EAST HANTS

STAFF REPORT
Infrastructure & Operations Department

Subject:	***Paley Brook Flood Mitigation Study***
To:	Executive Committee
Date Prepared:	August 2025
Related Motions:	n/a
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Summary

The Paley Brook Flood Risk Mitigation Strategy Final Report was completed in April 2025, by CBCL. The report is being made publicly available for information purposes, and will serve the Municipality as a guide for future mitigation opportunities to explore in further detail.

The report is comprehensive in its technical review, with the understanding that the information has been tailored to the defined scope posted in the Requests for Proposals (RFP), which results in limited scenarios used in the modelling for the study. Therefore, the document should be viewed as a guide for potential options, not necessarily a document with solutions. The report scope also has limited recommended mitigation options to public infrastructure (both Provincial and Municipal), along with some vacant land with no known development plans at the time of the study.

The availability of detailed flood maps, which accurately reflect flood hazards, combined with the mitigation options explored in the CBCL report, will equip the Municipality with the tools to make more informed and proactive decisions regarding flood risk management and emergency preparedness. This will support better planning and prioritization of infrastructure upgrades.

Financial Impact Statement

n/a

Recommendation

- Share culvert sizing information with Nova Scotia Department of Public Works
- Share report information with potential future developers of land within the Paley Brook watershed
- Post the report for public access
- Leverage themes from or aspects of the report, as opportunities present themselves

Recommended Motion

No recommended motion

Background

As part of continuous improvement work, the Municipality chooses to strategically study different areas of the municipality to review possible flood mitigation options. This approach was summarized in a council report from January 2024 entitled “Flood Risk Mitigation”. In that report, there was an updated list of forecasted flood mitigation studies planned within a 5-to-10-year period, with Paley Brook being the first study on that list.

In May 2024, Council endorsed the Paley Brook Flood Mitigation Study for an application for funding support through the provincial Flood Risk Infrastructure Investment Program (FRIIP). The application was successful, receiving up to $26,071 funding support from the province in July 2024.

While the Paley Brook study was still underway, Staff continued to work on progressing the study list, applying for FRIIP again in March 2025 for a Barney Brook study. That application was also successful receiving up to $124,583.10 funding support in June 2025, and the RFP (bids) was posted on August 26, 2025.

Discussion

The following is Staff perspective on areas covered within the CBCL report.

Culvert Upsizing

In section 7.1 of the CBCL report, culvert upgrades are identified as having notable impact on the flood extents, and a list of culverts with recommended upsizing is provided in Table 7-1. With regards to the recommended upsizing, priority order needs to start closest to the river and work upstream, otherwise there is risk of overwhelming downstream culverts if done in reverse.

The study area didn’t list a scope straight to the river, so Table 7-1 doesn’t include all of the culverts, which include Paley Road and a CN Rail crossing. Those culvert impacts should be looked at in the future. The first five (5) proposed culvert upgrades, identified as numbers 8, 7, 6, 5, and 4 in Table 7-1, are structures owned by the province. Staff will share this list for the purposes of long-term replacement planning on behalf of the province.

The crossing of Highway 102, north of Ryan Avenue is also included in Table 7-1, but without a recommended sizing, as that was not in the scope of work described in the report. Staff are not recommending a future upsizing at that location as shown in the report; future state modeling shows that Highway 102 holds back flows in extreme events. The focus for this location would be to alleviate flows getting to that culvert as a mitigation measure versus increasing size at the time of replacement. This perspective is also being sent to the province so that information can be tied to future asset renewal planning.

Stormwater Retention

Section 7.2 in the CBCL Report lists three (3) potential stormwater storage ponds. The proposed locations are two (2) municipally owned properties, and one (1) privately owned, which, although private, has been left undeveloped since the original development, and therefore included for review. A rank of effectiveness was applied to each pond, however all were listed has having insignificant volume for mitigating the flood modelling scenarios.

North Lantz Planning Area

Although the Paley Brook watershed north of Highway 102 was not included in the scope of work listed in the RFP, CBCL did flag the area for long term future study consideration. This is linked to the mitigation strategies that should be considered while looking at the Paley Brook cross culvert for Highway 102.

Figure 4-2 of the CBCL report shows a visual of the sub-watershed networks that make up the overall Paley Brook watershed. This includes the watershed north of Highway 102 that reaches up to parts of the Garden Meadows subdivision. Section 7.4 of the CBCL report summaries the opportunity to study the northern part of the watershed further in relation to its interaction with Highway 102. The visual shown in Figure 7-6 illustrates the potential storage area upstream of Highway 102. It's important to note that all the area highlighted for future study north of Highway 102 is currently privately owned, which limits the Municipality's ability to conduct work in this location. What can be more immediately actionable for this general area, is adopting future zoning and planning to account for flood mitigation.

Use of Berms

In section 7.3 of the CBCL report, there is discussion listed as "Upstream Stormwater Storage". This covers the areas between Mariah Drive and Highway 102, and behind Ryan Avenue. This area is privately-owned by an active developer who has completed Phase 1 of a development, that included the extension of Mariah Drive, and is planning Phase 2 which could start construction as early as 2026. The area listed in the report would be a future Phase 3 area for the developer.

The "Upstream Stormwater Storage" concept within the report is about the use of berms that would run behind homes, on Ryan Avenue and Mariah Drive, to create a type of large retention wedge area that would leverage the majority of the privately owned land in a large-scale flood event. This approach, when combined with the culvert upgrade long-term replacement recommendations does have notable flood mitigation impacts.

Staff have reached out to this developer to discuss the current Phase 3 area and its potential for flood mitigation. This could trigger innovation by the developer in potentially finding additional mitigation options that could still enable some form of development of those lands. Open dialogue with the developer would be beneficial to generating ideas of what mitigation work could be viable in the area.

Channeling the existing brook

Section 7.5 of the CBCL report reviews the potential of channeling the existing brook. This means digging out the brook to create a designed path with overall more consistent and controllable flows. Municipal staff would flag that the report doesn't detail the requirements or viability of getting approvals through regulators for such an approach.

Any designed channeling would require continuous maintenance and the Municipality would need to seek out advice from environmental experts to better define what could be allowed through a regulatory process for this approach to be viable.

Opportunity beyond the Study Areas

Each individual developed property can look at improvements on their own. This report didn't review that topic for recommendations as the Municipality does not undertake work on private property as per policy, however in past reports on flood mitigation there has been general recommendations that individual property owners could look at to improve the resilience of their property. Those actions can range from small scale property projects like the use of rain barrels or building rain gardens, up to larger scale projects like private berm installation or elevating the foundation of a home.

For any new developments within the Paley Brook watershed, the Municipality could also engage with developers to collaborate on designs that go beyond simply balancing flows, by increasing storage capacity to retain excess stormwater during major events, then release it more gradually over time. In the case of Paley Brook, extreme weather conditions could flood the wastewater system via access through manholes or overtopping a lift station. If there is net benefit to reducing that Inflow & Infiltration risk, the Municipality could negotiate via reduction in infrastructure changes with a developer as per the section 6 of the Municipal Storm Drainage Policy;

- 6. The Municipality may consider issuing credit on wastewater infrastructure charges, if stormwater management enhancements for new development proposals can quantify a benefit in reducing Inflow & Infiltration (I&I) issues for the wastewater system in neighboring developments, resulting in a net benefit to Municipal wastewater system as a whole. This would be a request made by the Municipality to a developer during the development application process.

Staff have explored the potential for a change order for the project to add in additional review, post the initial report, however there was no approved funding available. This can be re-explored in the future when there are specific areas that may have opportunity to implement a project.

Alternatives

Build Stormwater Operational Programming

Currently, the Municipality does not have staff resources dedicated to stormwater. This results in limited actions and scope of what is possible in relation to the topic of stormwater to existing designed assets. To enable more advanced operational programming for stormwater, it would be recommended that the Storm Drainage Policy be update to reflect a shift in approach. This would also require dedicated funding and likely an advance to more internal service delivery for field work versus contractor use.

Attachments

Paley Brook Flood Risk Mitigation Strategy, Final Report (CBCL April 2025)
Municipal Storm Drainage Policy (September 2020)
Flood Risk Mitigation, Executive Committee Report (January 2024)