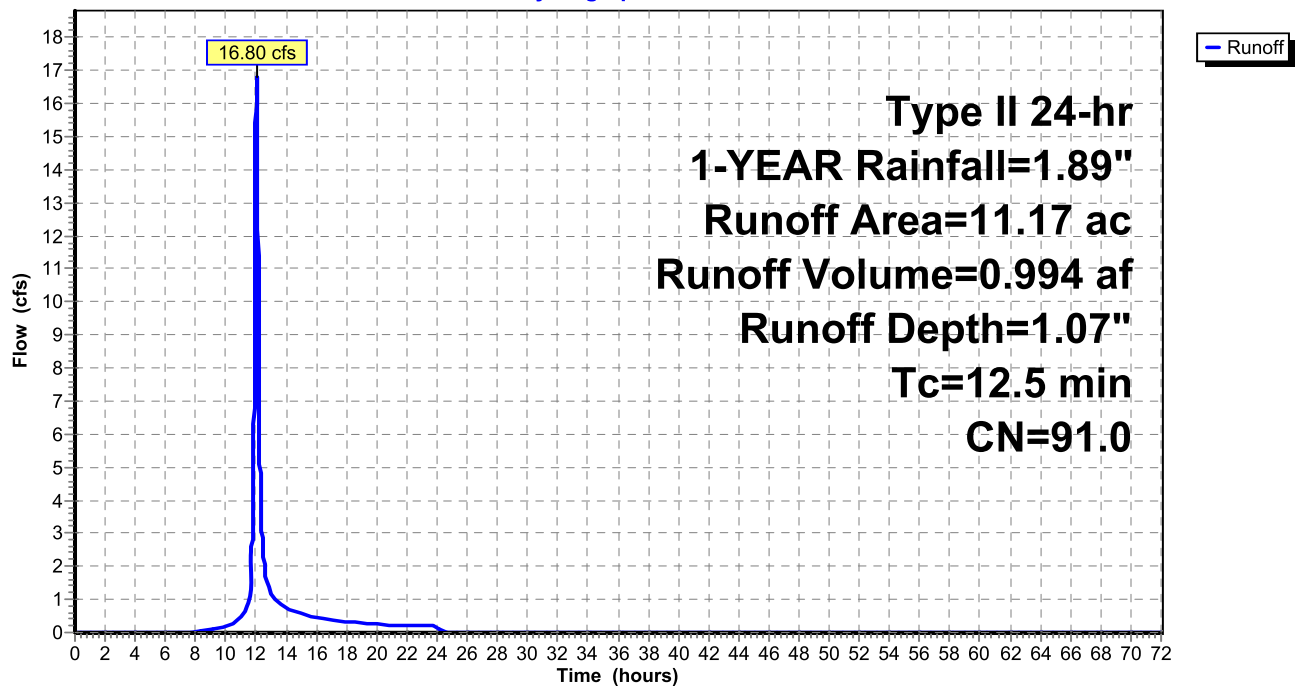
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YEAR Rainfall=1.89"

| Area (ac) | CN | Description |
|-----------|------|-------------------------------|
| * 11.17 | 91.0 | Direct Entry from Eng. Report |
| 11.17 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 12.5 | | | | | Direct Entry, Direct Entry from Eng Report |

Subcatchment 01: EX/PR Subarea Tops

Hydrograph



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Type II 24-hr 1-YEAR Rainfall=1.89"

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Page 4

Summary for Pond 02: Tops Pond

Inflow Area = 11.17 ac, 0.00% Impervious, Inflow Depth = 1.07" for 1-YEAR event
Inflow = 16.80 cfs @ 12.04 hrs, Volume= 0.994 af
Outflow = 1.55 cfs @ 12.70 hrs, Volume= 0.950 af, Atten= 91%, Lag= 39.7 min
Primary = 1.55 cfs @ 12.70 hrs, Volume= 0.950 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Starting Elev= 778.56' Storage= 2,129 cf

Peak Elev= 779.21' @ 12.70 hrs Storage= 25,151 cf (23,022 cf above start)

Plug-Flow detention time= 461.9 min calculated for 0.901 af (91% of inflow)

Center-of-Mass det. time= 387.4 min (1,214.1 - 826.7)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|---------------------------------------|
| #1 | 778.50' | 173,342 cf | Custom Stage Data Listed below |

| Elevation (feet) | Cum.Store (cubic-feet) |
|---------------------|---------------------------|
| 778.50 | 0 |
| 779.50 | 35,478 |
| 780.00 | 56,295 |
| 780.50 | 78,948 |
| 781.00 | 102,303 |
| 781.50 | 127,008 |
| 782.00 | 152,631 |
| 782.50 | 173,342 |

| Device | Routing | Invert | Outlet Devices |
|--------|----------|---------|--|
| #1 | Primary | 776.01' | 24.0" Round Culvert L= 12.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 775.93' / 776.01' S= -0.0064 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |
| #2 | Device 1 | 777.31' | 24.0" Round Culvert L= 454.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 777.31' / 775.93' S= 0.0030 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |
| #3 | Device 2 | 778.56' | 24.0" Round Culvert L= 446.7' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 778.56' / 777.31' S= 0.0028 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |
| #4 | Device 3 | 778.56' | 15.0" Vert. 18" Inverted Pipe C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=1.55 cfs @ 12.70 hrs HW=779.21' TW=774.43' (Dynamic Tailwater)

- 1=Culvert (Passes 1.55 cfs of 22.16 cfs potential flow)
- 2=Culvert (Passes 1.55 cfs of 10.35 cfs potential flow)
- 3=Culvert (Barrel Controls 1.55 cfs @ 2.63 fps)
- 4=18" Inverted Pipe (Passes 1.55 cfs of 1.76 cfs potential flow)

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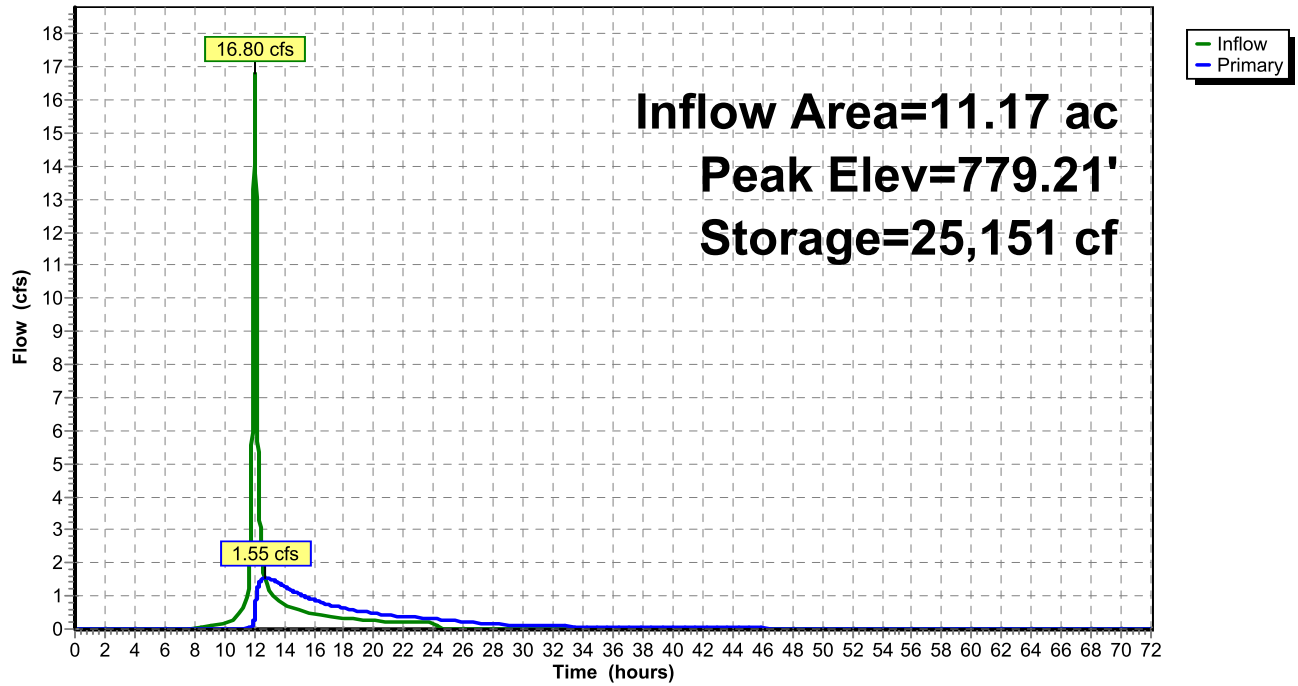
Type II 24-hr 1-YEAR Rainfall=1.89"

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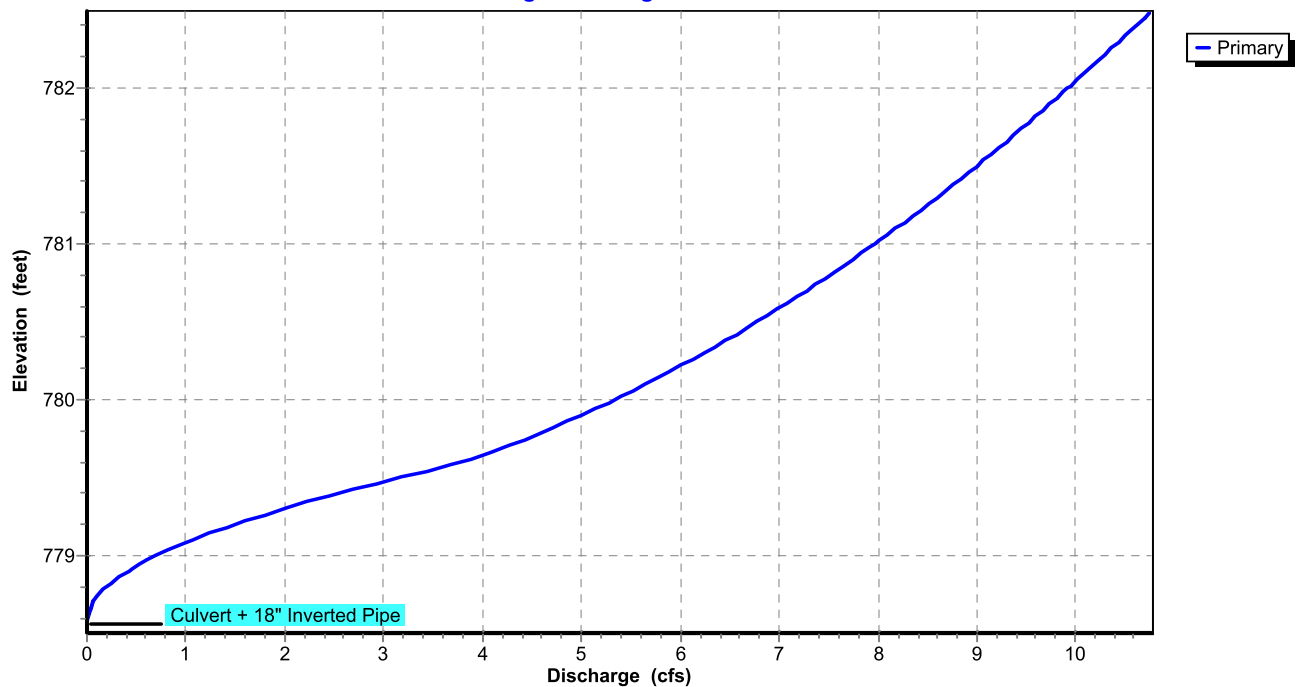
Pond 02: Tops Pond

Hydrograph



Pond 02: Tops Pond

Stage-Discharge



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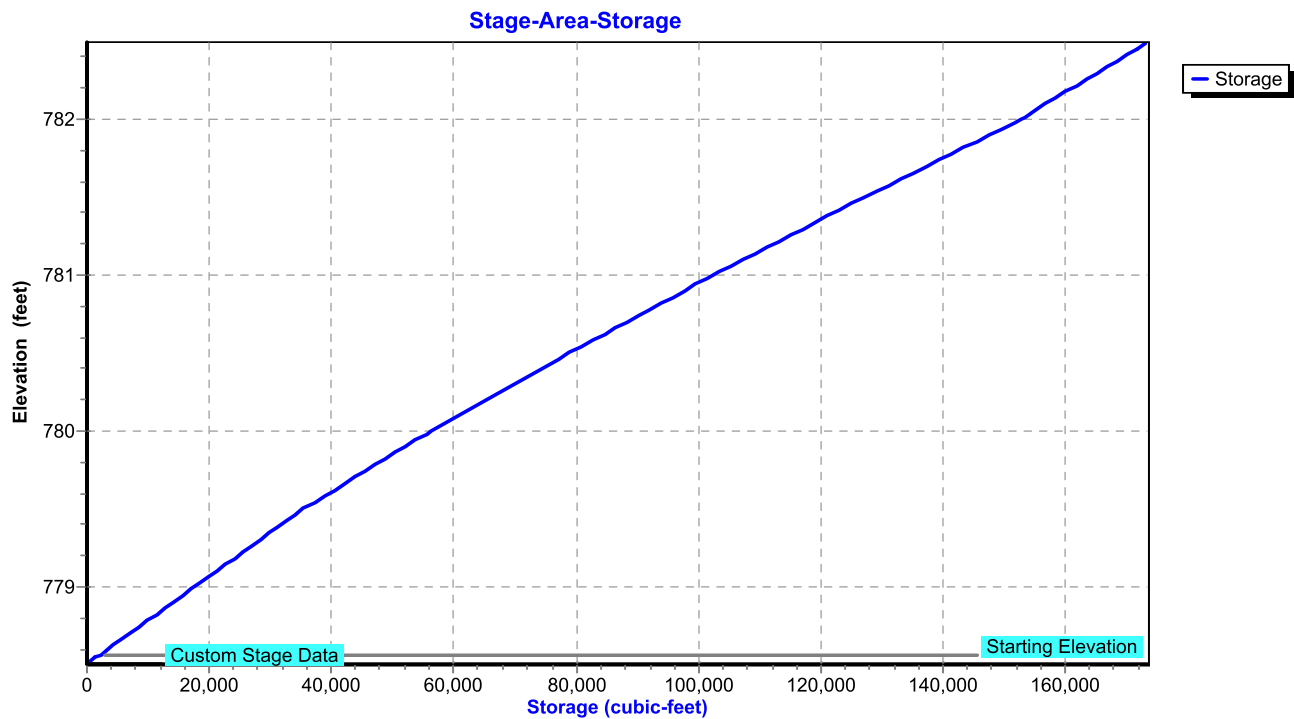
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Type II 24-hr 1-YEAR Rainfall=1.89"

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Page 6

Pond 02: Tops Pond



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Type II 24-hr 1-YEAR Rainfall=1.89"

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Page 7

Summary for Subcatchment 03: EX/PR Subarea B

Runoff = 2.20 cfs @ 12.26 hrs, Volume= 0.236 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-YEAR Rainfall=1.89"

| Area (ac) | CN | Description |
|-----------|------|---------------------------|
| 0.30 | 98.0 | Paved parking, HSG D |
| 0.95 | 96.0 | Gravel surface, HSG D |
| 2.35 | 73.0 | Brush, Good, HSG D |
| 2.10 | 78.0 | Meadow, non-grazed, HSG D |
| 5.70 | 80.0 | Weighted Average |
| 5.40 | | 94.74% Pervious Area |
| 0.30 | | 5.26% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 19.6 | 100 | 0.0150 | 0.09 | | Sheet Flow, Sheet Flow Grass: Dense n= 0.240 P2= 2.14" |
| 1.6 | 235 | 0.0240 | 2.49 | | Shallow Concentrated Flow, Shallow Conc Unpaved Kv= 16.1 fps |
| 7.9 | 225 | 0.0090 | 0.47 | | Shallow Concentrated Flow, Shallow Conc Woodland Kv= 5.0 fps |
| 29.1 | 560 | Total | | | |

Subcatchment 03: EX/PR Subarea B

Hydrograph

