Welcome

City of Sault Ste. Marie

Peoples Road Area Basement and Overland Flooding

Class Environmental Assessment

Public Information Centre

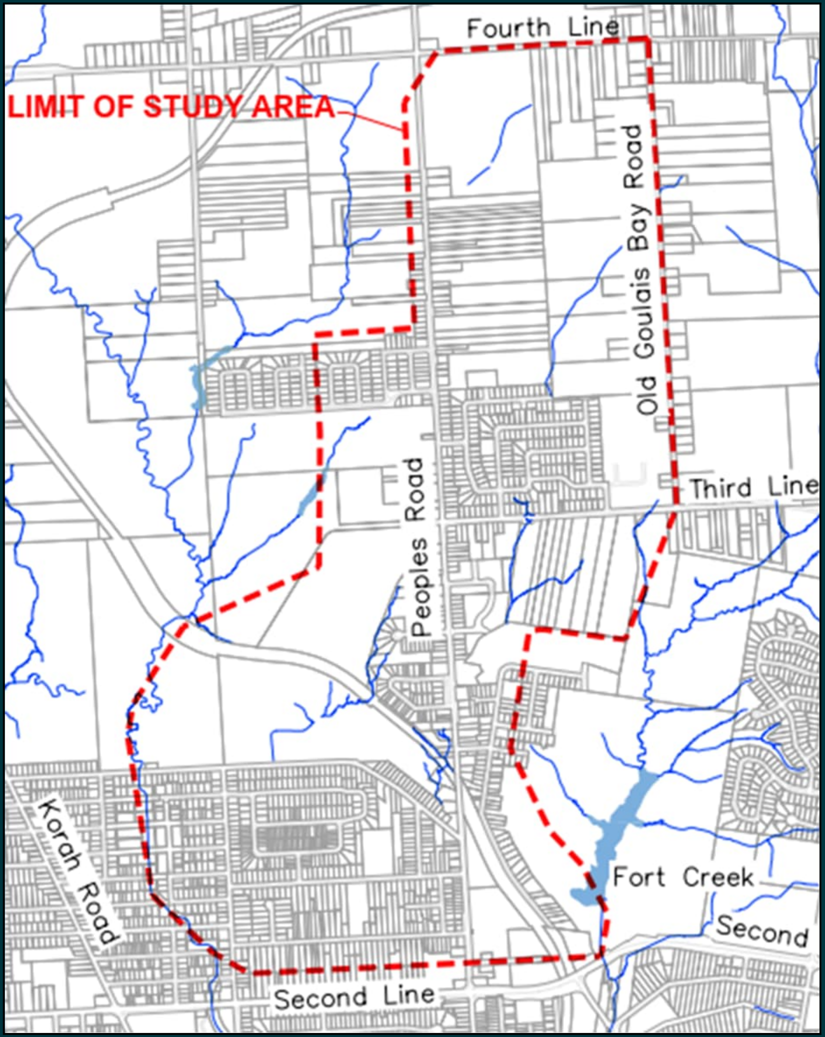
May 16, 2023

What to Do

- Please record your name on the sign-in sheet;
- Information package available on the project webpage as per Notice;
- AECOM and City Staff are available to present the project materials and answer questions; and
- Complete a Comment Sheet if desired.

Introduction

A Class Environmental Assessment (Class EA) was initiated to study overland and basement flooding issues within an area approximately bounded by Peoples Road and Farwell Terrace to the west, Old Goulais Bay Road and Fort Creek to the east, Fourth Line to the north and Second Line to the south (refer to key plan). Within the study area, there have been occurrences of overland and basement flooding during significant precipitation events. The focus of this study is to identify potential causes and develop alternatives to mitigate significant impacts.



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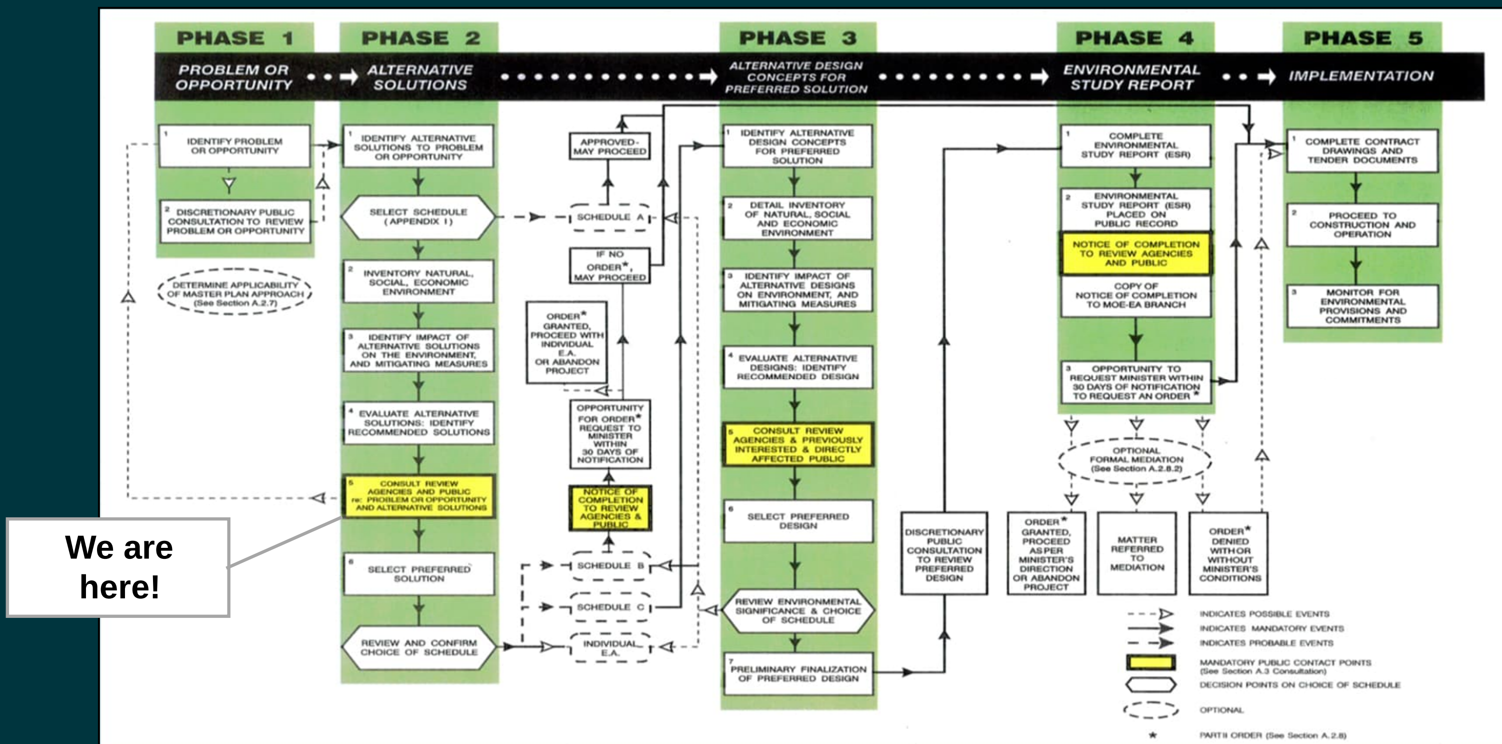
Problem/Opportunity Definition

Through the investigative and analytical work completed the principle contributing factors to the flooding occurrences likely consist of some or all the following:

- Significant inflows and infiltration (i.e. extraneous flows) into the wastewater collection system particularly during more significant precipitation events.
- Sanitary drains connected to the sanitary sewer system with no backflow valve or a poorly maintained or failed backflow valve.
- Property owners using water in their homes when there is a significant precipitation or snow melt event and the sanitary sewers are overwhelmed (surcharging).
- Storm drains directly connected by gravity to the storm sewer system with no backflow valve or a poorly maintained or failed backflow valve and no backup sump pump.
- Potential bottlenecks or flow restrictions in the wastewater and/or stormwater collection systems which may be due to blockages (i.e. system maintenance) and/or conveyance pipe sizes.
- Limited system storage particularly in relation to stormwater management.

Class Environmental Assessment Process



This flowchart highlights the steps that must be undertaken to meet the requirements under the Environmental Assessment Act.

Information Review and Data Analysis

What was reviewed and analysed:

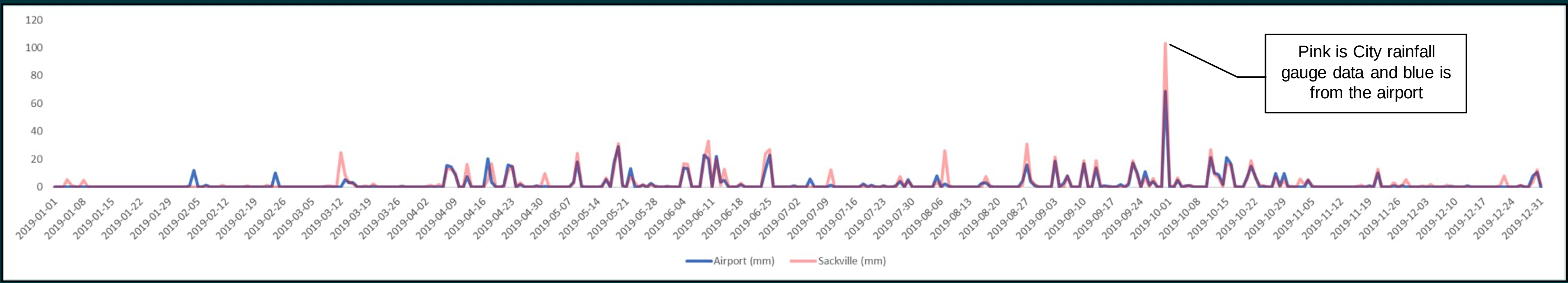
1. Historical complaint records reviewed, property owner questionnaires circulated and analysed, and field visits completed to understand the problems.
2. As-constructed records and City's GIS database reviewed to understand the existing infrastructure.
3. City By-laws were reviewed.
4. Design Guidelines were reviewed.
5. Rainfall Data was analysed.
6. Storm and Sanitary collection systems were modeled.

Data Analysis – Questionnaires/Field Visits

- 226 returned questionnaires;
- 110 identified a basement flooding issue;
- 24 respondents identified one basement issue;
- 66 respondents identified more than 1 basement issues;
- 28% and 23% of the basement flooding incidents identified that there was a sewage odor and dirt/mud odour associated with the water entering the basement respectively and approximately 57% identified that it was dirty while 35% indicated it was clear;
- 84 respondents identified a yard flooding concern;
- 119 respondents have sump pumps;
- Based on field visits it is believed some property owners have gravity storm drains with no or non-functional back flow valves; and
- Some property owners likely have sanitary drains with non-functional back flow valves.

Data Analysis – Rainfall Data

- Considered rainfall data from Environment Canada (airport) for period prior to Sept 2015 and City of SSM Sackville Road data for the period from Sept 2015 to 2019.
- Single day events exceeding 70mm in 2013, 2018 and 2019 and most years had at least one event exceeding 50mm.
- Higher intensity events with approximately 40mm in one hour recorded in Sep 2019 and Aug 2020.
- The majority of the flooding incidents were linked to higher precipitation or spring thaw events.



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Data Analysis – City Records and By-Laws

- As-constructed records show some gravity storm drains in areas where the storm sewer has adequate depth.
- Prior to 1968 it was common for building foundation drains to be connected to the sanitary sewer system.
- In 1968 a new By-law was enacted prohibiting foundation drain and roof downspout connections to the sanitary system but rather were to discharge to storm sewers, ditches or yards.
- However, foundation drain connections to the sanitary system continued beyond 1968 due to challenges with enforcement.
- Current sewer use By-law 200-50 permits both pumped and gravity storm drain connections to the storm sewer system.
- It is believed a requirement for backflow valves on sanitary and storm drains was introduced via By-law 77-433.

Data Analysis – Design Guidelines

City SSM Stormwater Management Guidelines

- New development, peak post-development flows should not exceed predevelopment flows for all storms up to the major drainage system design storm. This implies that that future development should not exacerbate existing challenges in the study area
- Developments within the City of Sault Ste. Marie shall continue to be serviced by a dual drainage system consisting of a minor stormwater drainage system (eg. piped system) and a major stormwater drainage system (i.e. over land system).
- The minor stormwater drainage system primarily consists of the underground pipe network, maintenance holes, outfalls, roof drains, lot drainage and drain tiles. The major stormwater drainage system conveys runoff that exceeds the conveyance capacity of the minor system components and typically includes overland flow pathways including drainage channels and floodwater diversion channels, streets, swales, stormwater detention and retention ponds outfalls and culverts.

Data Analysis – Design Guidelines

City SSM Stormwater Management Guidelines

- The minor stormwater drainage system shall be designed to convey stormwater runoff from the 1:10 year return period without surcharging.
- Storm sewer systems are designed to surcharge periodically (i.e. overloading the sewer beyond its design capacity). During larger storm events when the minor storm water system is overwhelmed (flooded), storm water will then follow the “major” overland storm water system. This would typically include storm water being conveyed, amongst other things along streets and roads.
- Recognizing that storm sewer systems are designed to flood it is imperative that gravity storm drains connected to homes must include functional backflow prevention valves and ideally should also include sump pumps as a contingency.

Data Analysis – Design Guidelines

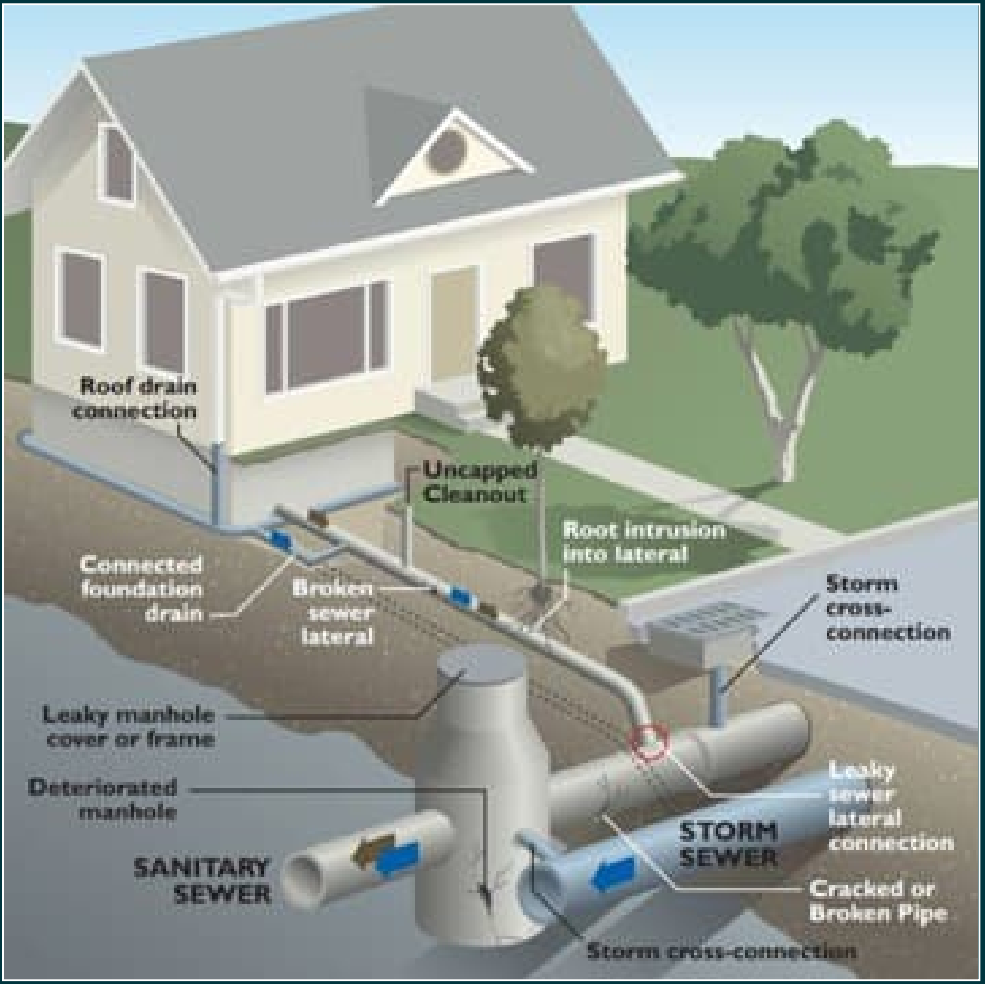
Sanitary Sewer Design Guidelines

- Sanitary sewer systems are designed to accommodate sewage and some limited extraneous flows (i.e. storm water).
- Sources of extraneous flows may include:

i. Groundwater infiltration into the collection system due to high groundwater and system leaks (i.e. broken or cracked pipes),

ii. Inflows into low lying manholes or uncapped or leaky sanitary lateral cleanouts; and

iii. Foundation and/or roof drains connected to the wastewater collection system.



Data Analysis – Summary

- Historical problems are generally widespread across the study area with no apparent focal neighbourhoods.
- Extraneous flows have been and continue to be a significant contributor to basement flooding.
- Foundation drain connections to the sanitary system continue to contribute significant extraneous flows in the wastewater collection system.
- Basement flooding problems are being experienced, to some extent, in the spring of each year which reflects the spring thaw period. Based on the rainfall data there were no obvious large rainfall events in the April to May period from 2013-2019 but problems have been reported by property owners.
- There is good correlation between the rainfall data and flooding complaints/problems reported in the summer and fall periods.

Data Analysis – Summary

- The basement flooding that has occurred has been linked to both sanitary flows and stormwater flows - in some instances property owners reported the flood waters were clear with no odour and water was observed to be entering through walls or windows.
- Property owners may not be aware of or understand the importance of the backflow valves on their sanitary and storm drains.
- Property owners may not be aware of or understand that during significant precipitation events when the sanitary collection system is overwhelmed (surcharging) they should monitor for sewage backup in their basements and avoid water use in their homes as it may not drain to the municipal system and could ultimately lead to basement flooding.
- The sanitary system modeling identified a couple of locations where existing pipe sizes may be restricting flows and resulting in system surcharging during periods of higher extraneous flows.
- The storm system modeling coupled with known areas of street ponding/flooding (e.g. Pozzebon, Hillside) indicate areas where improvements may be possible.
- Blockages in sanitary or storm sewer systems could also result in system surcharging.

Recommended Local (Property Owner) Remedial Measures

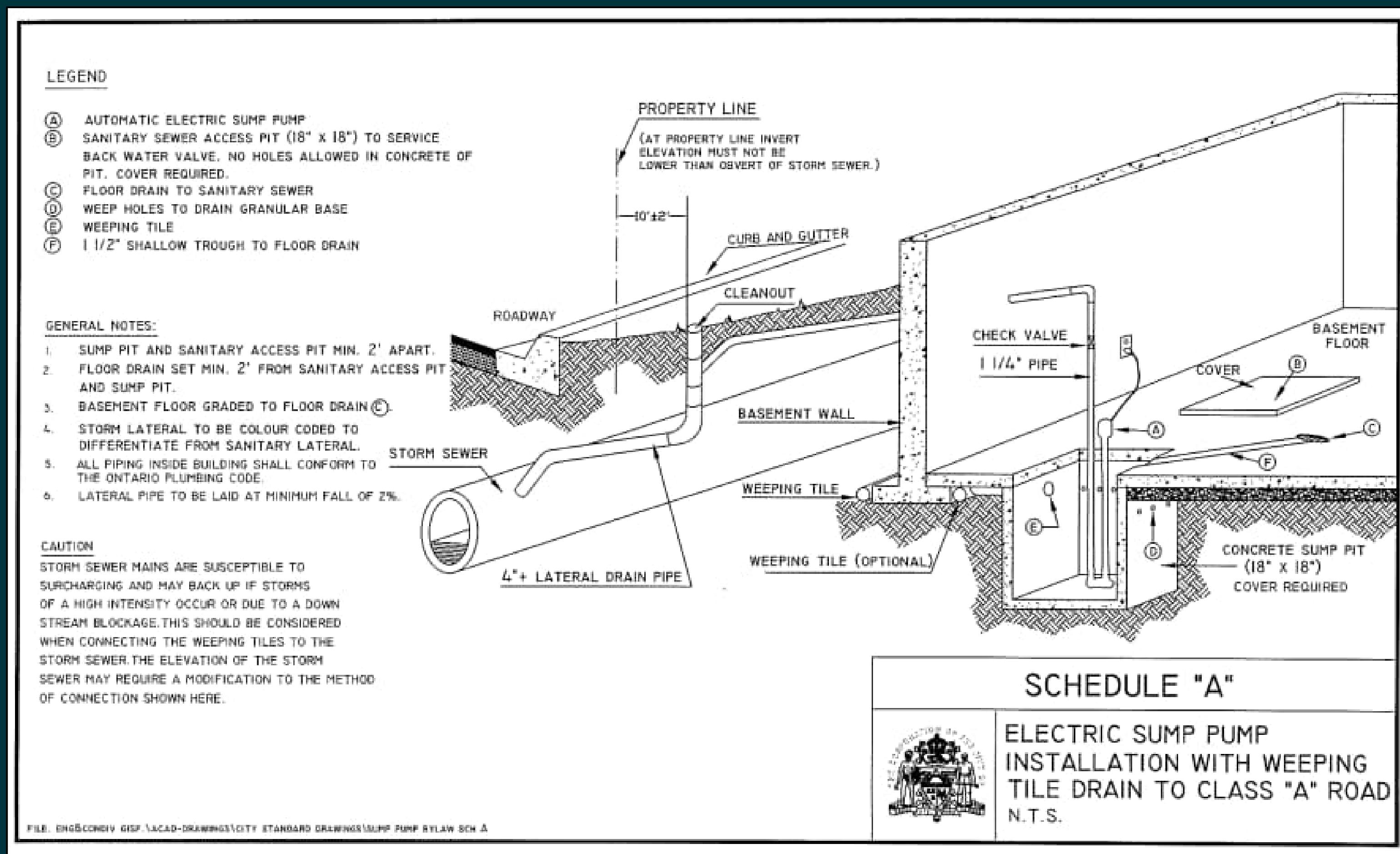
The following control measures are generally recommended for implementation by individual property owners. Not all of the control measures are appropriate for every property. These control measures are the responsibility of individual property owners and hence have not been included in the evaluation.

Control Measure	Applicability	Comments
Backflow prevention in sanitary and storm drains - **Most effective solution** for individual properties to mitigate basement flooding due to sewer surcharge.	May be applied to all sanitary drains and all gravity storm drains.	Encouraged as a general solution, especially in residences with previous flooding. Not identified as part of alternatives to be modeled and evaluated.
Avoid water usage and monitor sewage backup during significant rainfall and snow melt events.	Applied to all sanitary drains and in particular those locations with a previous history of flooding.	Encouraged as a general solution, especially in residences with previous flooding. Not identified as part of alternatives to be modeled and evaluated.
Sump pump for foundation drains - disconnection of foundation drains from gravity sanitary sewer and convert to a pumped storm discharge. Reduces inflow and infiltration in sanitary sewer and with broad acceptance and uptake collectively reduces the risk of sanitary sewer system flooding.	May be applied anywhere.	Encouraged as a general solution, especially in residences with previous flooding.
Sump pump backup for gravity storm sewer drains - Effective contingency solution for individual properties to mitigate basement flooding due to storm sewer surcharge when backflow valve fails.	May be applied to locations that have gravity storm drains.	Encouraged as a general solution, especially in residences with previous flooding. Not identified as part of alternatives to be modeled and evaluated.

Recommended Local (Property Owner) Remedial Measures

Control Measure	Applicability	Comments
Lot regrading to direct flow away from residences - Effective in reducing local flooding and high inflow and infiltration to foundation drains.	Applicable in areas where overland flow can we redirected without impacting adjacent properties. To be assessed on an individual property basis.	Encouraged as a general solution, especially in residences with previous flooding. Not identified as part of alternatives to be modeled and evaluated.
Rain barrel or similar - Reduces stormwater volume entering the sewer by promoting re-use of roof runoff. Also reduces municipal water consumption.	Where space for barrel exists. May be used even where basement flooding has not occurred.	Encouraged as a form of source control and general solution. Not identified as part of alternatives to be modeled and evaluated.
Downspout disconnection -Divert roof runoff from storm and sanitary sewers thereby reducing the peak flows and volume of runoff.	Applicable in areas where overland flow will not cause a problem. To be assessed on an individual property basis.	Encouraged as a form of source control and general solution. Not identified as part of alternatives to be modeled and evaluated.

Data Analysis – City Records and By-Laws



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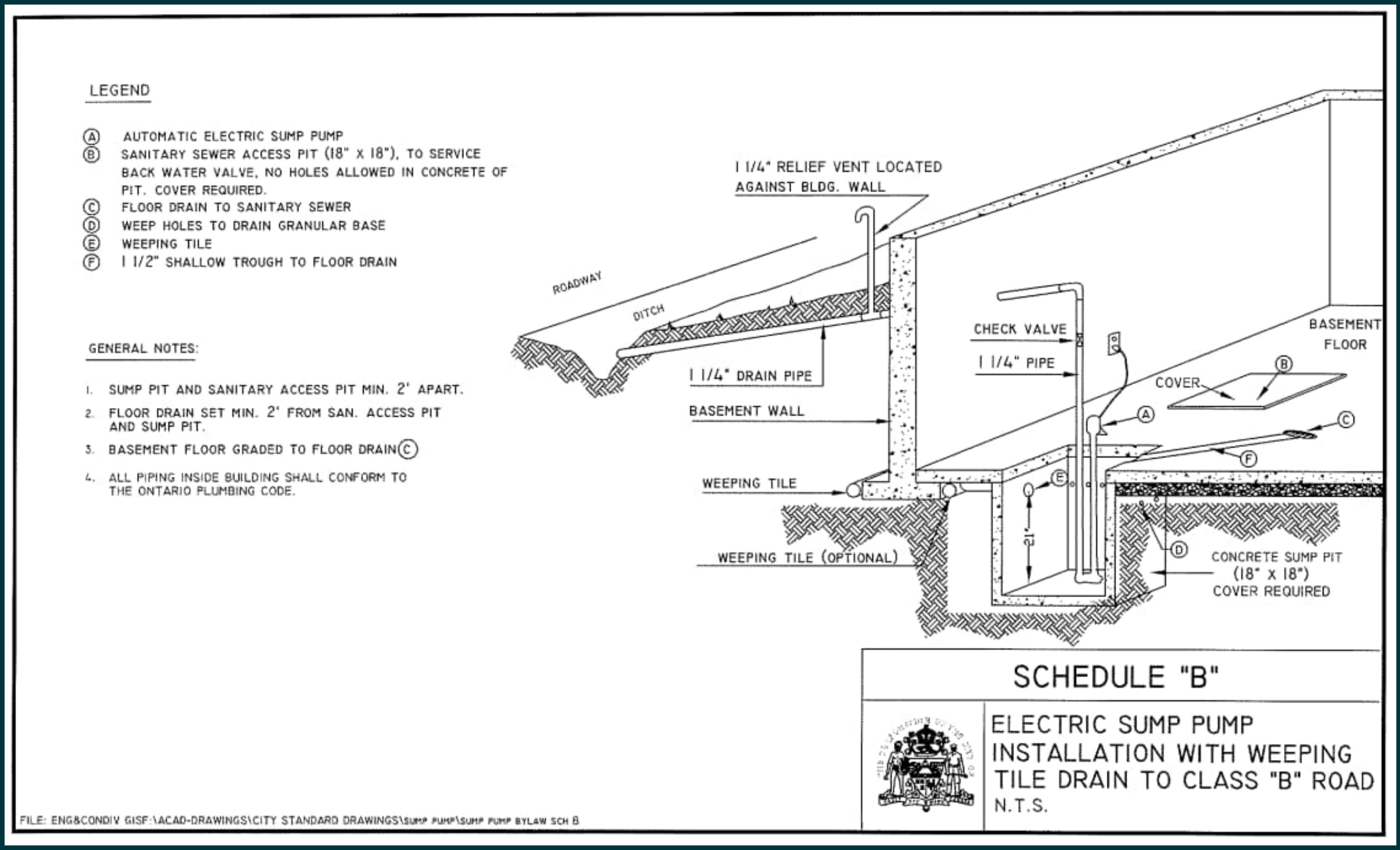
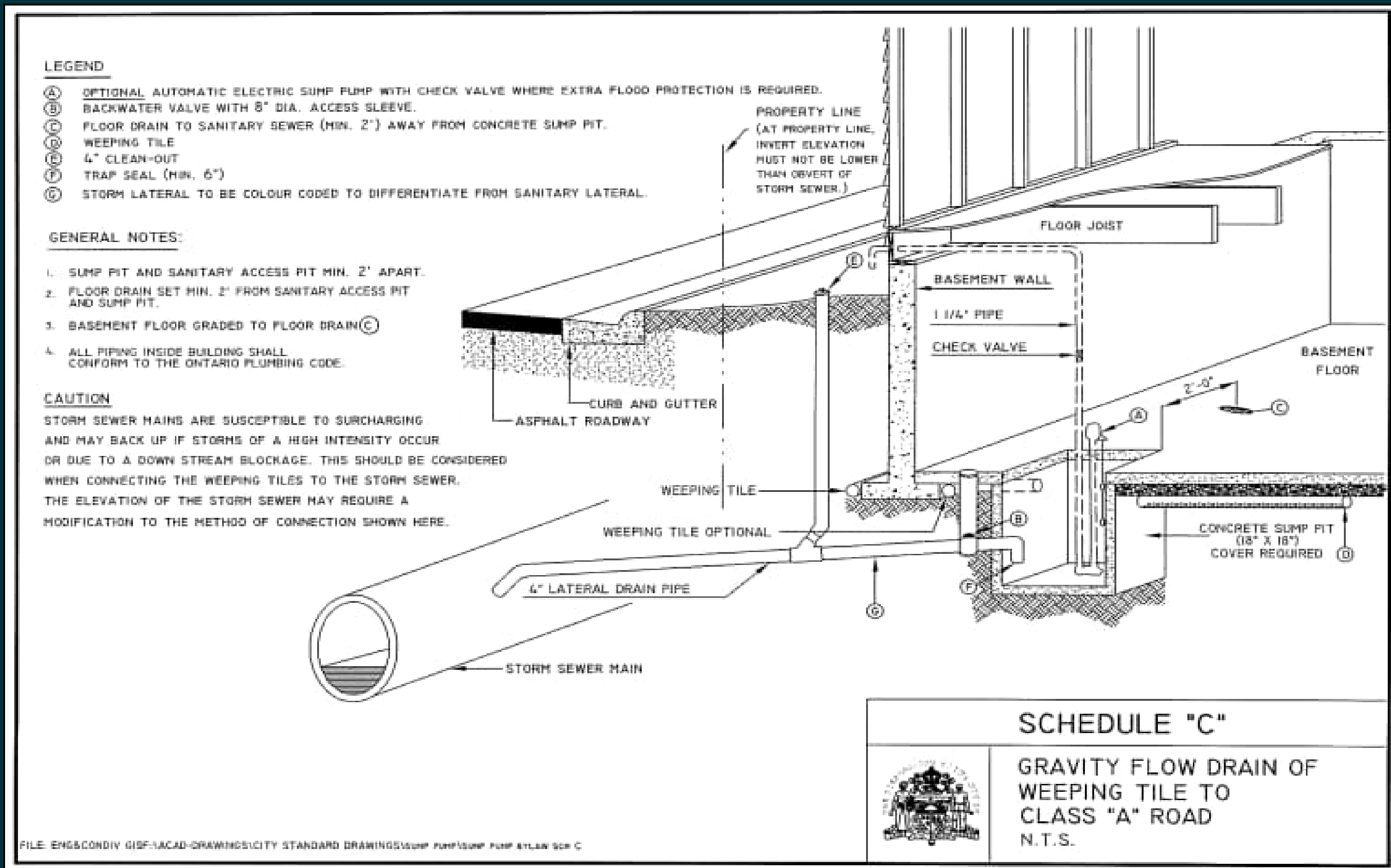
Data Analysis – City Records and By-Laws



Data Analysis – City Records and By-Laws



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Recommended Sanitary and Storm System Remedial Operation and Maintenance (O&M) Measures

The following O&M measures are generally recommended for implementation by the City. O&M measures can be implemented without completing a Class EA but have been identified here as important means of controlling inflows and infiltration (I&I) and flow control. These control measures have not been included in the evaluation.

Control Measure	Applicability	Comments
Sealing selective sanitary sewer manhole covers - low cost measure effectively reducing inflow and infiltration in sanitary sewers.	Primarily at low points of system or where frequent road flooding occurs.	Encouraged as a form of source control and general solution.
Sealing selective manholes and pipes to address system leakage - reducing I/I into sanitary sewer though system repairs inclusive of pipe lining and grouting.	Should be focused where high inflow and infiltration is evident.	Encouraged as a form of source control and general solution.
Sanitary system operations and maintenance - Mitigate potential bottlenecks from debris/grease/ sediment build-up.	Everywhere, particularly where basement flooding has occurred.	Encouraged as a general solution. Not identified as part of alternatives to be modeled and evaluated.
Storm system operations and maintenance - Mitigate potential bottlenecks from debris/sediment build-up in storm sewers and ditches.	Everywhere, particularly where basement and/or yard flooding has occurred.	Encouraged as a general solution. Not identified as part of alternatives to be modeled and evaluated.

Alternative Solutions Identified and Evaluated (Capital Improvements)

Reference	Description
1	**Do Nothing** – Under this alternative no improvements would be undertaken. This alternative has been included to provide a basis for comparing the other alternatives.
2	**Sanitary sewer conveyance system upgrades** – under this alternative the capacity of the wastewater conveyance system would be enhanced through the addition of new pipes or replacement of existing pipes.
3	**Stormwater conveyance system upgrades**– under this alternative the capacity or capabilities of the stormwater conveyance system (sewers and/or ditches) would be enhanced through the addition of new pipes or ditches or replacement of existing pipes.
4	**Stormwater detention ponds (dry stormwater management ponds)** – under this alternative dry stormwater management ponds would be constructed to better manage downstream stormwater flows particularly during higher precipitation events.
5	**Wastewater storage (pipes or tanks)** – under this alternative inline or offline storage pipes or tanks would be constructed to better manage downstream wastewater flows particularly during higher precipitation events.

Inventory of Existing Conditions

Inventoried existing conditions including consideration of:

Natural Environment

- Physiography and surface geology
- Surface water resources and aquatic habitat
- Vegetation and terrestrial habitat
- Cultural and heritage resources
- Groundwater resources
- Topography

Social Environment

- Municipal services (sanitary and storm collection systems)
- Utilities
- Land use
- Transportation
- Recreation

This inventory was necessary to provide a basis for comparing and evaluating the Alternative Solutions.

How were the Alternatives Evaluated?

In order to select a preferred solution a number of evaluation criteria were developed and applied to each of the alternatives.

A total of twelve (12) evaluation criteria were established under four broad categories; natural environment, social environment, technical and cost. A comparative qualitative approach was undertaken in evaluating each of the alternatives, whereby a score of 1 to 3 was assigned to each alternative for each criterion (1 being least preferred and 3 being most preferred). This approach consists of rating the alternatives relative to each other considering both the positive and negative qualities relative to each of the evaluation criteria. A score of 3 reflects a positive or neutral impact or relatively low cost while a score of 1 reflects a negative impact or relatively high cost. A score of 2 fits in between.

Interested Parties are encouraged to provide input regarding the valuations assigned.

How were the Alternatives Evaluated?

The evaluation criteria used in the assessment are described below.

Category	Comparative Criteria	Criteria Description
Natural Environment	Terrestrial Systems	Potential to impact terrestrial habitats or systems, including terrestrial features / functions unique vegetation species, mature trees, existing park / open spaces linkages or wildlife
	Aquatic Systems	Potential to impact aquatic habitats or systems, including possible impacts on aquatic life, features / functions.
	Soil, Ground Water and Surface Water	Potential to impact soils, groundwater and surface water from the construction of the facility. Alternatives that require more than 1.0 m of excavation may require some dewatering during construction.
Socio-Cultural Environment	Community Impact	Potential to impact the community in terms of visibility, road access, construction of mitigation measure in valley lands / parks and playgrounds, possible noise / odour / light, potential risk in terms of proximity to open water which may provide breeding grounds for mosquitoes, short-term construction impact, etc.
	Land Use Compatibility	The extent to which the control measure requires a change in current land use and how it blends in with the existing land uses in the area.
	Archaeology/Natural Heritage	The potential of the solution to impact any archaeological sites and/or significant / natural heritage areas (Note: at this stage of the assessment this is a tabletop screening level assessment the prefreered soultion may require more detailed evaluation prior to implementation).
Technical Considerations	Water Quantity Effectiveness of Control Measure	Effectiveness of the alternative in mitigating basement and or yard flooding.
	Stormwater Runoff Quality Effectiveness of Control Measure	Effectiveness of the alternative in improving the quality of the stormwater runoff.
	Feasibility and constructability of Control Measure	The extent to which the alternative is challenging to implement and construct in terms of availability of space, accessibility, utility conflicts, other infrastructure conflicts,easement requirements, construction techniques and requirements.
	Downstream Impacts Trunk Sewers/ Treatment Facilities/ Receiving Water	The impacts of the alternative in increasing flooding downstream and surrounding areas or impacts to instream erosion potential for works extending to outfalls
Economic Considerations	Capital Cost	The high level estimated capital cost associated with the construction of the alternative including labour, material and equipment and possibly property acquisition.
	Operation & Maintenance (O&M) Cost	Post-construction operation and maintenance activities associated with various mitigation measures including inspection, grass cutting / weed control, performance monitoring, sediment / trash removal, energy requirements and other operational requirements.

Summary of Evaluation

Evaluation Criteria	Do Nothing	Wastewater Storage Tank or Pipe	Stormwater Detention Ponds	Wastewater Pipe System Upgrades	Stormwater Conveyance System Upgrades
Natural Environment					
Terrestrial	2	2	1	2	2
Aquatic	2	3	3	1	2
Soil/Groundwater/Surface Water	1	1	1	1	1
Subtotal (Natural)	**5**	**6**	**5**	**4**	**5**
Socio-Cultural Environment					
Community	1	2	3	3	3
Land Use	2	2	2	2	2
Archaeology/Natural Heritage	2	1	1	2	2
Subtotal (Socio-Cultural)	**5**	**5**	**6**	**7**	**7**
Technical Considerations					
Water Quantity	1	2	3	3	3
Surface Water Quality	1	3	3	3	2
Feasibility/Constructability	3	1	2	2	2
Downstream System Impacts	2	3	3	1	2
Subtotal (Technical)	**7**	**9**	**11**	**9**	**9**
Economic Considerations					
Capital	1	1	2	2	3
O&M	2	2	2	2	2
Subtotal (Economic)	**3**	**3**	**4**	**4**	**5**
TOTALS	**20**	**23**	**26**	**24**	**26**

Preliminary Preferred Solution – Potential Municipal Undertakings

- Sanitary sewer system upgrades along Peoples Road (Third Line to Churchill Blvd) and Johnson Avenue (Diane St to Farwell Terrace) contingent on downstream system capacity.
- Storm sewer system upgrades at the Hillside Drive storm outlet, Diane Street (Pozzebon to Johnson) and Farwell Terrace (Johnson to Outlet).
- Stormwater detention ponds at one or more of the following locations:
  - South end of the cemetery
  - Elliott Field at location of former pond
  - Elliott Field adjacent to pickleball courts
  - West of Peoples Road and south of Hillside Drive
- Perimeter ditch along the south side of the eastern Elliott sports field.
- Replacement /upgrading of stormwater collection system in conjunction with normal capital construction project

Next Steps

- Conduct PIC – May 2023.
- Assess the input received and make changes as necessary to the preferred alternative.
- Finalize preferred solution – June, 2023.
- Confirm the Class EA schedule (i.e: likely proceeding under Schedule B);
- Develop a prioritized list of projects for implementation.
- Prepare and issue DRAFT report - August, 2023.
- Finalize Class EA report and issue Notice of Completion - September, 2023.

Thank you.

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