



Community Planning and Development Department

Wednesday, April 19, 2023

Subject: Drainage Study for Farr, River, and Webber Road Area

Recommendation:

BE IT RESOLVED THAT Council receive Report #2023-0097 – Drainage Study for Farr, River, and Webber Road Area, for information;

AND THAT Staff be directed to investigate the feasibility of dredging the roadside ditches and culverts along Farr and River Road within Public Works 2023 Operating Budget and/or the 2023 roadside ditching program;

AND THAT Staff continues to participate in discussions with the developers on the east and west sides of River Road to identify potential long-term, comprehensive drainage and stormwater solutions.

Background:

Through the fall of 2021 Council and staff received several complaints regarding drainage issues in the Farr, River, and Webber Road area from rural residential and agricultural property owners. It is noted that the summer and fall of 2021 were wet. On December 20, 2021, Council received a deputation from two rural residential property owners along with a petition signed by property owners in the area. At the same meeting, Council also received a report outlining the various drainage issues occurring on private properties in the area. Also, on December 20, 2021, Council included undertaking a Drainage Study in the Farr, River, and Webber Road area as part of the approval of the 2022 Capital Budget.

On February 7, 2022, Council considered a motion to request staff to prepare a report on the Town initiating a petition for a municipal drain in the Farr, River, and Webber Road areas prior to preparing terms of reference and undertaking a request for proposals for the Drainage Study approved in the 2022 Capital Budget and that Council considered a staff report on the Town initiating a petition for a municipal Drain potentially as an alternative to undertaking the Drainage Study approved in

the 2022 Capital Budget. That motion was not supported by Council. Staff then proceeded with the Farr, River, Webber Road Drainage Study.

Terms of reference for the Drainage Study were prepared and a request for proposals was undertaken in the spring of 2022. Seven consulting firms submitted proposals for this work, the proposals were evaluated, and the project was awarded to AHYDTECH Geomorphics Ltd. in accordance with the Town Purchasing Policy. The work on this Study commenced in May 2022.

Analysis:

Study Findings:

The purpose of the Drainage Study was to review the study area to determine the drainage patterns of the area, identify drainage concerns and identify possible solutions to address drainage issues. The focus of the study was on the unnamed watercourse just south of Webber Road and the channels that contribute to it. The unnamed watercourse is regulated by the Niagara Peninsula Conservation Authority.

Study Area:



To identify the drainage patterns, assess the extent of flooding in the area and potential solutions the consultant undertook the following tasks:

- Collected and acquired data from open sources, including from the Town and Niagara Peninsula Conservation Authority, for the development of the hydrologic and hydraulic models
- Reviewed reports and documents regarding studies carried out previously close to the study area
- Conducted field visits to collect topographic data and assess the existing condition of the study area including all the culverts
- Developed a hydrologic model through SWMHYMO to obtain the variation of peak flows corresponding to different return period conditions
- Developed a hydraulic model using HEC-RAS 1D to simulate flooding extent in response to flows of different return period events obtained from the hydrologic model
- Identified properties under flood risk and recommended mitigation options
- Prepared reports detailing the methodology and results obtained from the study
- Carried out consultations with the Town, NPCA, and pertinent stakeholders regarding the progress of the study.

The consultants also evaluated changes that occurred to the unnamed watercourse over the years by reviewing historical aerial imagery and contour mapping of the area from 2002 (prior to development) to 2020 (after development) to determine the impact that changes to grading and the watercourse have had on the direction of flow of the unnamed watercourse. The changes to the watercourse and grading changes occurred primarily to accommodate the unplanned rural residential development in the area. In 2002 Farr Road was the divide in the flow direction of water and lands on the west side of Farr Road flowed to the west to the Welland River via a culvert at Victoria Avenue and lands on the east side of Farr Road flowed east and ultimately to the Welland River past Balfour Street. By 2018 the divide had shifted due to changes made to the watercourse and the raising or filling of land associated with the rural residential development that had been occurring in the area. The divide in the flow direction of flow of the watercourse is now south of 930 Webber Road. The lands west of 930 Webber Road flow to the west and lands east of 930 Webber Road flow to the east resulting in a greater area flowing to the east than pre-development.

When evaluating the results of the hydrologic and hydraulic models that determined the flooding extent, it is evident that several properties and buildings are impacted by potential flood risk. Flow profiles were generated to illustrate the water levels

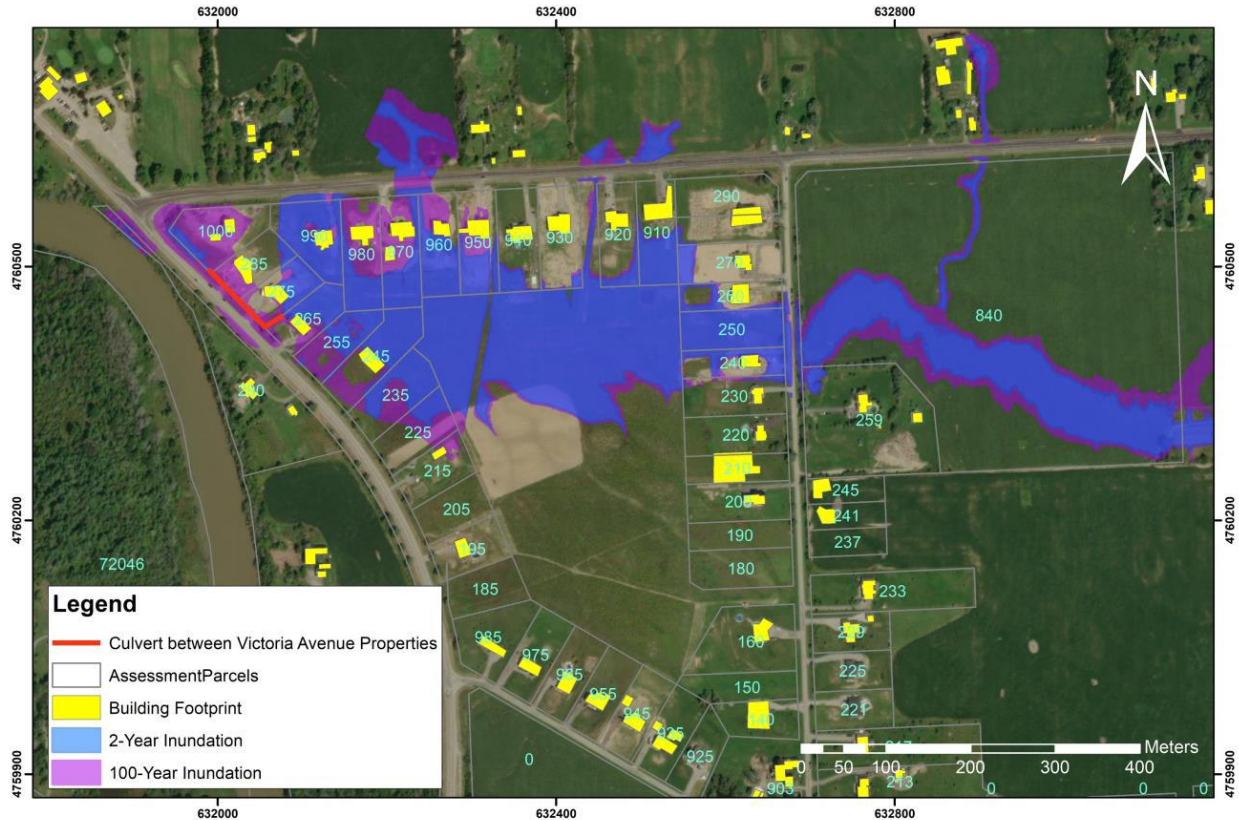
along the main channels of the unnamed watercourse. Along the East Channel (East of Farr Road) the inundation depth ranges from 1.31m for the 2-year flood to 1.62m for the 100-year flood near the railway crossing between Church and Balfour Streets. Comparatively, in the West Channel (west of Farr Road) the inundation depth is higher and ranges from 1.74m for the 2-year flood to 5m for the 100-year flood near the Welland River over Victoria Avenue.

Inundation Depth with respect to Existing Ground Elevation

Return Period	Maximum Inundation depth (With respect to existing channel bed elevation) West Channel (m)	Maximum Inundation depth (With respect to existing channel bed elevation) East Channel (m)
2-Year	1.74	1.31
5-Year	4.94	1.43
25-Year	4.97	1.56
100-Year	5.00	1.62

The following aerial image illustrates the area impacted by the 2-year and 100-year flood inundation.

Flood Risk Area:



Properties under High Risk of Flooding

There is a private 0.6m diameter culvert that runs 35m between two private properties on Victoria Avenue being 265 and 275 Victoria Avenue, and then turns 90 degrees under the ditch on Victoria Avenue for another 90m. This private culvert is undersized and contributes to the backwater effect, even during the 2-year storm flows, and flooding on both sides of the watercourse on the West Channel. This backwater effect also affects the direction of water flow on the West Channel during storm events.

Given the topography of the area, which is very flat, and soil structure of the area, the area has extremely poor drainage capacity. When rainfall events occur, stormwater gets entrapped in the area due to poor drainage and flooding occurs. Some of the main causes of flooding include:

- Less capacity of the private culvert which causes backwater effects
- Lack of water conveying structures
- High elevated road deck with poor drainage, i.e., Webber Road
- Alteration of the natural watercourse
- Landfilling
- High and dense vegetation in the channels.

Study Recommendations:

The Drainage Study provided the following mitigation options to address the drainage issues generally:

- Repair and reconstruction of the existing culverts
- Increase the number of barrels within the culverts and the size of the culverts
- Construct new stormwater conveying structures
- Removal of vegetation from the watercourse, inlets, and outlets of the structures.

The Drainage Study also recommended 3 alternative mitigation options to address the flooding concerns on properties in the Victoria Avenue and Webber Road area including the following:

- The existing culvert under Victoria Avenue should be sized for the 50-year storm event to minimize flooding because of backwater under major storm events.
- An overland flow channel be constructed between 285 Victoria Avenue and 990 Webber Road properties along the historical/original channel and be designed for major storm events. Note this option can only occur if there is adequate clearance from existing septic systems.
- The Region and Town consider the diversion of some, or all, of the stormwater from the tributaries north of Webber Road to the Webber Road ditch to Victoria Avenue and the Welland River. The capacity of the existing ditch system would need to be confirmed.

Staff Comments:

The Drainage Study provides useful information with regards to understanding the drainage issues in the study area and the changes that have occurred over the years due to the unplanned development in an area that does not have a comprehensive stormwater management plan.

It is noted that the rural residential lots in this area were legally created through the testamentary devise process that existed in the *Planning Act* prior to July 1991. The testamentary devise process created the lots through a will and circumvented the usual subdivision approval process where matters such as access, stormwater management, servicing considerations, zoning, and land use compatibility matters would have been addressed as part of the subdivision approval process.

The Town was legally required to issue building permits on those lots that complied with the Town Zoning By-law, i.e., have frontage on an improved street, and through the building permit approval process, individual lot grading and drainage plans are required. However, without an overall comprehensive master grading and

drainage plan for the entire area. Because the traditional planning process did not apply, there was no mechanism to ensure that the individual lot grading and drainage plans work together in a comprehensive way and that off-site drainage impacts are appropriately addressed. This is the main reason why the grading has changed incrementally through the study area over time as development has occurred.

Staff notes that the unnamed watercourse and the culvert between 265 and 275 Victoria Avenue are on private property and the Town has no legal authority or jurisdiction to do work on private property and to do so would result in liability for the Town whether that work related to improving the culvert, diverting the watercourse, creating an overland flow channel or alterations to the watercourse in any other way. Private property owners are responsible for doing work on private property and obtaining the necessary approvals for that work. The Town is not in a legal position to take on such work.

The Town can inspect the culverts on Farr and River Roads and clean them out along with cleaning out the Farr and River Road roadside ditches to improve the flow of water in the roadside ditches as these roadside ditches are within the Town's jurisdiction and ownership. At time of writing it is unknown if the cost of this work can be absorbed by the existing 2023 operations budget, and direction will be required from Council, as there are other ditches in Pelham which require maintenance.

The roadside ditches along Webber Road and Victoria Avenue are under the jurisdiction of the Region of Niagara, not the Town, as both Webber Road and Victoria Avenue are regional roads. Similarly, the culvert under Victoria Avenue is the responsibility of the Region, not the Town. Therefore, any work related to possibly increasing the size of the culvert on Victoria Avenue or diversion of water on the north side of Webber Road along the Webber Road roadside ditches would require the Region of Niagara's support and approval.

Because neither Webber Road nor Victoria Avenue roadways are experiencing drainage or flooding concerns, the Region would likely require that the costs associated with undertaking any work within the regional road allowances be the responsibility of the Town, not the Region, since from the Region's perspective, the works would address local issues, if the Region were to allow such works to occur. Discussions with the Region of Niagara staff would be required to obtain their support for work within their road allowances along with further engineering design work related to increasing the size of the culvert under Victoria Avenue and diverting the water from the north side of Webber Road to remain in the Webber Road roadside ditches.

Staff is also aware that the two developers whom each have an interest in developing the internal lots created by testamentary devise on the east and west side of Farr Road have had some preliminary discussions regarding working together to address stormwater and drainage issues in the area, amongst other matters, as an approach to work towards ultimately receiving development approvals for the internal lots. This would involve the preparation of an overall stormwater management plan and system to deal with stormwater in these areas on a comprehensive approach. This approach would provide the best means of developing a comprehensive stormwater management solution on the understanding that there would be some development ultimately on the internal lots. It is anticipated that the number of lots that potentially would be developed would be less than the current number of lots created by testamentary devise, as some area would be required to be devoted to a stormwater management facility which would likely result in fewer lots. The exact number of lots that could potentially be developed is unknown at this time, however. The following aerial image illustrates the lots created by testamentary devise in this area on the east and west sides of Farr Road, including the internal lots.



Next Steps:

Town staff should investigate the possibility of including the cleaning of the roadside culverts and ditches along Farr and River Roads as part of the 2023 roadside ditching program. This may result in other roadside ditching priority areas being deferred to accommodate work in the Farr and River Road roadside ditches given the budget allocations for roadside ditching work.

Town staff should also continue to facilitate discussions with the two developers with the goal of determining an ultimate stormwater management solution through a development approval process required to allow for the development of the internal lots created by testamentary devise.

Financial Considerations:

At this time staff is unable to quantify the costs associated with the proposed mitigation measures recommended by the Drainage Study, however, staff would recommend investigating cleaning the Farr and River Road culverts and ditches as part of the Public Works 2023 Operating Budget and/or part of the 2023 roadside ditching program. To understand what the potential costs would be for the various recommended works by the consultant; detailed design would have to be undertaken and then cost estimates for the works could be undertaken.

Alternatives Reviewed:

An alternative to undertaking drainage improvements on private property is through work authorized under the *Drainage Act* which would involve going through the process to establish a municipal drain in this area including having a valid petition, retaining a Drainage Engineer, undertaking the design of the necessary works and ultimately construction of the works. The Drainage Study does provide useful information that would aid in the design of the work, as it has established the watershed boundary and determined the flooding extent occurring in the area. The Town could initiate the petition for a municipal drain by signing the petition as a property owner.

Alternatively, any other property owner could also initiate a petition for a municipal drain by signing a petition as a property owner. If the petition is deemed valid by the Drainage Engineer, the Drainage Engineer would then undertake the design works for the drainage improvements. Note, if the petition is deemed not valid by the Drainage Engineer, the design work would not proceed, and no costs are incurred by those who signed the petition. If after the design work is completed and petitioners decide to remove their names from the petition and the petition is then deemed not valid, anyone who signed the original petition would be responsible for sharing the costs incurred to date. If the petition remains valid after the design

work phase, then the costs associated with the design of the works and construction of the works would be shared by all the benefitting property owners in the watershed, not just those that signed the petition.

If the petition remains valid, a municipal drain under the *Drainage Act* is established and the Town facilitates the construction of the drainage improvement works by retaining the appropriate contractors to undertake the works with the works being overseen by the Drainage Engineer. The Town, through the Town Drainage Superintendent, would be responsible for ensuring the long-term maintenance of the municipal drain, and any work done to maintain the municipal drain over the years is shared by the benefitting property owners.

Another alternative is for the private property owners who are impacted by the drainage issues to work together to resolve the issues. This approach would involve the property owners retaining a qualified professional to design improvement works and obtain the appropriate approvals from the Niagara Peninsula Conservation Authority if needed. Town staff would be available to provide guidance to the property owners as needed. The individual property owners would share the costs of the works and it is recommended that the affected property owners agree to have easements on their lands that provide for the long-term protection of those drainage improvements works.

Strategic Plan Relationship: Infrastructure Investment and Renewal

The Drainage Study has identified properties that are subject to flooding risk and provided recommendations on infrastructure improvements and renewal on private, Town and Regional properties that could potentially aid in mitigating some of the flooding risks.

Consultation:

The Director of Public Works, the Manager of Engineering, the Drainage Superintendent, and the Niagara Peninsula Conservation Authority staff were consulted during the preparation of the Drainage Study.

In addition, a public open house was held on January 26, 2023, where the consultants presented the Study findings to the public and received input from the community. The consultants also reviewed the Study findings with the owners of River Bend Farms and their engineering consultant in advance of the open house.

During the open house, several comments were received from the public on the following themes:

- Divert the water from the north side of Webber Road to remain in the ditch on the north side of Webber Road

- There is a need to improve the ditches on Farr Road to accommodate the water flows
- Original farm drainage tiles still exist in some of the open field areas, but have been cut off due to development and have no outlet, and are contributing to flooding, need to understand where these farm field tiles are draining to
- Culverts on Farr Road need to be cleaned out and collapsed culverts need to be replaced
- Study should look at the drainage area to the south as well, closer to River Road, properties on River Road are experiencing flooding and have drainage issues as well
- 100-year floodplain at the northeast corner of Farr and River Road has been altered
- Ditches along Farr and River Road need to be cleaned out regularly which will improve the rate of water flowing to the Welland River
- Need to have a long-term solution to the drainage issues
- Questioned development proposals on the interior lands
- Questioned approvals from the Niagara Peninsula Conservation Authority that permitted some filling in the floodplain.

Following the open house Town staff have also had discussions with representatives of the two developers that have an interest in the undeveloped lots created by testamentary devise that are on the east and west sides of Farr Road. These property owners are desirous to be able to develop their lands and acknowledge that to move forward with development proposals, solutions to the stormwater management issues, among others, will be required. As of writing this report, these property owners are willing to engage in discussions with the objective of working together to find solutions.

Other Pertinent Reports/Attachments:

Report 2021-0211 Webber, Farr, and River Road Drainage Issues

Final Draft Drainage Study of Farr, Webber, and River Road Area of the Town of Pelham – February 2023 by AHYDTECH Geomorphic Ltd.

Prepared and Recommended by:

Barbara Wiens, MCIP, RPP
Director of Community Planning and Development

Prepared and Submitted by:

David Cribbs, BA, MA, JD, MPA
Chief Administrative Officer