Item 14.b.1
Engineering Department
October 3, 2024

To: **David Creery, Chief Administrative Officer**

From: **Harold de Haan, City Engineer**

Re: **Warwick Flooding EA Amendment**

AIM

To receive City Council acceptance of the Warwick Area Flooding Assessment Addendum Municipal Class EA, Schedule B, June 2024 report and that the notification regarding the completion of the study be circulated for public comment with a thirty-day comment period.

BACKGROUND

In response to a July 28, 2010 storm event and resulting flooding, residents of the Warwick & Cambridge area asked Council to have this issue investigated. As a result, at the September 2, 2010 Council meeting, Council passed a motion directing Staff to prepare a Class EA.

Completion of the Class EA through the Phase 3 step of the process resulted in a recommended preferred alternative of 'Alternative 5' for the Warwick Study area. In order to provide flooding protection up to the 100-year storm event, Alternative 5 included a number of different features working together to provide the 100 year protection. The preferred concept comprised a number of projects including the creation of underground storage at Cambridge and Warwick. It was anticipated that these items combined will eliminate flooding onto private property up to the 100-year storm event.

Since the City of Woodstock has implemented most of the recommendations from the study, flooding in the area has reduced and the City has stopped receiving flooding complaints from area residents. In 2014, the Hughson Street storm sewer was upsized as part of the road reconstruction. In 2017, the City obtained an easement from the Woodstock Agricultural Society and constructed a dry SWM facility in the infield of the track. The remaining recommendation from the 2012 study, an underground stormwater management facility, proceeded to the detail design phase. During design, it became apparent that the cost was going to be significantly higher than originally estimated in the EA. Construction of the underground storage would greatly impact the residents in the area to the point of making some properties inaccessible for limited times during construction. Due to these factors, it was decided to revisit the environmental assessment to investigate new alternative solutions that will be more cost effective and less disruptive to area residents.

COMMENTS

Revisiting this issue involved restudying and remodeling of the watershed area. Modelling of the watershed including the projects already completed, showed that all of the properties in the area now had protection for a 100-year storm event except for 8 properties. Further investigation showed that these properties would still be at risk with the construction of underground storage volume. Knowing this, the EA needed to be reopened to amend the preferred option originally

proposed. Therefore in 2022, the Warwick Area Flooding Environmental Assessment Addendum commenced.

Notice of Commencement was published in July 2022 and a PIC was held in December of 2023. In addition to these opportunities for public comment, letters were distributed to the area and a specific website was created for residents to complete a survey and offer comments. To date there have been no negative comments received.

The Preferred Option proposed through this addendum (see attached report) is that the risks of flooding be addressed on site for each of the eight properties that still might experience flooding. The onsite mitigation measures are: install basement window protection, and/or complete grading modifications. Soakaway areas or means of pumping any created trapped water area may also need to be considered. Each property at risk will have to be looked at individually with a specific plan being created for each one. The estimated cost to design and construct all of these options is approximately $250,000. If approved, City staff would retain AECOM to design site specific measures to address flooding risks at each of the properties. Once completed, City staff would present the recommended work to the property owners. The property owners would be responsible to hire a contractor to complete the recommended works. A subsidy fund would be set up by the City to reimburse the property owners upon satisfactory completion of the work. Homeowners could opt out of this work if they are willing to accept the risk of future flooding.

Should Council approve this report, the public will have a 30-day period to provide comments at which time any interested parties may comment. After the 30-day comment period, the EA will be amended to incorporate any comments received and filed with the Ministry for approval. Copies of the report will be available for review at the City Engineer's Office and on the City's web site.

If approved, Staff would include the necessary funds for consideration as part of the 2025-2029 Capital Budget deliberations.

RECOMMENDATION

That Woodstock City Council accepts the report entitled "Warwick and Norwich Area Flooding Study Municipal Class EA, Schedule B, July 2012" and that the report be posted for a 30-day public comment period.

Authored by: Harold de Haan, P.Eng., City Engineer

Approved by: David Creery, P.Eng., MBA, Chief Administrative Officer

City of Woodstock

Warwick Area Flooding Environmental Assessment Addendum Schedule B

60677774

June 2024

Delivering a better world

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AECOM: 2015-04-13

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Distribution List

# Hard Copies	PDF Required	Association / Company Name
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1. Introduction

1.1 Project Background

The City of Woodstock (the City) through their consultant AECOM Canada Ltd. has completed a Municipal Class Environmental Assessment Addendum for the Warwick Area Flooding study originally completed in July 2012. The original Environmental Assessment reviewed the cause of flooding in the Norwich and Warwick areas and evaluated alternative solutions. Flooding in the Warwick area included severe surface ponding in the low-lying area at the intersection of Warwick Street. and Cambridge Street., ponding at the Warwick Street. and Belgrave Street. intersection, and basement and backyard flooding in several low-lying areas. Six alternative solutions were evaluated, and the preferred alternative consisted of strategically located underground storage facilities and an upgrade of the Hughson Street storm sewer.

All of the recommended alternatives have been implemented except the Warwick Street / Cambridge Street underground storage facility. When this storage facility proceeded to detailed design, the updated cost estimates for the recommended underground storage facility proved to be much higher than initially estimated.

In 2022 the City approached AECOM to identify new and more cost-effective solutions that could be evaluated against the previously recommended solution and complete an addendum to the Warwick Area Environmental Assessment study.

In addition to the analysis, AECOM conducted a monitoring program and assessment of the partially implemented recommendations.

The Warwick Flooding Environmental Assessment Addendum study included:

- Development of an updated problem and opportunity statement.
- Identification and evaluation of new alternative solutions.
- An assessment of the effects on the environment, including natural, social, economic and engineering aspects associated with the preferred alternative.
- Identification of measures required to mitigate any potential adverse effects.
- Public and approval agency consultation
- Indigenous community consultation

1.2 Study Purpose and Objectives

The purpose of this Municipal Class Environmental Assessment Addendum is to provide a comprehensive and environmentally sound planning process, which is open to public and Indigenous Community participation, to select the preferred stormwater management solution for the Warwick Area and updating or confirming the original

Environmental Assessment study recommendations. The objectives of this study include:

- Identify existing flooding conditions within the Warwick area since the implementation of some of the recommended stormwater management works.
- Protect the environment, as defined by the Environmental Assessment Act (EA Act), through the wise management of resources.
- Consult with affected and interested agencies, Indigenous Communities, key stakeholders, affected landowners, and the public.
- Identify a range of alternative solutions that incorporate concerns raised during the planning process.
- Identify measures needed to mitigate impacts associated with the recommended solutions.
- Prepare a Project File EA Addendum Report that documents all the consultation inputs and complies with the requirements of the MCEA process for Schedule B undertakings.

1.3 Study Area

The study area is separated into two (2) areas. The original study area from the 2012 Environmental Assessment which is the area of influence and a more targeted area affected by the originally recommended Cambridge Street / Warwick Street underground storage facility. Refer to **Figure 1-1**.

Figure 1-1: Study Areas

1.4 2012 Environmental Assessment Status

To date, five (5) of the six (6) recommended stormwater management projects have been constructed. The status of the recommended and constructed works are summarized below in **Table 1-1** and illustrated in **Figure 1-2.**

Table 1-1: 2012 Recommended Works and Status

Recommended Works	Description	Status
Upsize the Hughson Trunk Sewer	Upsize the 450mm Hughson Trunk Sewer from Sydenham Street to Winchester Street. The new sewer configuration is: • Winchester Street to Huron Street 525mm to 1200mm	Constructed

	• Cambridge Street to Jubilee Place 750mm • Jubilee Place to Vimy Place 600mm • Vimy Place to Winchester Street 525 • Jubilee Place to Winchester Street 300mm to 375mm. Refer to **Figure 1-3**	
Knightsbridge Park SWM Facility	Inlet controls redirecting flows to the Hughson Storm Sewer.	Constructed
Rerouting Knightsbridge Road Storm Sewer	Rerouting the sewer towards the upsized Hughson Sewer	Constructed
Fairgrounds Stormwater Management Facility	Provide storage and attenuation for overland flow routes. Storage Capacity of 2400m^3	Constructed
DM Sutherland Underground Stormwater Management Facility	Provide storage to eliminate flooding at the intersection of Warwick Street and Cambridge Street. Storage Capacity of 1150m^3.	Constructed
Cambridge St / Warwick St Underground Stormwater Management Facility	Underground stormwater storage facility at the intersection of Cambridge Street and Warwick Street. Storage Capacity of 400m^3.	Design Phase Started. Put on hold due to elevated costs that were much higher than estimated in the Environmental Assessment.

Figure 1-2: 2012 Environmental Assessment Recommended Works Identified and Implementation Status

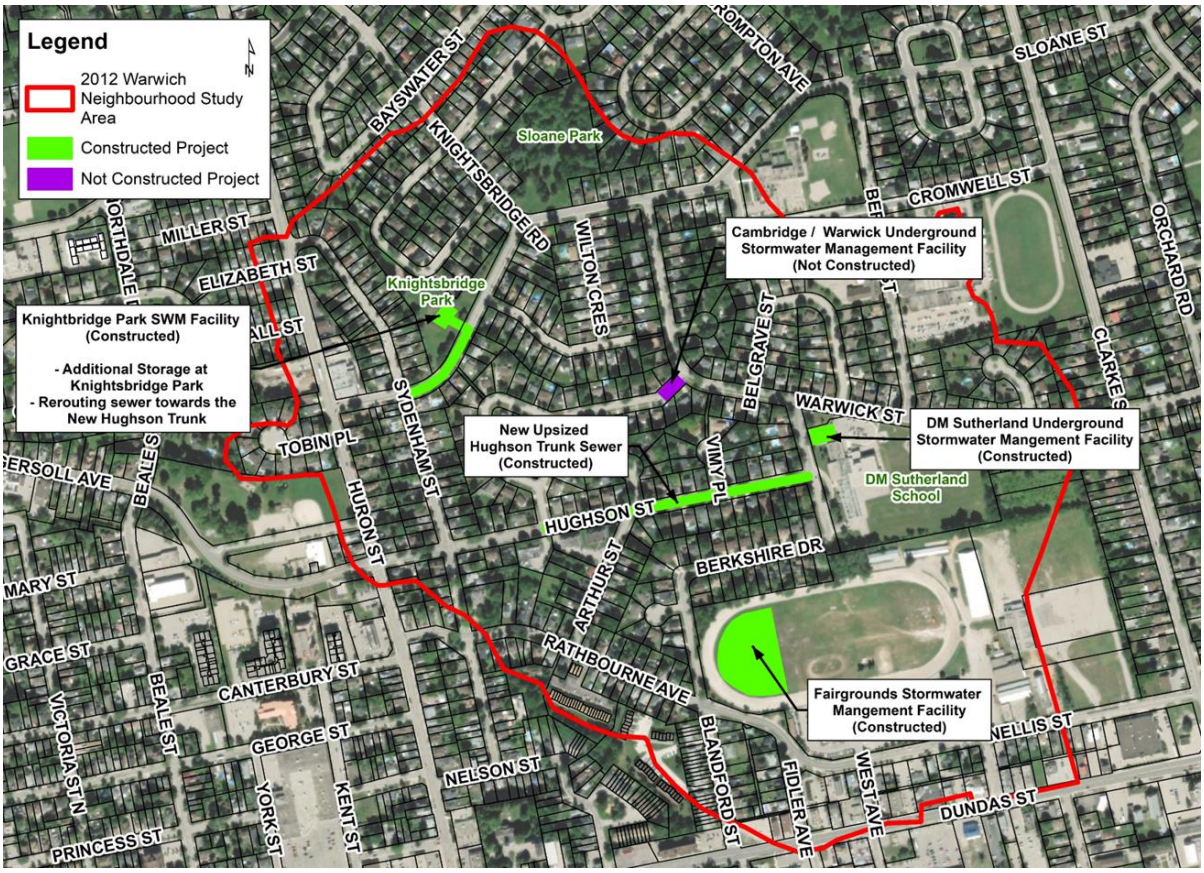
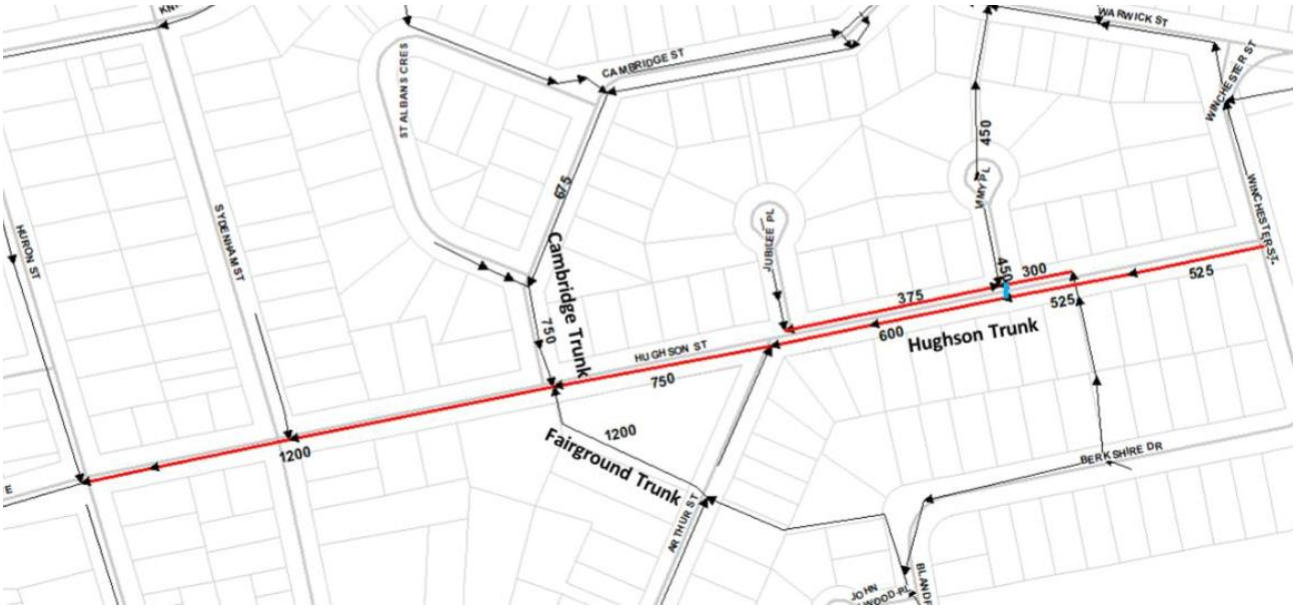


Figure 1-3: Upgraded Hughson Trunk Sewer



1.5 Need for Environmental Assessment Addendum

In consideration of the successful implementation of stormwater management works to date, the reduction of flooding and flooding complaints in the area, the much higher than anticipated costs for the remaining recommended works (Cambridge / Warwick Underground Storm Water Management Facility) and the severe impacts and disruptions to local residents that would be caused by its construction, the City has decided to revisit the original 2012 Environmental Assessment to investigate new alternative solutions that will be more cost effective and less disruptive to the neighbourhood during construction.

1.6 Project Team Organization

This MCEA Schedule B Addendum was undertaken by the City using consulting services provided by AECOM Canada Ltd. The City and consultant project managers are listed below.

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2. Municipal Class Environmental Assessment

2.1 Overview

All municipalities in Ontario, including the City, are subject to the provisions of the Environmental Assessment Act (EAA) and its requirements to prepare an Environmental Assessment for applicable public works projects. The Ontario MEA "Municipal Class Environmental Assessment" document (March 2023) provides municipalities with a five-phase planning procedure, approved under the EAA, to plan and undertake all municipal sewage, water, storm water management and transportation projects that occur frequently, are usually limited in scale and have a predictable range of environmental impacts and applicable mitigation measures.

In Ontario, infrastructure projects such as stormwater management facilities for the Warwick Area are subject to the MCEA process and must follow a series of steps as outlined in the MCEA guide. The Municipal Class Environmental Assessment consists of five phases as summarized below:

- **Phase 1** – Problem or Opportunity: Identify the problems or opportunities to be addressed and the needs and justification;
- **Phase 2** – Alternative Solutions: Identify alternative solutions to the problems or opportunities by taking into consideration the existing environment, and establish the preferred solution taking into account public and agency review and input;
- **Phase 3** – Alternative Design Concepts for the Preferred Solution: Examine alternative methods of implementing the preferred solution based upon the existing environment, public and agency input, anticipated environmental effects and methods of minimizing negative effects and maximizing positive effects;
- **Phase 4** – Environmental Study Report: Document in an ESR, a summary of the rationale, planning, design and consultation process for the project as established through Phases 1 to 3 above and make such documentation available for scrutiny by review agencies and the public; and
- **Phase 5** – Implementation: Complete contract drawings and documents, proceed to construction and operation, and monitor construction for adherence to environmental provisions and commitments. Also, where special conditions dictate, monitor the operation of the completed facilities.

The Municipal Class Environmental Assessment process ensures that all projects are carried out with effectiveness, efficiency, and fairness. This process serves as a mechanism for understanding technical, economic, social, and environmental concerns while implementing improvements to municipal infrastructure.

2.1.1 Planning Project Schedules

The Municipal Class Environmental Assessment defines three types of projects and the processes required for each (referred to as Exempt, formerly Schedule A, A+), Schedule B, or C). The selection of the appropriate schedule is dependent on the anticipated level of environmental impact, and for some projects, the anticipated construction costs. Projects are categorized according to their environmental significance and their effects on the surrounding environment. Planning methodologies are described within the Municipal Class Environmental Assessment and are different according to the class type, as described below.

Exempt (Formerly Schedule A and A+): Projects are limited in scale, have minimal adverse environmental effects, and include a number of municipal maintenance and operational activities. These projects are exempt from the Municipal Class Environmental Assessment planning process.

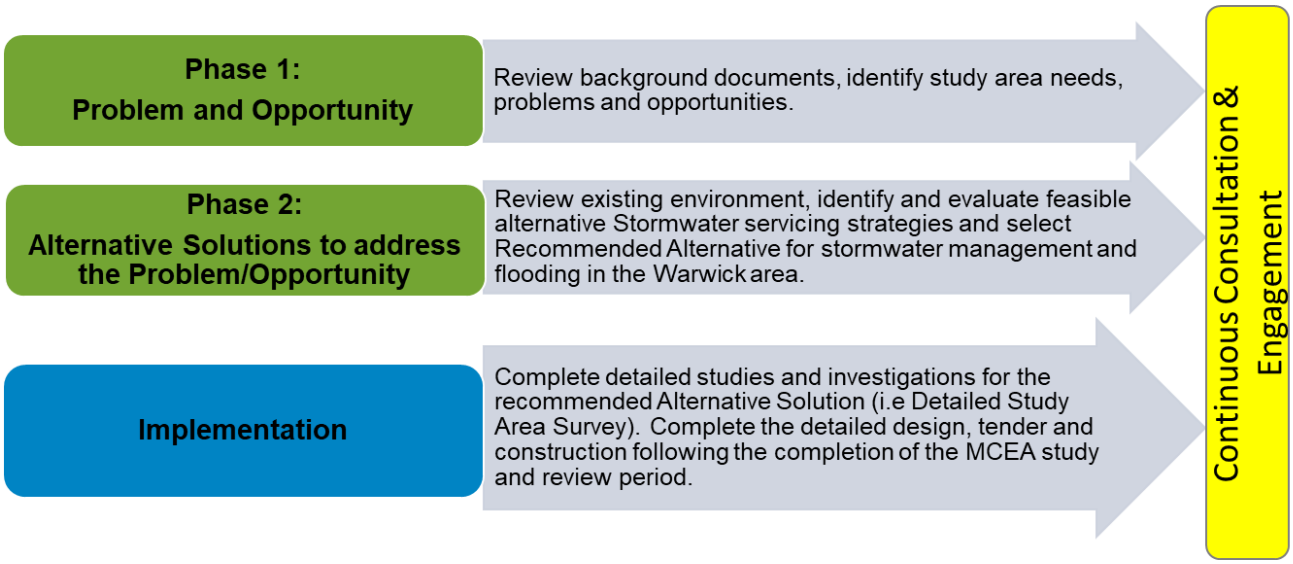
Schedule B: These projects have the potential for some adverse environmental effects. The proponent is required to undertake a screening process (Phases 1 and 2), involving mandatory contact with directly affected public, Indigenous Communities and with relevant review agencies to ensure they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation. At the end of Phase 2, a Project File Report documenting the planning process followed through Phases 1 and 2 shall be finalized and made available for public and agency review. Indigenous Communities have the opportunity to submit a Section 16 Order request to the Minister of Environment, Conservation and Parks. Review agencies, community partners and the public may also raise concerns to the Minister (refer to **Section 2.1.2** of this Report).

Schedule C: Such projects have the potential for significant adverse environmental effects and must proceed under the full planning and documentation (Phases 1 to 4) procedures specified in the Municipal Class Environmental Assessment document. Schedule C projects require that an Environmental Screening Report be prepared and filed for review by the public and review agencies. Indigenous communities have the opportunity to submit a Section 16 Order request to the Minister of Environment, Conservation and Parks. Review agencies, community partners and the public may also raise concerns to the Minister (refer to **Section 2.1.2** of this Report).

Based on a review of the Municipal Engineers Association (MEA) document, the Warwick Area Flooding EA Addendum project triggers a Schedule ‘B’ planning process and as such, Phases 1 and 2 of the Municipal Class Environmental Assessment planning process must be completed.

This Project File EA Addendum Report has been prepared and will be made available for a minimum of 30-day review period. **Figure 2-1** illustrates the process followed for the Warwick Area Flooding Environmental Assessment Addendum study.

Figure 2-1: Municipal Class Environmental Assessment Planning Process



2.1.2 Public Review of this Report and Next Steps

This Project File EA Addendum Report comprises the documentation for this Schedule B Municipal Class Environmental Assessment. Placement of this report for public review completes the planning stage of the project.

This Project File EA Addendum Report is available for public review and comment for a period of **30 calendar days** starting on [insert date 2024] and ending on [insert date 2024]. A public notice (Notice of Addendum) was published to announce commencement of the review period. To facilitate public review of this document, copies are available at the following locations:

Digital / Online: https://warwickfloodingreview.ca/

A hard copy may also be viewed at the City of Woodstock Engineering Office:

City of Woodstock
944 James Street
Woodstock, ON

Monday to Friday: 8:30 AM to 4:30 PM
Saturday/Sunday: Closed

Interested persons may provide written comments to the project team by [insert date 2024]. All comments and concerns should be sent directly to the Project Managers:

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In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e. requiring an individual/ comprehensive environmental assessment approval before being able to proceed), or that conditions be imposed (e.g. require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected aboriginal and treaty rights. This is called a Section 16 Order process.

For all other concerns, an additional 30-day window has been considered for the Ministry to decide if the Minister should take any action. During the additional 30 days the Minister will review the requested concerns and project documents in detail, decide if the project will be elevated (Section 16 Order request granted) or if it will be approved with conditions.

Requests should specify what kind of order is being requested (request for conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate or remedy potential adverse impacts on aboriginal and treaty rights, and any information in support of the statements in the request. This will ensure that the Ministry is able to efficiently begin reviewing the request.

After reviewing the Section 16 Order request and project documents in detail, the Minister may make one of the following decisions:

- Deny the request.
- Deny the request with conditions.
- Refer the matter to mediation.

- Issue a Section 16 Order whereby the proponent will be required to prepare a Terms of Reference and an Individual Environmental Assessment for the undertaking.

The request should be sent in writing or by email to:

Minister of the Environment, Conservation and Parks
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Avenue W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

Requests should also be copied to the City of Woodstock Project Manager (as per above) by mail or by email. Please visit the Ministry's website for more information on requests for orders under Section 16 of the Environmental Assessment Act at:

https://www.ontario.ca/page/class-environmental-assessments-section-16-order

All personal information included in your request – such as name, address, telephone number and property location – is collected, under the authority of Section 30 of the Environmental Assessment Act and maintained for the purpose of creating a record that is available to the general public. As this information is collected for the purpose of a public record, the protection of personal information provided in the Freedom of Information and Protection of Privacy Act does not apply (s.37). Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

3. Consultation

3.1 Consultation and Communication Program

The involvement of the community, such as residents, agencies, community partners, Indigenous Communities, and others who may be potentially affected by a project, is an integral part of the Municipal Class Environmental Assessment process. The purpose of the consultation process is to provide an opportunity to gain an understanding of the study process, contribute to the process for the development/selection of alternatives and design concepts, and provide feedback and advice at important stages in the Municipal Class Environmental Assessment process. Specifically, the objectives of the consultation efforts are to:

- Generate awareness of the project and provide opportunities for involvement throughout the planning process.
- Facilitate constructive input from public and agency community partners at key points in the Municipal Class Environmental Assessment process, prior to decision-making.

The Municipal Class Environmental Assessment process requires two points of contact for Schedule B projects which are described below.

- The first point of mandatory contact is made at the end of Phase 2 when the proponent has identified a problem statement, and developed, assessed, and evaluated alternative solutions to the problem based on the technical, social, natural, and economic environments that could be impacted by the project. This initial contact is issued to invite the public and community partners to comment on the potential impacts and local sensitivities.
- The second point of mandatory contact is when the Project File Report is complete. The Project File Report documents the entire planning process through Phases 1 and Phase 2. A proponent is required to place the Project File Report on the public record for at least 30 calendar days which provides the public and community partners the opportunity to review and make submissions to the Ministry of Environment Conservation and Parks.

A summary of the consultation activities undertaken for this Study is provided in this section.

3.2 Public Consultation

Public notices were issued throughout the course of this study to notify agencies, local Community partners, Indigenous Communities and the public of the status of the

project, provide notification of the Public Information Centre and to invite feedback on the project. Refer to **Appendix A** for notices.

Notices for Study Commencement, Public Information Centre and a Notice of Addendum were distributed as part of this Study. A list of public notices that were issued as part of the study are provided in **Table 3-1**.

All notices were posted on the City's website and the Project Webpage:

https://warwickfloodingreview.ca/

https://www.cityofwoodstock.ca/en/city-governance/municipal-studies-and-plans.aspx

Table 3-1: Public Consultation Notices

Notice	Publication Date
Notice of Commencement Appendix A.1	July 2022
Notice of PIC #1 Appendix A.2	December 2023
Notice of Addendum Appendix A.3	**TBD**

3.2.1 Notice of Study Commencement

The Notice of Study Commencement was first Issued on July 12th 2022, introducing the project and included the project webpage created specifically for this study, https://warwickfloodingreview.ca/. The Notice also provided contact information for the City of Woodstock and consultant project planner.

3.2.2 Study Webpage

A web page was created for this study to present all information to the public. Also included on this page was a survey used to solicit information from the targeted study area to gain a better and more up to date understanding of the current flooding conditions for Warwick area. A total of eighteen (18) residences responded to the survey. The results of this survey aided in the development of the Alternative Solutions for this study.

3.2.3 Public Information Centre

A Public Information Centre (PIC) consisted of an online presentation that went live on December 11th, 2023, and remained accessible for the remainder of the project. The purpose of the PIC was to introduce the project, summarize the 2012 Environmental Assessment recommendations, share background study findings, describe the updated alternative solutions, present the recommended alternative solution and to gather comments on the following:

- Updated problem and opportunity statement.
- Existing conditions.
- The Environmental Assessment Addendum process.
- The Recommended Alternative Solution.
- Next Steps in the process.

Following a two (2) week review period there were no comments received regarding the presented materials.

3.2.4 Notice of Addendum

The Notice of Addendum was sent out to review agencies, stakeholders, Indigenous Communities, local residents, posted on the project webpage and posted on the City of Woodstock website indicating that the report would be on public record for 30 calendar days. During the 30-day review period, anyone with an interest could provide comments or ask questions. The Notice briefly outlined the recommended solution and provided a link to the location where the report could be viewed or downloaded. **Table 3-2** summarizes the comments received during the 30-day review period.

Table 3-2: Public Comments during the 30-day review Period

Comment/Issue	Response
TBD	TBD

3.3 Indigenous Communities

The following communities were contacted throughout the course of this study.

- Six Nations of the Grand River
- Mississauga of the Credit

- Eelunaapeewii Lahkeewiit (Delaware Nation or Moravian of the Thames).
- Munsee-Delaware Nation.

There were no comments received from these Indigenous Communities.

3.4 Stakeholders

All relevant stakeholders, including those directly impacted by the proposed works were contacted at the project initiation stage through correspondence notifying them of the study commencement and requesting their comments. All of these stakeholders were included in the project mailing list, which was updated regularly to ensure accuracy. They were also notified of the PIC and the Notice of Addendum. The comments received were all collected through the flooding survey on the project website which indicated where and the extent of flooding in the area over the last few years since the implementation of the 2012 recommended stormwater management works.

4. Project Need and Justification

4.1 Project Need and Justification

Phase 1 of the five phase Municipal Class Environmental Assessment planning process requires the proponent of an undertaking (i.e. the City) to first document factors leading to the conclusion that an improvement is needed and develop a clear statement of the identified problems or opportunities to be investigated.

4.2 Problem and Opportunity Statement

The Problem and Opportunity Statement is the principal starting point of a Municipal Class Environmental Assessment and becomes the central theme and integrating element of the project. It also assists in setting the scope of the project.

4.2.1 2012 Environmental Assessment Problem Statement

Problem:

- The residents of the Warwick study area within the City of Woodstock have suffered from chronic flooding of basements and yards over the past 30 years.
- Recent high-intensity rainfall events and the continuously evolving impacts of climate change have resulted in wide-spread street, yard and basement flooding during high-intensity rainfall events.
- Street, yard and basement flooding is a result of poorly defined major overland flow routes and deficient storm drainage system capacity currently servicing the Warwick study area.
- Portions of the existing road and sewer infrastructure within the study areas will be reaching the end of its intended design life and will require replacement or rehabilitation.

4.2.2 Updated / Revised Problem and Opportunity Statement

Problem:

- The residents of the Warwick study area within the City of Woodstock have suffered from chronic flooding of basements and yards over the past 30 years.
- Recent high-intensity rainfall events and the continuously evolving impact of climate change have resulted in wide-spread street, yard and basement flooding during high-intensity rainfall events.
- Street, yard and basement flooding is the result of poorly defined major overland flow routes and deficient storm drainage system capacity currently servicing the Warwick study area.

- Portions of the existing road and sewer infrastructure within the study areas will be reaching the end of its design life and will require replacement or rehabilitation.
- Since the completion of the 2012 Environmental Assessment several of the recommended solutions have been implemented, including:
    - Upgrades to the Hughson Street Storm Sewer
    - Construction of the Knightsbridge Park Stormwater Management Facility
    - Construction of the DM Sutherland Stormwater Management Facility
    - Construction of the Fairgrounds Stormwater Management Facility
- The remaining recommended stormwater solution, the Cambridge/Warwick underground stormwater management facility, for the Warwick area proceeded to detailed design where the updated cost estimates were much higher than anticipated in the initial environmental assessment. The implementation of this project would also be very disruptive to the residents in the area. In addition to this, recent modelling has highlighted that the implementation of this remaining project would still not fully protect all of the properties in the area from flooding.")

Opportunity:

- Due to the success of the recently completed stormwater management solutions the City of Woodstock can revisit the original Environmental Assessment to investigate new alternative solutions that will be more cost effective and less disruptive to local residents.
- Development and assessment of a new range of Stormwater Management Solutions can be evaluated against the previously recommended underground stormwater management facility.
- Consult the public, Indigenous Communities, and regulatory agencies and solicit feedback to select the best solution for the future.

5. Existing Conditions

5.1 Technical

The Warwick study area is located within the North Woodstock Watershed (Upper Thames River Conservation Authority, 2007). Its stormwater drainage system is composed of two separate trunks draining towards two different Watersheds.

The system's current configuration is the result of iterative improvements or modifications throughout time, having portions of older drainage systems dating back to early twentieth century infrastructure. The Hughson trunk storm sewer conveys flow in a south-westerly direction and ultimately discharges directly to the Thames River within the South Thames Watershed and the Warwick trunk storm sewer conveys flow in a north-westerly direction and ultimately discharges into Pittock Lake within the North Woodstock Watershed.

At the west study area boundary, the Hughson trunk consists of a 1200 mm diameter storm sewer, the ultimate outlet at the Thames River is approximately 1,950 m downstream.

At the north study area boundary the Warwick trunk consists of a 900 mm diameter storm sewer, the ultimate outlet at Pittock Lake is approximately 1,350 m downstream.

The two Warwick study area storm drainage systems fall within a low-lying area of the City of Woodstock. Topographically, the major system flows towards the intersection of Warwick Street and Cambridge Street. On the other hand, the minor systems are designed to drain the centre areas towards Pittock Lake and Thames River, on the perimeter of the study area.

Consequently, the governing topography challenges the minor's systems ability to convey storm water flows away from the area by moving overland and underground storm flows in opposite directions. In addition, the two storm drainage systems present various interconnections, splitting stormwater flows between both North Woodstock and South Thames Watersheds, while adding complexity to the prevalent drainage paths under large storm events.

The sanitary system, on the other hand, presents two clearly separated systems draining North and West of the Warwick study area. With exception to the potential of basement flooding allowing the systems to interact, the storm and sanitary systems are entirely separated through out the study area and their performance is expected to be unrelated to each other under normal dry weather flow conditions.

5.2 Terrestrial and Aquatic Resources

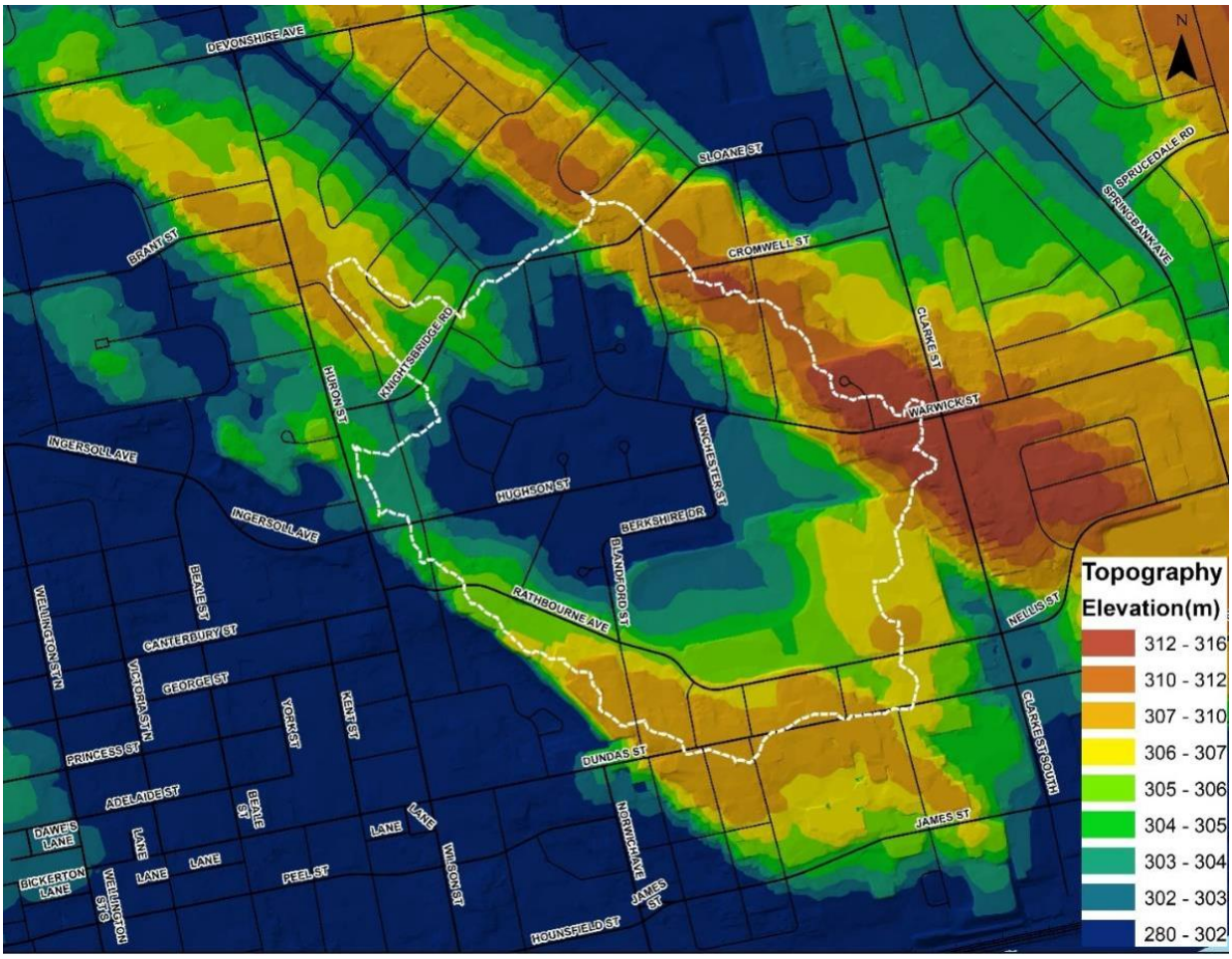
Typical of other urbanized areas within the City of Woodstock, the Warwick study area can be characterized as having limited natural vegetation. However, several remnant woodlots exist within the study area, included an old-growth deciduous tree stand located in Sloane Park along the northerly limit of the Warwick study area. The Warwick study area falls within the 'North Woodstock' subwatershed, within the Upper Thames River (South Branch) watershed, under the jurisdiction of the Upper Thames Valley Conservation Authority (UTRCA). Secondary source information and a letter obtained from UTRCA confirmed the Warwick study area does not contain any Areas of Natural and Scientific Interest (ANSIs), Environmentally Sensitive Areas (ESAs), significant wetlands or any other lands regulated by the conservation authority.

5.3 Topography and Overland Flow Routes

Much of Woodstock is characterized by moraines and faint drumlins aligned in a northwest direction, including the Thames River valley and the Cedar Creek River valley. The entire Warwick study area falls between two drumlins aligned in a north-westerly orientation. The highest ridges of the drumlin to the northeast of the Warwick study area are approximately 10 m higher than the trough in which the study area lies. To the southwest the drumlin ridge rises approximately 5 m above the lowest point in the trough before falling away to the southwest towards Cedar Creek.

The regional topography surrounding the Warwick study area has a significant impact on the drainage characteristics. The natural and man-made topographic features within the study area result in discontinuous major overland flow routes that affect drainage patterns and conveyance of flows that exceed the capacity of local storm sewers. The entire Warwick study area lies within a depressed zone within two drumlins. Although the overall topography falls in a southeast to northwest direction the local topography does not allow for a continuous overland flow route out of the lowest portions of the depression near the intersection of Cambridge and Warwick Street. Refer to Figure 5.1 for the study area elevation mapping.

Figure 5-1: Study Area Topography



5.4 Cultural Environment

5.4.1 Archaeology

A Stage 1 Archaeological Assessment (**PIF Number - P438-0305-2022**) was conducted within the study area boundary. It has been determined that the potential for the recovery of pre- and post-contact Indigenous and 19th century Euro-Canadian archaeological resources within the Study Area is high within areas not subject to previous disturbance. Areas where archaeological potential has been removed include areas that have been subject to extensive and deep land alterations that have significantly compromised the recovery of archaeological materials, such as constructed roadways, parking lots, and building footprints. All of the recommended work will take place within the right of way or adjacent to existing structures where the ground has been previously disturbed and graded.

5.4.2 Built Heritage and Cultural Heritage Landscapes

The study area consisting mainly of residential homes built in the mid 1950's to the early 1970's, contains no sites of built historically significant interest or significant Cultural Heritage Landscapes.

5.5 Socio-Economic Environment

The County of Oxford is composed of eight municipalities and covers an area of 2,028square kilometres, having the City of Woodstock as its main urban centre. In 1979, the County of Oxford adopted its Official Plan (the Plan) which contains goals, objectives and policies established primarily to manage and direct change and the effects on the social, economic and natural environment of the municipality (County of Oxford, 2022). The Plan has been amended regularly since, with the current version being updated in 2022, to reflect the present challenges and future opportunities within Oxford County.

Specifically, the Plan establishes land use planning principles, coordinating the current and future strategies for environmental and socio economic sustainable development. Among their land use objectives, the Plan states the following principles:

- Maximizing the use of existing services and infrastructure
- Promoting energy efficiency and protecting natural areas
- Land use intensification
- Integration of environmental considerations into land use planning
- Improving community livability, function and design
- Committing to public environment.

The City displays a higher density in its historic central area, west of the Warwick study area, progressively reducing its density towards the edges. The dominant land uses towards the centre and north of the City are residential (low density single-detached and semi-detached dwellings).

Woodstock also displays extensive industrial and commercial areas on the southeastern quadrant, adjacent to Highway 401 and Oxford Road 4. Throughout time, the study area has experienced organic intensification and redevelopment, increasing the built area extents and infrastructure level of service.

The Warwick study area consists primarily of low-density residential land uses. Notable community facilities include the Fairgrounds Complex, Civic Centre Arena,Winchester Street Public School, Huron Park Secondary School and Roch Carrier French Emmersion School in addition to Knightsbridge Park. The Warwick area is a fully developed mature community without clear opportunities for large redevelopment.

6. Provincial and Municipal Planning Context

6.1 Provincial Policy Statement

The 2020 Provincial Policy Statement1 (PPS) provides policy direction on matters of provincial interest related to land use planning and development. As a key part of Ontario's policy-led planning system, the PPS sets the policy foundation for regulating the development and use of land. It provides for appropriate development while protecting resources of provincial interest, public health and safety, cultural heritage, system and water resources including natural hazards and water quality, air quality and energy use, and the quality of the natural environment.

Key policies relevant to this project include the following:

- Section 1.6: Infrastructure and Public Works
- Section 1.8: Energy Conservation, Air Quality and Climate Change
- Section 2.1: Natural Heritage
- Section 2.2: Water

Relevance to Study: Investment in municipal infrastructure within the study area for a project of this nature, will have regard for the range of planning objectives of the PPS. In addition, project design will consider and address impacts involving natural heritage, cultural heritage, water resources and climate change.

6.2 Climate Change

The Ministry of Environment, Conservation and Park's guide "Consideration of Climate Change in Environmental Assessments in Ontario" was finalized in October 2017 and, therefore requires that all Municipal Class Environmental Assessments consider this within the scope of the project. Two approaches for consideration and addressing climate change in project planning include:

- Reducing a project's effect on climate change (climate change mitigation).
- Increasing the projects and local ecosystem's resilience to climate change (climate change adaptation).

Relevance to the Study: Although this project has a relatively small footprint and the climate change impacts can be considered relatively minor, it does not preclude consideration. Removal of any naturalized vegetation in the study area can result in a reduction carbon sequestration capacity which has been taken into consideration for

1 *Provincial Policy Statement. Ontario Ministry of Municipal Affairs and Housing, 2020.*

this study. The main consideration for this project would be potential greenhouse gas emissions related to alternative solutions, including construction methods and duration. As such greenhouse gas emissions were considered in the evaluation of alternative solutions.

6.3 Source Water Protection

Section A.2.10.6 of the Municipal Class Environmental Assessment document directs proponents, including the City to consider Source Water Protection in the context of the *Clean Water Act*. Projects proposed within a Source Water Protection vulnerable area are required to consider policies in the applicable Source Protection Plan, including their impact with respect to the project. A watershed-based Source Protection Plan contains policies to reduce existing and future threats to drinking water in order to safeguard human health through addressing activities that have the potential to impact municipal drinking water systems. The Thames - Sydenham & Region Drinking Water Source Protection Plan is the relevant Source Protection Plan for this project and contains policies that address current and potential threats to municipal drinking water supply.

There are four types of vulnerable areas covered by the Source Protection Plan:

1. **Intake protection zones** - An Intake protection zone is the area around a surface body of water where water is drawn in and conveyed for municipal drinking water.
2. **Highly vulnerable aquifers** - Aquifers are underground layers of water that supply wells. Highly vulnerable aquifers are susceptible to contamination due to their proximity to the ground surface or where the types of materials in the ground around it are highly permeable.
3. **Significant groundwater recharge areas** - Significant Groundwater Recharge Areas are characterized as having porous soils (e.g. sand or gravel), which allow for water to easily seep into the ground and flow to an aquifer.
4. **Wellhead protection areas** - Wellhead protection areas are areas of land around a municipal well where land use activities have the greatest potential to affect the quality of water flowing into the well.

Relevance to Study: The relevance of the policies of the Source Protection Plan have been considered in this study. There are no Intake protection zones within or adjacent to the study area; however, the study area is within a Highly Vulnerable Aquifer and Wellhead protection area. These factors were considered during the evaluation of alternatives. Potential contamination from fuel storage and refueling vehicles during construction and runoff from the potential works were considered during the evaluation. Although these are designated as vulnerable areas, there are no significant, moderate or low drinking water quality threats associated with this project and the minimal amount of required construction for the recommended solution will not impact source water.

6.4 County of Oxford Official Plan

The County of Oxford Official Plan provides general policy direction and a long-range planning framework for development within the City of Woodstock. The objectives, policies and land use designations guide physical development of the City with a view to enhance social, economic and environmental well being of the Municipality and its residents. This MCEA Addendum has regard for the following relevant policies:

- **Section 2.1 Planning Principles**
  - **2.1.5 Responsible water and wastewater management**
- **Section 3.2.4 Natural Heritage System**
- **Section 5.2.4 Utility and Infrastructure Development Policies**

Relevance to Study: This MCEA Addendum has been conducted with regard to the policies of the County of Oxford Official Plan. The official plan was used to identify any potential natural heritage systems in the study area and policies regarding stormwater management infrastructure.

7. Identification of Alternative Solutions

7.1 2012 Environmental Assessment Proposed Solutions

Strategic locations of underground storage and upgrades to the Hughson Street storm sewer was the preferred solution identified in the original EA. The solution consisted of the following elements:

- Upgrading the storm sewer on Hughson Street to 1350-1800 mm, with sufficient capacity to convey the 100-year storm underground to the west outlet.
- Stormwater management facility (SWMF) implemented in the Fairgrounds Complex in the south part of the study area (2400 m^3).
- Surface flooding at Warwick Street/Cambridge Street addressed with:
    - expansion of the existing (107 m3) underground storage at the DM Sutherland School, with added inlet capacity for the 100-year storm (1150 m3).
    - additional underground storage at Cambridge/Warwick within the right-of-way (400 m3), inlet controls at Knightsbridge Park, redirecting flows to the Hughson storm sewer.

The upgrade of the Hughson Street storm sewer and the construction of the Fairgrounds Complex SWMF were completed, but detailed design of the proposed underground storage at the Cambridge/Warwick resulted in significantly higher cost estimates than originally presented in the EA. As a result, progress toward the proposed underground storage was halted in order to further investigate alternative approaches and identify a cost-effective solution.

7.2 Data Collection and Modelling

Monitoring of the partially implemented original solutions was carried out by AECOM in 2019, and modelling and assessment of the new conditions was completed in 2021. Refer to **Appendix C** for the Modelling Assessment and Warwick Area Flooding Report.

7.3 Revised Alternative Solutions

The alternatives considered in this report to address the problem and opportunity statement are as follows:

- **Alternative 1 Do Nothing** – This alternative would accept the existing conditions achieved by the partial implementation of the recommended 2012 Environmental Assessment solutions.

- **Alternative 2 Implementation of the Full 2012 Environmental Assessment Solution** – This alternative would involve:
    - Expansion of the existing (107m^3) underground storage at DM Sutherland School.
    - Additional underground storage at Cambridge Street / Warwick Street within the Right of Way (400m^3).
- **Alternative 3 Update the recommended storage volumes** – This alternative would use the new calibrated model to update the storage volumes recommended in the original 2012 Environmental Assessment. Additional storage at Cambridge Street and Warwick Street would be designed and implemented based on the updated volumes.
- **Alternative 4 Localized Flood Mitigation Measures** – This alternative would involve implementing flood mitigation measures localized to specific properties identified as being at risk.

7.4 Evaluation Criteria

In order to evaluate the alternative solutions, a set of criteria were chosen which are categorized as follows in **Table 7-1**.

Table 7-1: Evaluation Criteria

Factor	Criteria	Description
Socio-Economic	Property Impacts Traffic Impacts Construction Impacts	Potential impacts to private property. Potential disruption to vehicular and pedestrian/cycling traffic Construction Impacts (Noise, Dust, Vibrations)
Cultural Environment	Archaeological Resources Cultural Heritage Landscapes and Built Heritage Resources	Disturbance to archaeological sites, cultural heritage landscapes and built heritage.
Natural Heritage	Aquatic/Terrestrial Environment Species at Risk Source Water Protection	Impacts/enhancements to aquatic and terrestrial species and habitat. Effects on Species at Risk. Effects of project on source water.

Factor	Criteria	Description
	Climate Change	Potential for project to impact climate change and for climate to impact the project
Technical	Design and constructability Stormwater Management	Complexity of Design. Level of Improvements to stormwater management
Economic and Financial	Capital Costs Ongoing maintenance and operating costs	Design and constructions costs. Costs to maintain/operate the stormwater management solution.

7.5 Evaluation of Alternative Solutions

A qualitative assessment of each alternative solution was completed based on the previously described evaluation components and criteria. In this evaluation approach, trade-offs consider the advantages and disadvantages of each alternative planning solution in addressing the problem and opportunity statement (with the least environmental impact as well as the most technical benefits) to form the rationale for the identification of the recommended alternative planning solution.

A summary of the evaluation matrix for the alternative solutions is shown in **Table 7-2**. For a comprehensive evaluation in matrix form, the full evaluation of alternative solutions is provided in **Table 7-3**.

Based on the evaluation and combined impacts, the recommended alternative solution was **Alternative 4: Localized Flood Mitigation Measures.**

Each evaluation category was evaluated based on the following scoring system. Low impact is considered a preferred solution compared to moderate or high impact.

Table 7-2: Alternative Solution Evaluation Summary

Evaluation Criteria Category	Alternative 1 Do Nothing	Alternative 2 Implementation of the Full 2012 EA Solution	Alternative 3 Upgrade the recommended storage volumes	Alternative 4 Localized Flood Mitigation Measures
Socio-Economic	Low Impact	Highest Impact	Moderate Impact	Low to Moderate Impact

Evaluation Criteria Category	Alternative 1 Do Nothing	Alternative 2 Implementation of the Full 2012 EA Solution	Alternative 3 Upgrade the recommended storage volumes	Alternative 4 Localized Flood Mitigation Measures
Cultural Environment	Low Impact	Low Impact	Low Impact	Low Impact
Natural Environment	Low Impact	Low to Moderate Impact	Low to moderate Impact	Low Impact
Technical Environment	Moderate Impact	Low to Moderate Impact	Moderate Impact	Low to Moderate Impact
Economic and Financial	Low Impact	Highest Impact	Moderate to High Impact	Low Impact
Overall Rating	Low to Moderate Impact **Not Recommended**	Moderate to High Impact **Not Recommended**	Moderate Impact **Not Recommended**	Lowest Impact **Recommended**

7.6 Recommended Alternative Solution

Based on the evaluation of alternatives the recommended solution was **Alternative 4** – Localized Flood Mitigation Measures.

This alternative involves implementing flood mitigation measures localized to specific properties at risk. Eight (8) properties identified as having some residual risk are shown in **Figure 7-1**. This solution involves supplementing the recommended EA measures which have already been implemented with measures targeted for the homeowners to pursue (such as sealed basement windows, raised sills and lot grading).

Rationale for selecting Alternative 4 includes:

- Lowest cost in comparison to the amount of flood protection each alternative can provide.
- Least amount of community disruption due to construction (road closures, driveway access, noise, dust etc.).

- Lowest impact to the natural environment (small construction timelines and footprints will have a lesser effect on climate change and local wildlife.)

Alternatives 2 and 3 were not selected due to:

- High costs compared to the level of protection provided.
- Recent modelling (described in **Section 7.2**) has highlighted that the implementation of Alternative 2 would still not fully protect all of the properties in the area from flooding.
- Constructing underground storage in the right of way will have severe impacts on the local community (road closures, driveway access, noise, dust).
- Higher impacts to the natural environment. (larger construction timelines and footprints will have a greater effect on climate change and local wildlife).

Figure 7-1: Recommended Solution – Properties with Residual Risk

Table 7-3: Alternative Solution Evaluation Matrix

Category	Criteria	Alternative 1 Do Nothing Accept the conditions achieved by the partial implementation of the 2012 EA recommendations	Alternative 2 Implementation of the full 2012 EA Solution	Alternative 3 Update the recommended storage volumes. Additional storage at Cambridge Street and Warwick Street would be designed on these volumes.	Alternative 4 Localized Flood Mitigation measures.
Socio Economic	**Construction Impacts** Potential effects (Noise, Dust, Vibration, property access) related to disruptions to residences, business, and travelling public during construction and operation.	Low impacts due to lack of further construction.	High Impact. Largest construction effort and footprint. Longest construction period.	Moderate to High Impact. Large construction effort and footprint would still be required. Long construction period.	Lowest impact due to minor construction and grading efforts.
	Property Impacts Potential impacts to private property	Moderate impact. No further flooding protection is provided.	High impacts to private property during construction, such as access.	Moderate to High impacts to private property during construction, such as access.	Moderate impacts. Solutions would require grading and other mitigation measures on private property.
	Traffic Impacts Potential Disruption to vehicular and pedestrian/cyclist traffic	Low impacts due to lack of further construction.	High impacts due the larger footprint of construction and the increased time lines. Temporary Lane or Road closures would be required for an extended period.	High impacts due the larger footprint of construction and the increased time lines. Temporary Lane or Road closures would be required for an extended period.	Low Impacts due to minor construction works.
Cultural Environment	**Archaeology** Potential effects to cultural heritage resources.	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.
	Built Heritage Potential effects to built heritage resources.	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.
	Cultural Heritage Landscapes Potential effects to Cultural Heritage Landscapes**.**	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.

Category	Criteria	Alternative 1 Do Nothing Accept the conditions achieved by the partial implementation of the 2012 EA recommendations	Alternative 2 Implementation of the full 2012 EA Solution	Alternative 3 Update the recommended storage volumes. Additional storage at Cambridge Street and Warwick Street would be designed on these volumes.	Alternative 4 Localized Flood Mitigation measures.
Natural Heritage	**Impacts to Aquatic Environment**	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.	No impacts anticipated.
	Impacts to Terrestrial Environment	No impacts anticipated.	Moderate impacts due to construction around street trees and disturbances to birds.	Moderate impacts due to construction around street trees and disturbances to birds.	Low to moderate impacts due to minor construction efforts around street trees and disturbances to birds.
	Source Water Protection Effects on Source water and Source water protection.	No impacts anticipated	Moderate impacts. Potential impacts due to excavating in an HVA and Wellhead protection area.	Moderate impacts. Potential impacts due to excavating in an HVA and Wellhead protection area.	Low impacts. Minor construction would not affect the HVA or wellhead protection area.
	Climate Change Potential for impacts to climate change	No impacts anticipated	Moderate impacts to climate change due to increased construction and excavation work. Longer time frame and larger equipment would produce more greenhouse gasses.	Moderate impacts to climate change due to increased construction and excavation work. Longer time frame and larger equipment would produce more greenhouse gasses.	Low impacts. Minor construction activities would have minimal impacts to greenhouse gas emissions and climate change.
Technical	**Design and Constructability** Complexity of design	Low Impacts. No design or work required.	High Impact having the most complex design.	High Impact having a complex design.	Low Impact. Least complex design requirements.
	Stormwater Management Level of Improvements to stormwater management	No increase to the level of stormwater management/flood protection.	Moderate impact. Minimal improvement to stormwater management/flooding protection in comparison to the high environmental impacts.	Moderate impact. Minimal improvement to stormwater management/flooding protection in comparison to the high environmental impacts.	Low to moderate impacts. Similar improvements (slightly lower) compared to Alternative 2, with minimal environmental impacts.
Economic and Financial	**Capital Costs** Design/Construction Costs	Low to Moderate impacts. No increased flooding protection, so costs may incur should flooding happen.	High Impact. High cost to design High cost to construct	High Impact. High cost to design High cost to construct	Low to Moderate design and construction cost.

Category	Criteria	Alternative 1 Do Nothing Accept the conditions achieved by the partial implementation of the 2012 EA recommendations	Alternative 2 Implementation of the full 2012 EA Solution	Alternative 3 Update the recommended storage volumes. Additional storage at Cambridge Street and Warwick Street would be designed on these volumes.	Alternative 4 Localized Flood Mitigation measures.
	Ongoing Maintenance and operating costs Costs to maintain and operate the stormwater management solution	Low impact. No additional costs to maintain.	Moderate Cost to maintain.	Moderate Cost to maintain and operate.	Low to moderate cost to maintain and operate.
Recommended Site		**Not Recommended**	**Not Recommended**	**Not Recommended**	**Recommended**

8. Project Description and Potential Costs

8.1 Design

The first steps in refining the design of the localized protections will require detailed topographic surveys of the eight properties at risk highlighted in **Figure 7-1**. The information of interest includes:

- Corners of properties / property lines.
- Corners of buildings.
- Top of foundation.
- Finished first floor elevation.
- Any and all building opening elevations and dimensions of openings below finished first floor elevation.
- Location of sump pump outlet (i.e., elevation, discharge to grade or Private Drain Connection (PDC).)

Thie City of Woodstock will initiate and pay for the property surveys with the costs estimated to be in the range of $1000 per property. Once the most vulnerable areas and flow routes have been identified, the most effective options can be refined. Detailed design and pursuit of homeowner approval can be carried out following this step, but as the design will be dependent on the information obtained during the survey, there is currently insufficient information available to provide an estimate on the level of effort.

It is possible that survey results may allow for narrowing of the areas and locations required to be impacted by the controls. The following sections provide estimations of supply and construction costs for some protection options, assuming that all eight properties will be involved.

8.1.1 Basement Window Protections

The supply and install cost for sealed window wells is estimated to be $2500 per window. Assuming four basement windows per home, the costs of this option are expected to be in the range of $80,000 or $10,000 per home.

8.1.2 Curb Protections

The supply and install costs of standard and mountable curbs are typically in the ranges of $45-$80 per meter. The costs of specialized curbs with sills to provide overland flood protection will be dependent on the supplier, but approximately twice the price of more typical curbs has been initially estimated. The length of curb and driveway along the 8 properties of interest has been assumed to be 220 m, and at a price of $150/m to

supply and install, and $7/m for removal of the existing curb, the costs of this option are expected to be in the range of $35,000 or approximately $4,375 per home.

8.1.3 Grading Modifications

The costs involved in grading the front lawns of the 8 properties to prevent overland flows impacting the buildings will depend on the area required to be disturbed and how much material is required to be brought in or excavated. Assuming front lawn dimensions of 25 m x 10 m, the estimated grading and re-sodding costs for the eight properties is estimated to be in the range of $60,000 or $7,500 per home.

8.1.4 Low Impact Development

If curb protection and grading measures are implemented to prevent overland flows from encroaching on the properties, drainage paths away from the properties will also be blocked. Measures to manage the trapped runoff will be required, and one potential option would be to utilize rain gardens or soakaways. Implementing a basic clear-stone soakaway to infiltrate runoff from the 8 properties is estimated to be in the range of $20,000 or $2,500 per home. However, additional costs are expected as the soakaway would need to be located on private property and permission from the owner would be required. Splitting the soakaways into individual units is anticipated to have similar total installation costs, but landscaping materials to improve the aesthetics of the soakaways would increase the pricing.

8.1.5 Pumping

If curb protection and grading measures are implemented to prevent overland flows from encroaching on the properties, drainage paths away from the properties will also be blocked. Measures to manage the trapped runoff will be required, and one potential option would be to pump the runoff out of the trapped area. The costs of implementing a pumping solution will be dependent on the extent of new infrastructure required, maintenance and operating costs for the system, and costs involved in acquiring areas for the pump(s) to be installed in; there is currently insufficient information available to provide an estimate.

Figure 8-1 presents examples of some of the above mitigation options.

8.2 Recommended Work Payment Program

One way that these recommended steps may be implemented is by creating a program where, once the surveys are completed and the recommended localized protection measures are identified, a program can be initiated, where the residents initially pay for the recommended work to be completed and the City will reimburse the resident at completion. Each of the recommended measures can be implemented independently of

each other and are not required to be completed all at once. This will allow the resident to select a contractor of their choice and the timing of the work as well. Residents will be contacted directly by the City of Woodstock to discuss the work.

Figure 8-1: Examples of Potential Flood Mitigation Measures

9. Mitigation Measures and Monitoring

9.1 Construction Mitigation

While the recommended solution will not require extensive construction, it is recognized that some construction will still result in impacts on the existing environment.

The following mitigation measures are recommended to ensure that any disturbances are managed by the best available methods. These measures will be further confirmed and developed during detailed design. **Table 9-1** provides assessments of the potential impacts associated with the project and the recommended mitigative measures required to reduce these effects.

Table 9-1: Potential Impacts and Mitigation Measures

Potential Impact	Mitigation / Compensation or Enhancement Measure
Noise and Vibration and dust	Construction operations to occur during day shift. Adhere to municipal noise by-laws, where possible. A non-chloride dust suppressant can be applied to areas of exposed soils to reduce or eliminate dust generation.
Construction Timing	While not anticipated, should any vegetation clearing or significant species habitat clearing take place it should occur outside of the breeding bird period (i.e. April 1 to August 31).
Navigation and Residential Access	Construction work should be minor and it is not anticipated to impact neighbourhood navigation, should it be required thought, during construction, provide navigable passage signs around work areas, as applicable and maintain access to private driveways.
Disturbance to Wildlife	Restrict construction activities to daytime hours (sunrise to sunset). While vegetation removal is not anticipated, should it be required, restrict vegetation removal to periods before and after the bird nesting period of April 1 to August 31.

9.2 Climate Change

Climate change is now being integrated into infrastructure planning and design as a way of building more resilient and robust systems. Incorporating sustainability and resiliency early in the decision-making process provides a level of flexibility into the project design to allow for changes in future weather and climate uncertainty.

Climate change trends across Ontario show that temperatures are increasing across all seasons, precipitation patterns are changing, and extreme weather events are becoming more intense and frequent. Planning for these changes in historical averages, as well as shorter-term more extreme events, is challenging but essential.

9.2.1 Effects from Climate Change and Potential Construction Effects

The planning and design of city infrastructure should take into consideration key factors and climate change trends, such as building to withstand extreme precipitation and extreme heat.

While construction for the recommended solution will be minor, during this construction, the proposed works should be as climate ready as possible.

The implementation of the recommended works will provide a benefit to the area in providing further protection from increase rainfall and the potential of resultant flooding.

10. Conclusions and Next Steps

This Project File Addendum Report outlines the process required to ensure that the planning process and proposed recommended solutions meet the requirements of the Environmental Assessment Act. The Municipal Class Environmental Assessment planning process has not identified any significant environmental concerns that cannot be addressed by incorporating established mitigation measures during construction.

The proposed project improvements address the problem and opportunity statement identified in this report. A preliminary evaluation of potential impacts has been included in the evaluation, which indicates minor and predictable impacts that can be addressed by recommended mitigation measures as presented in **Section 9**. The proposed mitigation measures will further be developed at the detailed design stage and will form commitments that will be adhered to by the City of Woodstock. Appropriate public notification and opportunity for comment was provided and no comments were received that could not adequately be addressed.

Subject to receiving Municipal Class Environmental Assessment clearance following the 30-day review period, the City of Woodstock can start the detailed survey and design process, eventually proceeding to construction as outlined in this Project File Report.