



The Corporation of the Town of LaSalle

Date	September 6, 2017	Report No:	PW-30-17
Directed To:	Mayor and Members of Council	Attachments:	~ Notice of Completion ~ EA Executive Summary
Department:	Public Works	Policy References:	
Prepared By:	Peter Marra, P.Eng. – Director of Public Works		
Subject:	Heritage Estates/Oliver Farm Flooding Environmental Assessment Finalization		

RECOMMENDATION:

That Council concur with the Environmental Assessment as presented, that Council also concur with the formal issuance of the notice of study completion, and that the mandatory 30-day review period commence September 12, 2017.

REPORT:

The Town has been underway with an Environmental Assessment (EA) since late 2015 for the area of Heritage Estates and Oliver Farms to investigate flooding occurrences that occurred in the respective areas in 2014 and 2015. Stantec Consulting was hired by the Town to conduct this EA.

This study was initially identified as a schedule A+ project under the environmental assessment act and was scheduled to only have two public information meetings. As this project matured, this project transitioned into a schedule B project and a third public information meeting was added. The addition of this third meeting was well worth the effort and minor delay and valuable feedback was received from the residents on expectations.

The EA was developed to identify the problem, solicit feedback from residents, develop various solutions, weigh each solution against each other for impact on the environment and public and recommend a final preferred solution. The EA was finalized and made available to the public for viewing through the Town website and hard copies were made available at the Townhall and the LaSalle library branch. Notices (copy enclosed) were mailed out August 9 2017 to the residents of this area advising of the September 12th Council meeting and the various ways that the report

could be viewed. Two advertisements of this same notice were placed in the LaSalle post, one on August 18 and another on August 25.

The mailed notice provides info on the EA process and how to have any additional concerns addressed. Further, the notice provides info that the report will continue to be on review for another 30-days until October 12 2017.

Stantec will be presenting the final EA outlining the recommended solutions to assist in reducing flooding occurrences in these respective areas. Enclosed is the Executive Summary of the report outlining the backbone of the final report. The formal complete report provides additional background information.

It is recommended that Council concur with the Environmental Assessment as presented, that Council also concur with the formal issuance of the notice of study completion, and that the mandatory 30-day review period commence September 12, 2017.

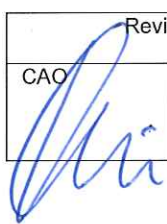
Once the mandatory review period has expired on October 12, 2017, the next steps will be to work through the implementation/construction phases of this recommended solution. The next phases will need to be budgeted for in future year budgets.

Respectfully submitted,



Peter Marra, P.Eng.
Director of Public Works

Reviewed by:							
CAO	Treasury	Clerks	Public Works	Planning	Cult. & Rec.	Building	Fire





**HERITAGE ESTATES AND OLIVER FARMS
FLOODING AND PRELIMINARY DESIGN STUDY**

NOTICE OF COMPLETION AND COUNCIL MEETING

The Town of LaSalle, through their consultant Stantec Consulting Ltd., has completed a study to investigate the cause and solutions to basement flooding resulting from rainfall events that occurred in August of 2014 and July of 2015. The study includes preliminary design of the Oliver Farms area, including road reconstruction, new sidewalks, watermain replacement, storm sewer replacement and evaluation of existing street lighting to meet current Town Standards. The study began in the Winter of 2015 and was originally designated as a Schedule A+ project under the Municipal Class EA process, with two (2) planned Public Information Centres. The project evolved into a Schedule B with the preferred solution identified as a new stormwater facility proposed in Heritage Park. An additional (third) PIC was held in December of 2016 to solicit public comments and feedback on the proposed stormwater facility options in Heritage Park. The study report is now available for public review.

The study report is available online at www.lasalle.ca and at the following locations during normal business hours until October 12th, 2017:

Department of Public Works
Town of LaSalle (2nd Floor)
5950 Malden Road
LaSalle, ON N9H 1S4

Essex County Library
LaSalle Branch
5950 Malden Road
LaSalle, ON N9H 1S4

Interested persons must provide written comments on the study report by contacting the individuals identified below by October 12th, 2017.

Peter Marra, P. Eng.
Director of Public Works
Town of LaSalle (2nd Floor)
5950 Malden Road
LaSalle, ON N9H 1S4
Tel: 519.969.7770 ext. 1475
Email: pmarra@lasalle.ca

Alain Michaud, P. Eng.
Municipal Engineer
Stantec Consulting Ltd.
140 Ouellette Place
Windsor, ON N9X 1L9
Tel: 519.966.2250 ext. 364
Email: alain.michaud@stantec.com

The Municipal Class EA entitles any person who has significant concerns about the project to request the Minister of the Environment to issue a Part II Order to change the status of the project from a Class EA to an individual environmental assessment. The procedure for requesting a Part II Order is:

- First, the person with concerns discusses them with the Municipality of the Town of LaSalle.
- If concerns cannot be resolved, the person may submit a written request for a Part II Order to the Minister of the Environment at 77 Wellesley Street West, 11th Floor, Ferguson Block, Toronto Ontario, M7A 2T5 by October 12th, 2017.

The Municipal Freedom of Information and Protection of Privacy Act applies to information gathered for this project. With the exception of personal information, all comments will become part of the public record.

The study report will be presented before Council on September 12th, 2017 for information to be received. Please note the following time and location of this meeting:

Town of LaSalle Council Meeting	
Date:	Tuesday, September 12 th , 2017
Time:	7:00p.m.
Location:	LaSalle Town Hall (Council Chambers) 5950 Malden Road LaSalle, Ontario
Format:	Formal meeting of municipal Council. Open to the public. 2017 agendas available at http://www.lasalle.ca/en/Calendar/Council/Default.aspx

Executive Summary

GENERAL

This report will discuss the Oliver Farms Preliminary Design as well as the findings of our flooding study for both the Oliver Farms and Heritage Estates residential developments, referred to as the study area.

The Oliver Farms area was constructed after the second World War and is in need of municipal infrastructure improvements. The Heritage Estates area was constructed in the 1980's. Both the Oliver Farms as well as the Heritage Estates areas have experienced basement flooding in the past few years.

SECTION 1.0

This section outlines the background and objectives of the study. The study area is located near the northeast limit of the Town of LaSalle and is bounded by the new Rt. Hon. Herb Grey Parkway to the north, Howard Avenue to the east, 6th Concession to the south and Heritage Drive to the west. The objectives of the study are to:

- investigate the cause and solutions to basement flooding resulting from rainfall events that occurred in August of 2014 and July of 2015;
- eliminate surface ponding during minor events and providing flooding relief during major events;
- complete a preliminary design of infrastructure improvements in the Oliver Farms area.

SECTION 2.0

This section provides a description of the existing stormwater system within the study area as well as adjacent areas.

Through the original design of Oliver Farms, stormwater was collected via roadside ditches and all conveyed to the Lepain Drain, a municipal drain, which existed across the area that is now developed as Heritage Estates. In approximately 1957, some of the roadside ditches were enclosed. Currently, the Oliver Farms storm drainage outlets via an existing 675 mm dia. storm sewer.

The storm sewer system in the Heritage Estates area was constructed in the 1980's and designed based on the 1 in 5 year Yarnell curve storm.

The study area is the most upstream catchment of the LePain Drain subwatershed. Immediately downstream of the study area, the Heritage storm sewers outlet to the LePain Drain open channel. The LePain Drain also collects flow from the Head/D'Amore Development and

discharges to the West Branch of the Cahill Drain which ultimately discharges into the Canard River.

At the time in which the study area was developed, there was no requirement for stormwater management from both a quantity or quality control perspective.

SECTION 3.0

This section discusses potential causes of basement flooding. The findings of our study suggest that the primary cause of the basement flooding is deficient private drainage systems (i.e. – cracked pipes, sump pump failure, tree roots, grading around the house, etc.).

The rainfall intensities that were experienced at the study area for August 11, 2014 and July 25, 2015 storm events significantly exceeded the sewer design capacity – resulting in significant surcharging and surface ponding. Surface ponding in itself is not a cause of basement flooding, however it can stress the private drainage system and aggravate any existing deficiencies.

SECTION 4.0

This section presents the findings of our evaluation of the existing stormwater systems. The existing storm sewer system experienced significant surcharging and surface ponding during both the August 2014 and July 2015 storm events. The August 2014 and July 2015 storms can both be classified by a return period of approximately 1 in 10 year storm when compared to historical rainfall data. Both storms had similar high-intensity rainfall periods which significantly exceeded the design rainfall intensity of the Heritage storm sewer system.

It should be noted that storm sewer systems throughout the County of Essex are generally designed to convey a 2 Year or 5 Year return period. Storm sewers within the County are not designed to fully convey the flows resulting from the above-mentioned storm events that occurred in 2014 and 2015.

SECTION 5.0

This section presents our review of alternative solutions. The study considered several alternative solutions (options) to address flooding issues which can be categorized as follows;

1. Maintaining/improving private drainage systems
2. Improving conveyance capacity of the storm system – Options 1 to 3
3. Adding storage capacity within the system to temporarily detain runoff from high intensity rainfall events – Options 4a to 4g

Maintaining private drainage systems is critical to ensure that surface water and groundwater surrounding the home is directed away from the home and towards the roadway/storm sewer system.

OLIVER FARMS/HERITAGE ESTATES FLOODING STUDY AND OLIVER FARMS PRELIMINARY DESIGN

Improving conveyance capacity will limit the amount and frequency of sewer surcharging and subsequently alleviate stress on private drainage systems.

Adding storage capacity within the system will temporarily detain runoff from high intensity rainfall events to reduce sewer surcharging and surface ponding depth and duration.

All options provide a similar reduction in overall sewer surcharge and surface ponding which will alleviate stress on the private drainage systems. However, Option 4d – large wet pond in Heritage Park provides this reduction with the most easily implementable solution in terms of accessibility, constructability and lowest Total Stormwater Cost of **\$5,401,000**, which includes improvements to both Oliver Farms and Heritage Estates storm systems.

Residents have expressed concerns with the Wet Pond Solution. A commendable effort was undertaken by a group of local residents to visit every home in Heritage Estates (664 homes) and ask residents if they would be prepared to sign a petition with the message **"Preserve Heritage Park for Future Generation. No Storm Water Pond in Heritage Park"**. The petition provided signatures from 562 residents (440 homes), representing 66% of all homes and 90% of all responding residents, with the remaining 10% of responding residents refusing to sign the petition. The petition signatures appear to have ranged from November 27, 2016 to December 7, 2016 (i.e. both before and after PIC No. 3 held on December 1, 2016).

The study originally planned for two Public Information Centres. A third Public Information Centre was held to allow residents the final opportunity to provide feedback on the proposed pond in Heritage Park and proposed storm system improvements in Oliver Farms. The PIC No. 3 presented conceptual plans of the proposed pond solution as well as expanded options in lieu of the pond. The PIC was held on Thursday, December 1, 2016 and was attended by 75 residents.

Below is a synopsis of comments received during the PIC as well as from comment sheets received from 44 residents:

The general consensus was that the residents habitually use and are unwilling to lose the open space that the park currently provides. Many residents also were strongly against the wet pond due to wet pond related concerns (lack of maintenance, breeding of mosquitos/disease, habitat for insects and vermin, safety hazards of open water and thin ice, geese fecal matter and/or attacks, poor aesthetics – odor and appearance). While the PIC display boards presented and discussed design approaches and mitigating measures to address these wet pond concerns, the residents generally maintained their disapproving position on wet ponds.

To mitigate the loss of the park's green space and provide economically viable options in lieu of a wet pond, expanded options considered adding storage capacity via the use of a polypropylene and polyethylene elliptical arch shaped chambers (StormTech) as an economical alternative to provide underground storage. Options 4d2 to 4g provide expanded options using StormTech chambers for underground storage in the park as well as using the

chambers in lieu of a standard storm sewer design (circular concrete pipe designed for 1:5 Year Storm conveyance).

The expanded options are all similar in regards to technical and natural environment impacts. Where the expanded options differ is in their socio-cultural and economic impacts. As evidenced by the petition and comments received from PIC No.3, the residents strongly oppose a wet pond type of stormwater management. Thus, the balance between economic and socio-cultural and impacts has shifted with the final recommendation to implement option 4f2 – underground storage with a dry pond (depressed floodplain area) for surface storage during extreme events. Option 4f2 would incur an added cost of **\$1,364,000** as compared to the original preferred option 4d (from a total stormwater cost of **\$5,401,000** to **\$6,765,000**).

For perspective on the frequency of ponding in the depressed floodplain area, the storm system model estimates that the area would not have ponded during the July 25, 2015 and would have ponded for only 2 ¼ hours under the August 11, 2014 event. In summary, the depressed floodplain area will maintain all of the current open space that the park provides and it will not experience surface water ponding for most rainfall conditions.

SECTION 6.0

This section discusses study conclusions and provides recommendations. **The most effective way to reduce the risk of flooding involves a two-part solution that aims to:**

- Solution A.** Maintain/Improve private drainage systems to ensure adequate drainage of surface, roof and groundwater around the home, supplemented with;
- Solution B.** Improvements to the Town's stormwater system to reduce the duration and frequency of sewer surcharging during intense rainfall events – thereby alleviating stress on the private drainage systems.

Solution A

- **Private Drainage System Maintenance**

Periodic maintenance and repairs to private drainage systems is important to ensure that surface water and groundwater surrounding the home is directed away from the home and towards the roadway/storm sewer system.

- **Sump Pump Systems**

The sump pump is the most critical element in dewatering the groundwater surrounding the home and should not be neglected. Adequate power outage protection (i.e. power generator) or a backup pump with alternative power supply is strongly recommended. It is also recommended that the backup pump be equal to or better than the main pump.

OLIVER FARMS/HERITAGE ESTATES FLOODING STUDY AND OLIVER FARMS PRELIMINARY DESIGN

Equally important, the sump pump discharge must be effectively directed away from the home. When a pump discharges into a cracked or clogged private storm drain, water is not effectively directed away from the home.

- **Downspout Disconnection**

When feasible, disconnection of the roof downspouts from the underground sewer system can significantly reduce the direct inflow of water to the private drainage system. However, care must be taken to direct roof water to the street and/or rear yard drainage inlet and not on neighbouring property. Do not disconnect downspouts at sidewalks or driveways.

- **Completely Isolated Private Drainage System**

When feasible, complete isolation from the Town sewer system typically provides the best protection against basement flooding. Complete isolation eliminates drainage issues resulting from deficient private drains and protects the home of backflow from the Town's sewer systems.

Solution A is most critical in reducing the risk of flooding and protecting the home. This solution is the first line of defense and can be implemented immediately. It is strongly recommended that the homeowner take an active role in implementing home improvements to reduce the risk of basement flooding.

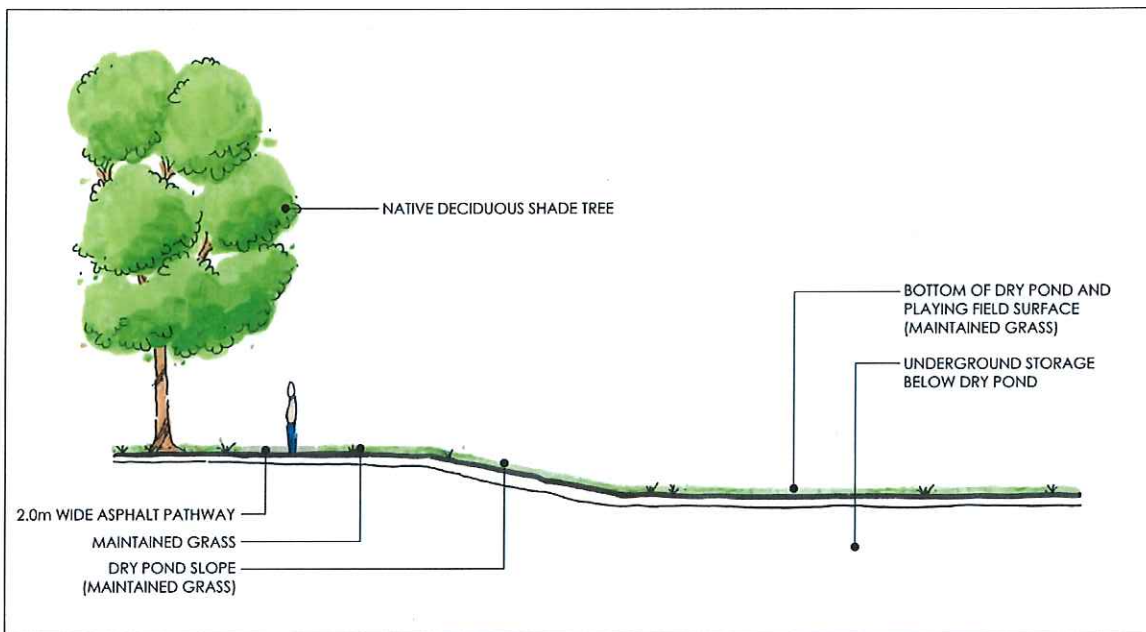
Solution B

Option 4f2 – Add Underground Storage with Dry Pond in Heritage Park



OLIVER FARMS/HERITAGE ESTATES FLOODING STUDY AND OLIVER FARMS PRELIMINARY DESIGN

The recommended **Solution B** to improve the Town's stormwater system consists of adding storage capacity within the system to temporarily detain runoff from high intensity rainfall events and reduce peak flows to the storm sewer. The recommended **Option 4f2** consists of underground storage with a dry pond (depressed floodplain area) in Heritage Park for surface storage during extreme events. This option will maintain the park's green space as illustrated on the previous page. The illustration below depicts a typical dry pond cross section. The proposed dry pond is to have a maximum depth of 1.2 metres (4 feet).



TYPICAL DRY POND CROSS SECTION

Option 4f2 is the recommended Solution B which can be implemented in two independent phases (i.e. Phase 2 can be implemented before Phase 1):

Phase 1 – Oliver Farms Improvements

- Replace approximately 2,360 metres of existing Oliver Farms storm sewers with one row of MC4500 StormTech underground chambers (approximately 10,000 cubic metres of storage).
- Replace approximately 260 metres of existing storm sewer in greenway from Montgomery Drive to the south end of walkway off Carriage Lane with one row of MC4500 StormTech underground chambers (approximately 1,100 cubic metres of storage).
- Install a 900 mm dia. flow control orifice with backflow prevention connecting StormTech chambers to 1200 mm dia. storm sewer in walkway from Carriage Lane.

Phase 2 – Heritage Estates Improvements

- Install approximately 260 metre length of one row of MC4500 StormTech chambers within greenway from Kenwick Way overflow sewer to Heritage Park lands.
- Install approximately 3,200 cubic metres of StormTech underground chambers under Heritage Park with configuration to be determined at detailed design.
- Construct shallow dry pond (shallow depressed area) up to maximum 1.2 metre (4 foot) depth in Heritage Park to provide 11,000 cubic metres of surface storage at a maximum water surface elevation of 184.0m.
- Install surface catch basins in depressed areas for surface runoff drainage as well as interconnections between underground and surface storage. Ensure sufficient routing capacity in interconnections for underground storage to rise up and fill surface storage during extreme events.
- Install 525 mm dia. storm sewer outlet from Heritage Park underground storage chambers to Heritage Drive storm sewer.
- Install 900 mm dia. storm sewer along Winfield Dr. and Coachwood Pl. to divert 10.74 hectares to the greenway storm sewer /pond.
- Install overflow relief sewers to connect existing storm sewers to the greenway storm sewer/pond through walkways at Lepain Cr. (600 mm dia.), Kenwick Way (600 mm dia.) and Guildwood Cr. (450 mm dia.), complete with flap gates.
- Construct interconnection sewers on Rushwood Cr. (375 mm dia.), Carriage Lane (375 mm dia.) and Guildwood Cr. (300 mm dia.).
- Disconnect existing 750mm dia. sewer in manhole at Winfield Dr. and Coachwood Pl. such that all flows are diverted northerly via new storm sewer along Coachwood.
- Disconnect existing 600mm dia. storm sewer in manhole at Sugarwood Cr. and Winfield Dr. such that all flows are diverted northerly via new storm sewer along Winfield.

Refer to **Figure 4** on the next page for a storm sewer plan of Option 4f2.

Solution B will help to mitigate risk of flooding by alleviating stress on the private drainage system caused by sewer surcharging and prolonged surface ponding. It will improve level of service of the storm sewer system such that the 5 Year design storm event will not result in any surface ponding. In other words, Solution B will result in less frequent and shorter durations of surface ponding.

However, Solution B is ultimately only a supporting measure that does not, in itself, provide long-term protection against basement flooding and should not be relied upon without implementation of Solution A.

Figure 4 – Option 4f2 Storm Sewer Replacement Plan



Funding Solution B

It is important to note that any and all options presented have not been included in any current capital plan approved by Council. In developing a financial strategy to implement any solution the Town will require assistance/funding from senior levels of government, may need to issue debt to fund the ultimate solution, or otherwise re-prioritize existing projects. Given these financial circumstances and realities the construction of any solution may be beyond the 5 year horizon unless significant senior government funding is obtained, other projects are re-prioritized, and/or debt issued.

With the issuance of debt will come the corresponding required debt repayment. The annual amount of the debt repayment could be funded by an increase in taxes (which will effect all properties Town wide), or the implementation of a local improvement assessment (which will effect only the directly benefitting properties), and/or some combination of both. **Table 4** below outlines cost allocations for both neighbourhoods.

Table 4 – Cost Allocations for Recommended Solution B (Option 4f2)

	Oliver Farms Neighbourhood	Heritage Estates Neighbourhood	TOTAL
Total Number of Homes	119	664	783
Total Approximate Residential Assessment	20,300,000	123,400,000	143,700,000
Total Approximate Commercial Assessment	---	25,000,000	25,000,000
Total Stormwater Cost	3,996,000¹	2,769,000	6,765,000

Note 1: Proposed Oliver Farms Improvements also include watermain replacement, road reconstruction and street lighting replacement for a total cost of \$9,079,000. See section 7.0 for details.

Town Council has not determined method in which the project(s) will be financed nor the timelines for commencement as both factors may be subject to funding from senior levels of government. The ultimate method of financing will be the subject further public consultation.

SECTION 7.0

This section discusses the preliminary design of Oliver Farms area improvements, including road reconstruction urban road cross-section, new sidewalks, watermain replacement, storm sewer replacement, stormwater management, evaluation of existing street lighting to meet current Town Standards, utility coordination and approvals. The probable cost of the proposed improvements is \$ 9,079,000.

Table 5 below provides a summary of the probable cost of the proposed Oliver Farms improvements.

Table 5 – Probable Cost of Oliver Farms Improvements

Description	Probable Cost
Storm Sewer Replacement/ Stormwater Management	3,996,000
Watermain	1,478,000
Roadway	3,538,000
Street Lighting	67,000
TOTAL COST	9,079,000

Abbreviations

cms	cubic metres per second flow rate
dia.	diameter
mm	millimetre
m	metre
Mun. nos.	Municipal numbers
PIC	Public Information Centre

Glossary

1:5 year storm event (also referred to as 5 year storm)	A storm event with a 1:5 year return period or 20% probability of occurrence in any given year.
Hydrodynamic	Hydrodynamics is the study of motion of liquids, and in particular, water. A hydrodynamic model is a tool able to describe or represent in some way the motion of water.
Hydrograph	A hydrograph is a graph showing the rate of flow (discharge) versus time.
Hyetograph	A hyetograph is a graphical representation of the distribution of rainfall over time.
Major	In the context of stormwater, major relates to a major storm event. For purposes of design, the major storm event is quantified as a 1:100 year storm event.
Minor	In the context of stormwater, minor relates to a minor storm event. For purposes of design, the minor storm event is typically specified as a 1:5 year storm event.
Obvert	Elevation at the highest point of the inner surface of a pipe (i.e. interior top of pipe)
Return period	A return period, also known as a recurrence interval is an estimate of the likelihood of an event, such as an earthquake, flood or a river discharge flow to occur
Runoff	Surface water, from precipitation, that flow over the land surface.
Stormwater	Stormwater is the water from rain or melting snow that is not absorbed into the ground. It flows over land or impervious surfaces such as streets, parking lots and roofs.
Subcatchment	An area of land where all surface runoff converges or is assigned to a single point along a drainage feature. E.g. a storm sewer manhole.
WSEL	Water Surface Elevation