The Corporation of the
Town of Tecumseh

Public Works & Environmental Services

To: Mayor and Members of Council

From: Phil Bartnik, Director Public Works & Environmental Services

Date to Council: June 25, 2019

Report Number: PWES-2019-35

Subject: Storm Drainage Master Plan
Filing the Notice of Study Completion

Recommendations

It is recommended:

That the Public Works & Environmental Services Report PWES-2019-35 Storm Drainage Master Plan, Filing the Notice of Study Completion **be received**;

And that the Notice of Study Completion **be advertised** in the local newspaper and the Town's social media accounts to initiate the mandatory 30-day public review period.

Background

At the December 13, 2016 Regular Council Meeting, Council approved the recommendations (Motion RCM-442/16) of PWES Report No. 54/16 titled "2017-2021 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the Storm Drainage Master Plan.

This Storm Drainage Master Plan is one of three Storm Master Plans that are currently in progress within the Town, as outlined within the Town's Flood Mitigation Strategy (Report PWES-2018-17). The other two being the:

- Oldcastle Hamlet Storm Drainage Master Plan; and the
- Upper Little River Watershed Stormwater Master Plan

Comments

The purpose of the Storm Drainage Master Plan is to address the impacts of surface flooding on the mainly urbanized residential areas of the Town located along the northern and eastern limits of the municipality. This includes the assessment of storm pump stations, gravity outfalls and the respective service areas minor (sewer) and major (roadway) systems discharging to Lake St. Clair and Pike Creek. The Storm Drainage Master Plan will:

- Confirm the factors contributing to surface flooding from significant storms that exceeds the current guidelines;
- Determine surface flooding problem areas throughout the study area based on existing conditions;
- Identify areas of future development and incorporate the future level of service design into a future conditions model;
- Identify and evaluate alternative solutions within the future conditions model to reduce the risk and impacts of surface flooding;
- Identify recommended design solutions based on a traditional level of service for the design;
- Simulate the effects of climate change on the recommended solutions and further enhance the level of service, if warranted; and
- Outline a recommended long-term implementation strategy with preferred surface flooding solutions.

Municipal Class Environmental Assessment

The *Ontario Environmental Assessment (EA) Act* recognized that certain municipal undertakings occur frequently, are small in scale, have a generally predictable range of effects or have a relatively minor environmental significance. To ensure that a degree of standardization in the planning process is followed throughout the Province, the EA Act contemplated the use of the Class Environmental Assessment (Class EA) procedure for projects which require approval under the Act but which are not considered to be major environmental works. The Municipal Engineers Association (MEA) document titled Municipal Class Environmental Assessment (October 2000 as amended in 2007, 2011 and 2015), describes the procedure for undertaking a Class EA for municipal projects.

Projects undertaken by municipalities vary in their environmental impact, and are classified within the Class EA document in terms of Schedules:

- **Schedule A** projects are limited in scale, have minimal adverse environmental effects and include a number of municipal maintenance and operational activities. These projects are preapproved and may proceed to implementation without following the full

Class EA planning process. Schedule A projects generally include normal or emergency operational and maintenance activities.

- **Schedule A+** projects are similar to Schedule A projects in that they are considered pre-approved; however, the public is to be advised prior to project implementation.

- **Schedule B** projects have potential for some adverse environmental effects. The proponent is required to undertake a screening process, involving mandatory contact with directly affected public and relevant review agencies, to ensure that 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. Schedule B projects generally include improvements and minor expansions to existing facilities.

- **Schedule C** projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the Municipal Class EA document. Schedule C projects require that an Environmental Study Report (ESR) be prepared and filed for review by the public and review agencies. Schedule C projects generally include the construction of new facilities and major expansions to existing facilities.

The main elements of the Class EA planning process are incorporated in the following five phases, and further depicted on Attachment No.3:

Phase 1: Identify the problem or opportunity.

Phase 2: Identification and evaluation of alternative solutions to determine a preferred solution.

Phase 3: Examination of alternative methods of implementation of the preferred solution.

Phase 4: Documentation of the planning, design and consultation process.

Phase 5: Implementation and monitoring.

The Municipal Class EA process includes an appeal period of 30-days for the public to review the EA document once it has been completed. The proponent is encouraged to work in cooperation with any member of the public who may have a concern to determine the preferred means of addressing a problem. If the concerns of the project cannot be resolved through discussions with the proponent, the member of the public may request the Minister of the Environment to require the proponent to comply with Part II of the EA Act before proceeding with the proposed undertaking. If no request is received by the Minister or delegate, the proponent is free to proceed with the implementation and construction.

The Master Plan Process

Master Plans are long range plans which integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. The plans examine an infrastructure system(s) or group of related projects to outline a framework for planning for

subsequent projects and/or developments. At a minimum, Master Plans address Phase 1 (Identify Problem/Opportunity) and Phase 2 (Alternative Solutions) of the Municipal Class EA process. Master Plans typically outline a set of specific projects across a geographic area that will be implemented over a period of time.

There are four different Approaches to undertaking a Master Plan, which include:

- Approach No.1
  - Preparation of a Master Plan document at the conclusion of Phases 1 and 2 of the Municipal Class EA process.
  - Broad level of assessment thereby requiring more detailed investigations at the project-specific level in order to fulfil the Municipal Class EA documentation requirements for the specific Schedule B and C projects identified within the Master Plan.
  - Schedule B projects would require filing of the Project File for public review.
  - Schedule C projects would have to fulfil Phases 3 and 4 of the Municipal Class EA prior to filing an Environmental Study Report (ESR) for public review.

- Approach No.2
  - Preparation of a Master Plan document at the conclusion of Phases 1 and 2 of the Municipal Class EA process.
  - Level of investigation, consultation and documentation are sufficient to fulfil the requirements for Schedule B projects.
  - The public notice for the Master Plan becomes the Notice of Completion for the Schedule B projects within it.
  - Schedule C projects would have to fulfil Phases 3 and 4 of the Municipal Class EA prior to filing an ESR for public review.
  - The Master Plan would provide the basis for future investigations for specific Schedule C projects identified within it.

- Approach No.3
  - Preparation of a Master Plan document at the conclusion of Phase 4 of the Municipal Class EA process.
  - The Master Plan would document Phases 1 to 4 of the Class EA process for Schedule B and/or Schedule C projects.
  - The final notice for the Master Plan becomes the Notice of Completion for the Schedule B and C projects within it.

- Approach No.4
  - Possible integration with approvals under the Planning Act (i.e. Official Plans, Official Plan Amendments).
  - A master servicing plan prepared in this fashion establishes need and justification in a very broad context.
  - This approach would satisfy early phases of the Class EA including Phases 1 and 2 for Schedule B projects and may satisfy, in addition, Phases 3 and 4 for Schedule C projects.
  - This approach is best suited when planning for a significant geographical area in the long term.

This Storm Drainage Master Plan was completed following Approach No.2. to ensure that the level of investigation, consultation and documentation were sufficient to fulfil the requirements for Schedule B projects.

Modelling and Design Criteria

The Storm Drainage Master Plan utilized the latest in 1-Dimensional and 2-Dimensional stormwater modelling technologies to assess both existing and future conditions within the study area. The model was used to simulate the existing flow conditions of the minor (sewers) and major (overland) systems. The minor system was modelled using a 1-Dimensional (1D) linear model network, while the major (overland) system was modelled using a 2-Dimensional (2D) approach.

The study took into consideration all applicable guidelines identified within the released Windsor/Essex Stormwater Management Standards Manual (December 2018). The analysis of both the existing and future development conditions used Environment Canada's Windsor Airport (Windsor_A) rainfall data to evaluate the stormwater infrastructure throughout the study area. This Intensity-Duration-Frequency (IDF) data was used to generate the following storm events using the Chicago Storm Distribution:

- Chicago 1:2 year 4 Hour Storm Event;
- Chicago 1:5 year 4 Hour Storm Event;
- Chicago 1:10 year 4 Hour Storm Event;
- Chicago 1:100 year 4 Hour Storm Event;

To take into consideration Climate Change, two rainfall events were used as an "Urban Stress Test" to assess the resiliency and vulnerability of the designed and/or pre-existing storm system. This included the following:

1. **High Intensity Climate Change Event:** Chicago 1:100 year 4 hour storm event distribution + 40% incremental intensity. This rainfall event produced a total rainfall volume of 115 mm with a maximum 10 minute intensity of 241 mm/hr.

2. **High Volume Climate Change Event (as per the Windsor/Essex Stormwater Management Standards Manual):** 150mm rainfall event with a 15 minute time step, representing a 39% increase in volume uniformly distributed across the rainfall event, as compared to the Windsor Airport 1:100 year 24-hour rainfall of 108mm. Maximum intensity of 145 mm/hr.

The high intensity climate change event was used to design the recommended surface flooding solutions and the high volume climate change event was then used to validate and confirm the design.

In development of the solutions within the study, the design level of service applied is based on local surface flooding conditions that were identified. In some instances, a traditional engineering approach is applied, which involves a static design criteria meeting the regulatory requirements. In other instances an enhanced approach is applied that accounts for climate change considerations, adding more resiliency to the storm system.

Alternative Solutions and Evaluation Criteria

Alternative solutions were developed to improve the resiliency of the storm drainage infrastructure, taking into consideration the impacts of climate change. A surface flooding solution decision framework was developed to outline an approach to developing solutions that address both the required level of service and added resiliency for each surface flooding problem area, as appropriate.

The decision framework was developed to determine the scope of the preferred design solution and identify areas that require either a traditional or an enhanced level of service to suit the risks and vulnerability of the area. The framework is detailed within the Executive Summary (see page 6 of Attachment No. 5).

As part of the decision making process, a comparative evaluation of the alternative solutions was completed for each problem area identified. The evaluation criteria included:

- Meets Study Objective:
    - **Addresses Study Problem/Opportunity Statement**: If the alternative does not address the objective, it was not considered further.

- Technical Factors:
    - **Impact on Minor System (sewers) drainage**: Ability to increase flow conveyance during minor storm events.
    - **Impact on Major system (roadway) drainage**: Ability to enhance major system flow routing and reduce ponding to provincially accepted standards during major storm events.
    - **Ease of construction and implementation**: Ease of construction based on a technical, regulatory and practical basis. Alternatives that are easier to construct/implement are preferred.

- Social/Economic Factors:
    - **Future land uses**: Potential to influence infill development in currently developed areas.
    - **Impact on Urban Community**: Potential for disruption or displacement of existing residents, greenspace/recreational uses (streets, trees, parks, open spaces).

- Environmental Factors:
    - **Natural Environment**: Potential for significant negative impacts on terrestrial and aquatic resources, including Species at Risk habitat

- Cultural Factors:
    - **Archaeological resources**: Potential to impact lands with archaeological resources.
    - **Built heritage and/or cultural heritage resources**: Potential impacts on built heritage and/or cultural heritage resources.

- Cost Factors:
    - **Relative capital cost**: Relative overall capital costs, including restoration/enhancement costs for the alternative. Lower cost alternatives are preferred.

Recommended Solutions, Schedule B Projects and Estimated Capital Costs

The recommended surface flooding solutions outlined within the Storm Drainage Master Plan have been designed to a functional level of detail, and further specifics of these solutions can be found within Recommended Solutions Summary Map (Attachment No.4) as well as the Executive Summary (starting on page 10 of Attachment No. 5).

The Schedule B projects included for approval as part of this Master Plan are designed to be functional in nature and provide sound direction on the nature of the designs that would be effective in addressing surface flooding concerns. These projects have been identified as:

1) Lesperance Road Storm Pump Station Improvements
2) West St. Louis Storm Pump Station Improvements
3) New Consolidated Scully/St. Mark's Storm Pump Station
4) PJ Cecile Storm Pump Station Improvements
5) New Southwind Crescent Storm Pump Station
6) Surface Storage within 'Tecumseh Soccer Fields' Park at Ecole Secondaire L'Essor
7) Surface Storage within Buster Reaume Park
8) Surface and Underground Storage within Tecumseh Centre Park

Estimated capital costs and implementation phasing for all of the recommended solutions are detailed within the Executive Summary (starting on page 22 of Attachment No. 5). A summary of the capital costs is as follows:

Service Area	Estimated Construction Cost & Contingency ($M)	Engineering ($M)	Total ($M)
Lesperance Pump Station	$26.09	$4.44	$30.53
Consolidated Scully/St. Mark's Pump Station	$19.39	$3.31	$22.70
West St. Louis Pump Station	$17.96	$2.99	$20.95
East St. Louis Pump Station	$0.62	$0.10	$0.72
East Townline Drain	$5.34	$0.91	$6.25
Baillargeon Drain	$6.60	$1.13	$7.73
PJ Cecile Pump Station	$10.98	$1.88	$12.86
Southwind/Starwood Area	$0.90	$0.15	$1.05
Brighton Pump Station	$3.25	$0.55	$3.80
Totals	**$91.13**	**$15.46**	**$106.59**

Implementation phasing for all of the recommended solutions was provided for each of the storm service areas. Works would typically precede starting downstream and working

upstream in the system. However with utilizing the 2D Model, we now have the capability of reviewing the effects on the system if upstream works were constructed first (i.e. can the Town install trunk sewers in advance of pump station upgrades without adversely affecting the existing level of service).

As identified within the Town's 2018 Asset Management Plan (v2.0), the recommended solutions will be incorporated into the annual Public Works & Environmental Services Capital Works Plan moving forward. It is intended to consolidate various infrastructure improvements into a singular tender package for efficiencies and economies of scale benefits (i.e. storm sewer improvements would be consolidated with a watermain replacement and road reconstruction).

Public Consultation

There was extensive public consultation throughout the Master Plan process which exceeded the requirements of the Municipal Class EA. These included:

1. Notice of Study Commencement

   The Notice of Study Commencement was mailed to the study contact list, which consists of interested property owners, stakeholders, indigenous communities, and regulatory agencies. It was also published in the April 28th and May 5th, 2017 editions of the Shoreline and placed on the Town's website and social media accounts.

2. Public Information Centre (PIC) No.1

   The Notice of PIC No.1 was mailed to the study contact list on July 12, 2018. It was also published in the July 13th and July 20th, 2018 editions of the Shoreline and placed on the Town's website and social media accounts.

   PIC No.1 was held on July 25, 2018 from 3:00 p.m. to 5:00 p.m. and 6:00 p.m. to 8:00 p.m. at the Royal Canadian Legion Branch 261 on Lanoue Street. A total of 33 people attended PIC No.1 and any comments received have been documented and addressed within the Master Plan document. The purpose of the PIC was to present:
   - Project need, including information on why surface flooding occurs;
   - Problem areas identified in the storm sewer overland drainage systems; and
   - Alternative storm drainage solutions considered and recommended regional solutions.

3. Public Information Centre (PIC) No.2

   The Notice of PIC No.2 was mailed to the study contact list on January 22, 2019. It was also published in the January 25th and February 1st, 2019 editions of the Shoreline and placed on the Town's website and social media accounts.

   PIC No.2 was held on February 6, 2019 from 3:00 p.m. to 5:00 p.m. and 6:00 p.m. to 8:00 p.m. at the Royal Canadian Legion Branch 261 on Lanoue Street. A total of 27 people attended PIC No.2 and any comments received have been documented and addressed within the Master Plan document. The purpose of the PIC was to present:

- Recommended solutions to reduce surface flooding for each problem area; and
- Information on recommended Schedule B projects.

4. Indigenous Communities Consultation Engagement

   The Indigenous Communities identified as potentially interested in the study included Walpole Island, Caldwell, Aamjiwnaang, Chippewas of the Thames, and Moravian of the Thames (Delaware Nation). All project Notices were sent to the Indigenous Communities along with cover letters. Correspondence was only received from the Aamjiwnaang First Nations.

   Prior to PIC No.2, a presentation was made by Dillon Consulting Limited and Administration to the Aamjiwnaang First Nation Environmental Committee on February 5, 2019 in Sarnia.

5. Direct Property Owner Consultation Regarding Schedule B Projects

   Additional consultation and meetings were held with property owners who were directly affected or adjacent to the identified Schedule B projects. Alternatives and preferred solutions for each project were discussed. Notifications were mailed out on January 23, 2019, and the following efforts were undertaken:

   - Lesperance Road Storm Pump Station Improvements (PS-1)
     - A meeting was held on January 30, 2019 and attended by two property owners.
   - West St. Louis Storm Pump Station Improvements (PS-3)
     - A notice to the adjacent property owners was mailed January 23, 2019. The property owners did not request a meeting with the project team.
   - Scully & St. Mark's Storm Pump Stations Improvements (PS-2)
     - A notice to the adjacent property owners was mailed January 23, 2019. The property owners did not request a meeting with the project team.
   - PJ Cecile Storm Pump Station Improvements (PS-4)
     - A meeting was held on January 22, 2019 with the Beach Grove and Country Club and attended by two representatives from the Club. A second meeting was held on January 30, 2019 with the Kensington Beach Owners Group, where six individuals attended.
   - New Southwind/Starwood Storm Pump Station (PS-5)
     - A meeting was held on January 28, 2019 and attended by four property owners. A second meeting was held on January 30, 2019 with the Southport Sailing Club where one representative attended.

- Tecumseh Soccer Fields Surface Storage (SM-3)
    - A meeting was held on January 11, 2019 with two representatives from Conseil Scolaire Catholique (CSC) Providence. Dillon Consulting and Administration also gave a presentation to their Board on February 11, 2019.
- Tecumseh Centre Park – Underground & Aboveground Storage (LE-5)
    - A meeting was held on December 20, 2018 with the Director Parks & Recreation Services to review the proposed works.
- Buster Reaume Park – Aboveground Storage (ETD-1)
    - A meeting was held on December 20, 2018 with the Director Parks & Recreation Services to review the proposed works.

6. Policies & Priorities Committee Meeting – 6:00 p.m. November 27, 2018

   The Director of Public Works & Environmental Services provided an overview of the Storm Drainage Master Plan, and the progress on the study to date. A detailed summary of the required works and alternatives identified at PIC No.1 for the Baillargeon Drain area west of Manning Road was also provided.

Presentation

The Town's consultant, Dillon Consulting Limited, will be in attendance at the 4:30 p.m. June 25, 2019 Special Meeting of Council to make a presentation that summarizes the Master Plan process, details the modelling results of the existing conditions, outlines the alternative solutions and the evaluation criteria, and identifies the preferred solutions and associated estimated costs.

Next Steps

The Notice of Study Completion will be published in the local newspaper and on the Town's website and social media accounts, and will also be mailed to landowners, stakeholders and regulatory authorities on the contact list for the Master Plan.

A copy of the Notice of Completion will also be included as a Communication Item at the following regularly scheduled meeting of council following publication.

A hard copy of the Storm Drainage Master Plan will be made available at Town Hall through the Clerk's Office during the 30-day review period, along with a digital copy being made available on the Town's website.

Following the 30-day review period, and considering that all of the comments received have been addressed and that no Part II Orders were submitted to the Minister of the Environment, Conservation and Parks, Administration will bring forward a separate report to Council to have the Storm Drainage Master Plan formally adopted.

Consultations

Financial Services
Planning & Building Services
Dillon Consulting Limited

Financial Implications

In 2017 the Town was successful in receiving approval from the Federation of Canadian Municipalities (FCM) for funding in the amount of up to $175,000 under the Municipalities for Climate Innovation Program (MCIP) for the Town's Storm Drainage Master Plan study.

The 2D modelling and resulting recommended solutions to improve the level of service for the storm infrastructure is anticipated to cost **$106.59M.**

The current allocation to the Storm Sewer Reserves ($902,700) is intended for the replacement of the existing assets and not meant for 'level of service improvements'. There was no significant increase in the Storm Sewer Reserves within the 2019 budget, however it was intended that the 'level of service improvements' may be funded from the New Infrastructure Reserve in the interim. This approach may find storm infrastructure projects competing for funding with other Council initiatives such as the Multi-Use Sportsplex and the Main Street CIP Streetscape project.

Administration has, and will continue to explore other grant funding opportunities for funding of the storm infrastructure projects, including the anticipated second Intake for the Disaster Mitigation and Adaptation Fund (DMAF), the Green Infrastructure Stream under the Investing in Canada Infrastructure Program (ICIP), and the Green Municipal Fund through FCM.

Now that the Storm Drainage Master Plan has been finalized and the recommendations identified, a subsequent report to council will be prepared outlining a funding and phasing strategy.

Link to Strategic Priorities

Applicable	2017-18 Strategic Priorities
☐	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
☒	Ensure that the Town of Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
☐	Integrate the principles of health and wellness into all of the Town of Tecumseh's plans and priorities.
☒	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
☒	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☒

Website ☐ Social Media ☐ News Release ☐ Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Phil Bartnik, P.Eng.
Director Public Works & Environmental Services

Reviewed by:

Tom Kitsos, CPA, CMA, BComm
Director Financial Services & Chief Financial Officer

Reviewed by:

Brian Hillman, MA, MCIP, RPP
Director Planning & Building Services

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	**Attachment Name**
1	Study Area and Municipal Drainage Map
2	Storm Pump Station Service Area and Gravity Outfall Map
3	Municipal Class EA Planning and Design Process (Flow Chart)
4	Recommended Solutions Summary Map
5	Storm Drainage Master Plan, Executive Summary
6	June 25, 2019 Special Council Meeting Presentation