

Romans Avenue Area Sewer Separation

Project Scope

The Romans Avenue Area in Halifax, NS is on a combined sewerage system. Halifax Water wants to change it to a separated system, with stormwater flowing in a new pipe network and wastewater continuing to flow in the existing combined system. The streets affected include Romans Ave, Federal Ave, Barnstead Lane, and parts of Chisholm, Micmac, and MacAlpine Drives. Part of the MacAlpine Ave area already has a separated system.

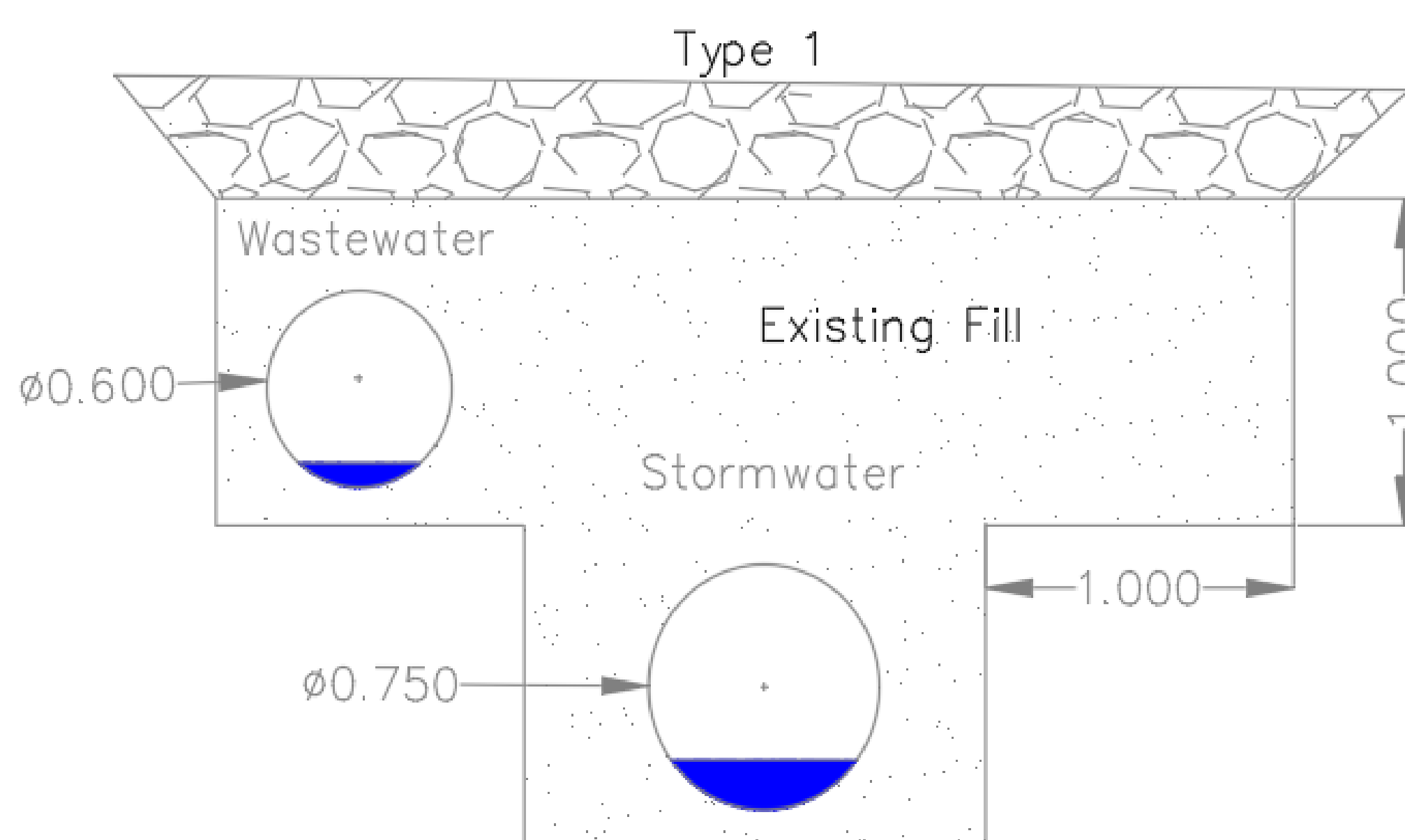
Sanitary Design

- Examine existing combined sewer flow data
- Separate existing combined flows into sanitary and storm flows by interpreting given rainfall data
- Assess dry weather flows to determine if existing combined system can act as a sanitary only system
- Complete design of sanitary system as fresh ground and compare with results from flow data

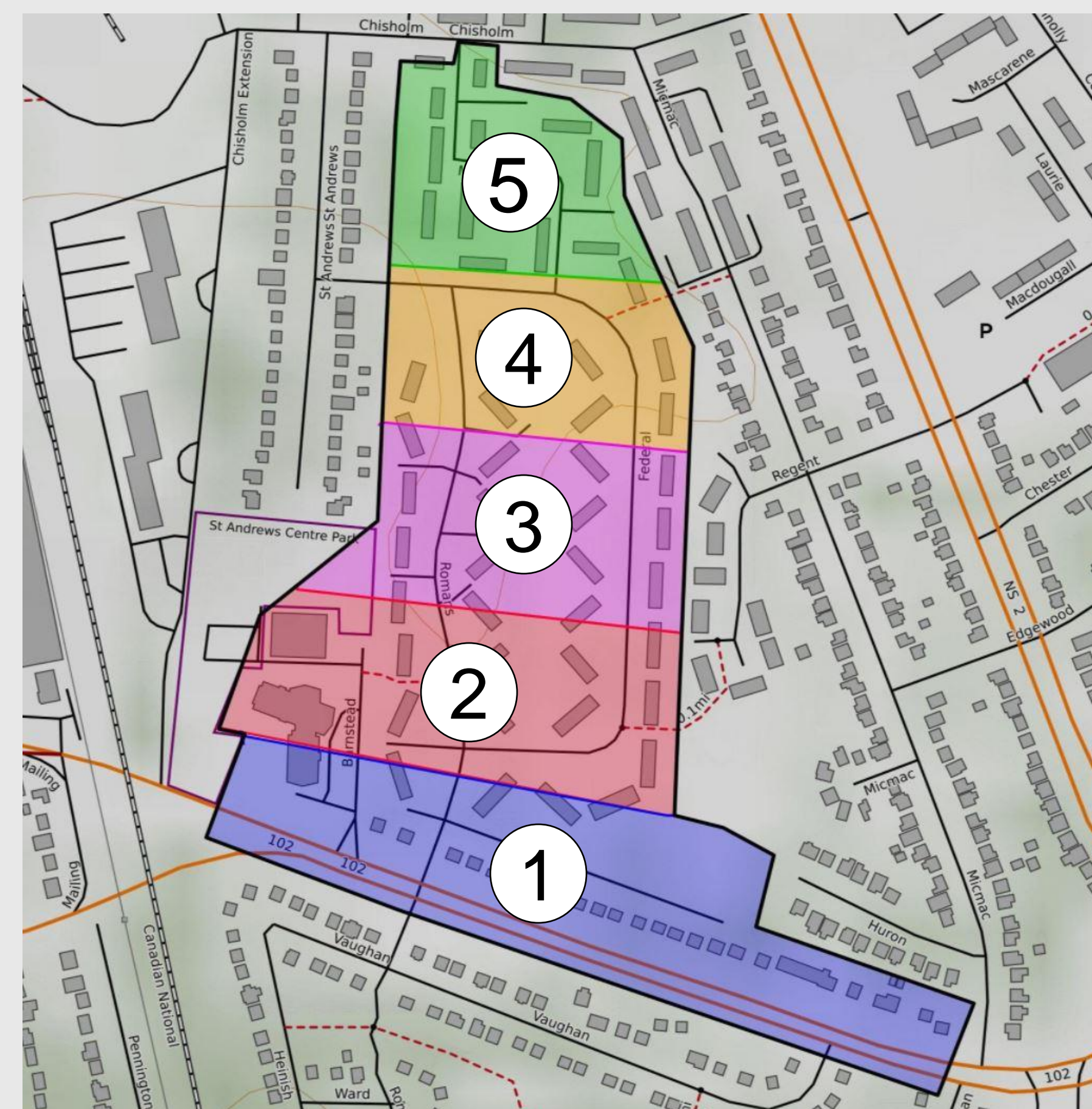
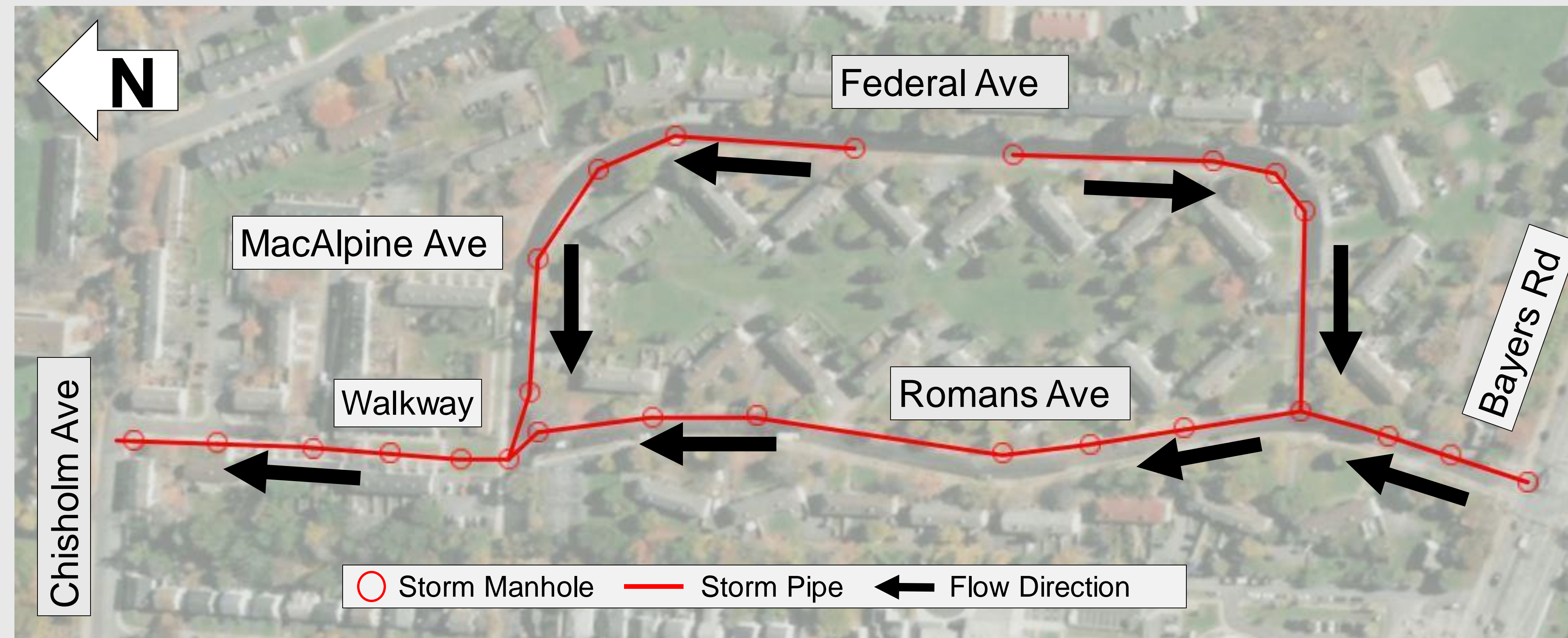
Stormwater Management

- Application of Chicago Design Storms (5 & 100-year return periods) to generate rainfall hyetographs
- Time-Area Method for catchment routing to generate runoff hydrographs for peak runoff design flow
- Design layout must follow Halifax Water 2020 Design Specifications for all stormwater infrastructure, where applicable.

Trench Detail at Outlet

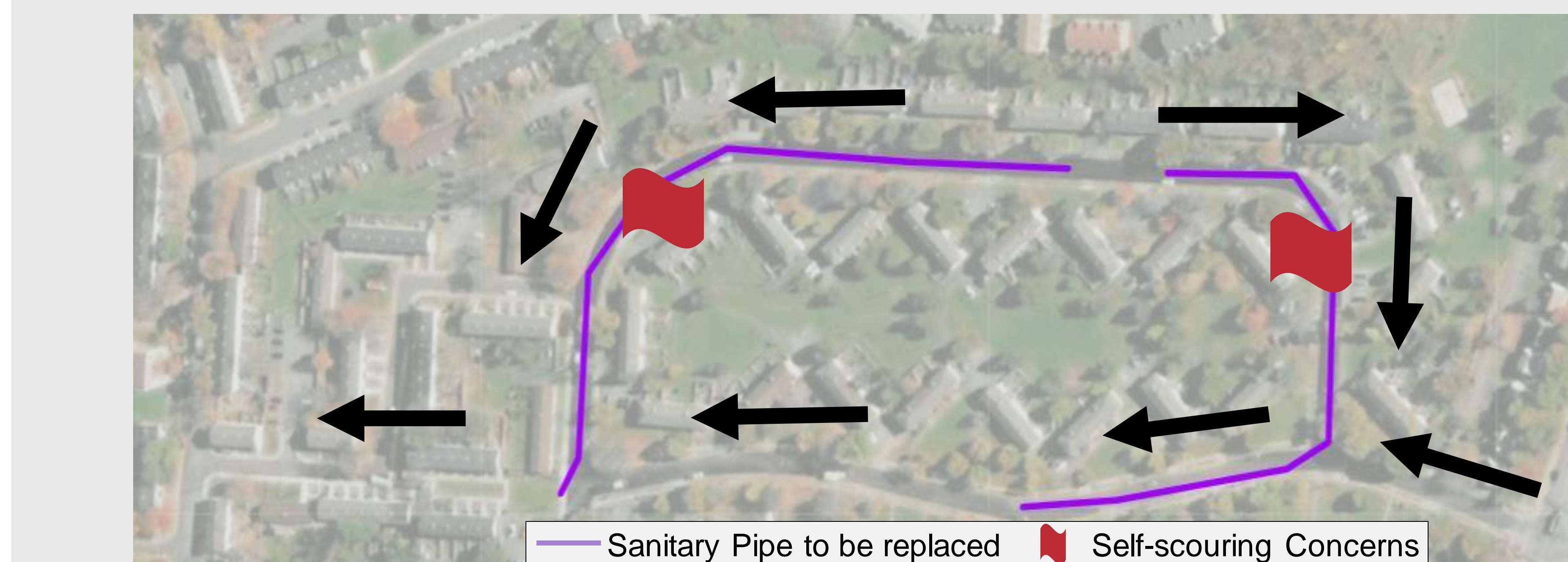
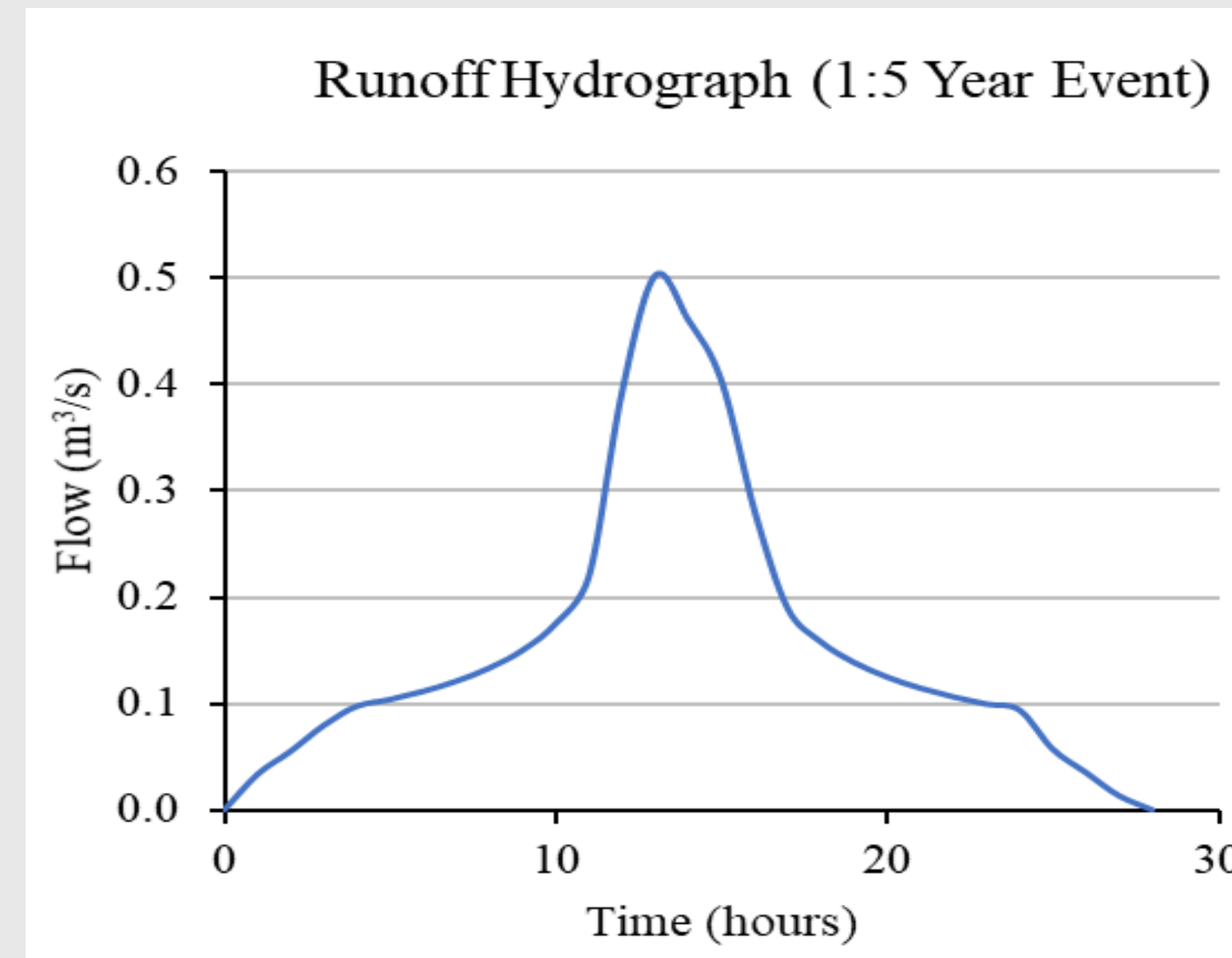


Details of Design



HYDROLOGIC MODELLING

The catchment's time of concentration was estimated at 25.2 minutes. This was divided into 5 equal time intervals of approximately 5 minutes each over the catchment area by isochrone delineation. Applying design storm produced peak runoff for a 5-year event at $0.503 \text{ m}^3/\text{s}$.



Stormwater Design 1:5 Year Event			
Pipe	Diameter (mm)	Length (m)	Material
Romans			
PR1	600	32.5	CSA257.2
PR2	600	17.9	CSA257.2
PR3	600	46.9	CSA257.2
PR4	750	45.6	CSA257.2
PR5	750	36.0	CSA257.2
PR6	750	41.6	CSA257.2
PR7	750	90.4	CSA257.2
PR8	750	48.2	CSA257.2
PR9	750	49.2	CSA257.2
PR10	750	12.8	CSA257.2
MacAlpine			
PM1	750	47.7	CSA257.2
PM2	750	32.8	CSA257.2
Walkway			
PW1	750	24.8	CSA257.2
PW2	750	27.2	CSA257.2
PW3	750	32.2	CSA257.2
Federal			
PF1	375	78.9	PVC (DR35)
PF2	300	25.0	PVC (DR35)
PF3	300	26.0	PVC (DR35)
PF4	300	48.4	PVC (DR35)
PF5	300	84.9	PVC (DR35)
PF6	300	28.8	PVC (DR35)
PF7	300	39.4	PVC (DR35)
PF8	375	67.1	PVC (DR35)
PF9	375	12.9	PVC (DR35)

Conclusion and Recommendations

- Self-scouring may be an issue on Federal Avenue
- Existing clay pipes will be replaced with new concrete pipes
- Newly designed stormwater management system to improve sanitary system capacity
- Installation of stormwater infrastructure including pipes, manholes, catch basins, and catch basin leads.
- Tie into existing infrastructure at beginning and outfall of stormwater system.
- Check capacity of stormwater system for a 100-year rainfall event

References

- Autodesk. AutoCAD 2021 [computer software]. Autodesk, Inc. San Rafael, CA, USA
- Halifax Water 2020 Design Specifications
- Ponce, V.M. 1989. Engineering Hydrology: Principles and Practices.