



Report to: General Committee

Date Report Authored: March 28, 2018

SUBJECT: Thornhill Village Library Parking Lot Restoration – 10 Colborne Street,
Thornhill

PREPARED BY: Michael Ryan, Facility Engineer Ext. 2563

RECOMMENDATION:

- 1) **THAT** the staff report entitled, “Thornhill Village Library Parking Lot Restoration – 10 Colborne Street, Thornhill” be received;
- 2) **AND THAT** Council approve the staff recommended option to replace the parking lot surfacing with plain concrete and a drainage system of weeping tiles tied into the storm water system;
- 3) **AND THAT** Council approve the potential shortfall to a maximum amount of \$30,000 to be funded from the Life Cycle Replacement and Capital Reserve Fund;
- 4) **AND THAT** staff be authorized and directed to do all things necessary to give effect to this resolution.

PURPOSE:

The purpose of the report is to obtain Council approval to replace the existing unit pavers with plain concrete and install a drainage system of weeping tile that will tie into the storm water system. Any potential shortfall to a maximum of \$30,000 will be funded from the Life Cycle Replacement & Capital Reserve Fund.

This report explains the rationale staff used to recommend the solution of plain concrete for the parking lot at Thornhill Village Library located within the Thornhill Heritage Conservation District. It is the most sustainable (economically and environmentally) solution. Heritage Markham Committee’s recommendation was to refer this decision to Council with no preference stated.

Concrete is not identified for parking areas in the Heritage District Plan (asphalt and pavers are), however Heritage Section staff understand that due to site conditions concrete is best but prefer stamped concrete.

Originally as part of the Capital Project (17182 - Library Improvements - \$25K), the unit paver (small concrete stones) parking lot at the Thornhill Village Library was to be replaced with the same type of material.

Site conditions are causing frequent manual re-leveling and/or replacement of the unit pavers which are not suitable for pedestrian traffic.

Our maintenance strategy for the unit pavers (which conforms to Heritage District guidelines) is not effective and staff recommends that the parking lot be replaced with a more durable material.

BACKGROUND:**Thornhill Village Library Parking Lot Condition:**

The Thornhill Village Library parking lot is located in the Thornhill Heritage Conservation District and is approximately 2,100 ft² in size and surfaced with unit pavers which match the character of the neighborhood.

In 2016, Sustainability & Asset Management (SAM) staff engaged a geotechnical consultant to identify an appropriate parking lot design based on the site conditions. The geotechnical consultant firm (GeoPro Consulting Limited) performed the investigation and found that there is a high water table (ground water close to surface) below the parking lot. The effects of the high water table on the parking lot are as follows:

- The soil is highly saturated (water logged) and there is very limited “volume” for additional water to be stored;
- Permeable pavement would not be an effective investment as the ground is already very saturated with ground water. The parking lot will behave as an impermeable surface once the soil below the pavement is completely saturated; and
- The high water table causes voids in the soil through freeze-thaw cycles as the water freezes and melts. As the liquid water freezes it expands in size and displaces the soil beneath the parking lot. The soil displacement creates voids as the ice melts causing the unit pavers to shift. This typically occurs in fall, winter and spring.

Our staff and consultant noted the following:

- Due to the high water table a drainage system is necessary to extend the life of the parking surface and to prevent additional groundwater pressure on the Library’s foundation; and
- A drainage system will not prevent settling of unit pavers or other flexible surfaces like asphalt.

OPTIONS AND DISCUSSIONS:

City staff considered the following options:

1. Replacement of the existing unit pavers with permeable concrete unit pavers (approved Capital Project 17182 “Library Facility Improvements” in the amount of \$25,000).
2. Replacement of the existing unit pavers with asphalt and a drainage system of weeping tile tied into the storm water system.
3. Replacement of the existing unit pavers with stamped concrete and a drainage system of weeping tile tied into the storm water system.
4. Replacement of the existing unit pavers with plain concrete and a drainage system of weeping tile tied into the storm water system.

We have summarized the life cycle construction and maintenance costs for the four (4) options below:

	Option 1 – Replacement with new Unit Pavers	Option 2 – Asphalt Pavement	Option 3 - Stamped Concrete	Option 4 – Plain Concrete – Recommended Option
Typical Lifespan of Option	15 years	25 years	40 years	40 years
Estimated Lifespan of Option based on Site Conditions (A)	8 years	15 years	25 years	30 years
Construction Cost – Drainage System Installation¹ (B)	Not installed for this option	\$40,000		
Construction Cost - Parking lot surfacing (C)	\$25,000	\$10,000	\$40,000	\$15,000
Total Construction Cost (D) = (B)+(C)	\$25,000	\$50,000	\$80,000	\$55,000
Annual Cost of Maintenance (E)	\$4,000	\$1,000	\$1,600	\$670
Total cost/year (Construction and Maintenance) (F) = (D/A)+(E)	= \$7,125	= \$4,333	= \$4,800	= \$2,503
Environmental and Site Considerations²	Permeable and will settle unevenly due to voids in soil	Non-permeable and will crack and settle unevenly due to voids in soil	Non-permeable and a structural slab that will withstand soil voids	
Aesthetics	Considered an appropriate material in the Heritage District Plan for parking areas.	Considered an appropriate material in the Heritage District Plan for parking areas, but not recommended by Heritage Section due to the site's exposure, visibility and its civic use.	Not an identified material in the Heritage District Plan for parking areas, but considered similar to pavers in appearance by Heritage Section staff and supported.	Not an identified material in the Heritage District Plan for parking areas, and not recommended by Heritage Section due to the site's exposure, visibility and civic use.

Note 1: Drainage System only installed during initial construction (1st year) for Options 2, 3 and 4. Option 1 is the original scope which does not include the installation of a drainage system provided by a weeping tile.

Note 2: With the high water table the permeable parking lot surface becomes impermeable as there is a limited depth of unsaturated soil beneath the parking lot to direct water away from the storm system.

HERITAGE CONSIDERATIONS:

As per the Thornhill Heritage Conservation District Plan, alterations to driveway/parking materials require a Heritage Permit. The District Plan indicates that “appropriate driveway materials include asphalt, pea gravel, coloured asphalt in natural tones and concrete pavers in natural tones”. The use of concrete either plain or stamped is not addressed in the policy or guidelines.

Sustainability & Asset Management staff attended the Heritage Markham Committee on two occasions (July 12 and August 9, 2017) to review the issues associated with the existing interlock pavers and options for replacement. After extensive discussions, the Committee was unable to reach a decision with respect to the most appropriate materials to be used for the resurfacing and instead approved a recommendation that “consideration of this matter be referred to Council”. (See Attachment)

Heritage Section staff’s advice to the heritage committee was that the use of patterned concrete (Option 3) would be similar to stamped coloured asphalt or pavers which are materials supported in the District Plan. Heritage staff also supported the Old World Belgium Block pattern for the stamped concrete as the most appropriate treatment for the Heritage District given the visibility and exposure of the parking area to the public realm and the library’s unique role as a gathering place in the village.

CONCERNS WITH STAMPED CONCRETE:

Maintenance of stamped concrete presents challenges not found with plain concrete:

- Only snow plows with a rubber blade can be used for snow removal, this maintains the textured appearance of the stamped concrete;
- Water may become trapped in the textured surface of stamped concrete and not be suitable for pedestrian traffic if there is a flash freeze; and
- Where localized repairs are required matching the colour and texture of the stamped concrete will be difficult.

PREFERRED APPROACH BY SAM AND OPERATIONS STAFF:

Although the use of concrete for driveways/parking area is not identified as a preferred material in the City’s Heritage District Plan, Sustainability & Asset Management and Operations staff support the consultant’s recommendation of concrete, which has the following benefits:

- Concrete is a structural material and is able to “bridge” gaps in the supporting base soil. This improves the resistance of the parking lot surface to uneven settlement from the high water table.
- Plain concrete will have the lowest total Life Cycle Cost, it is more economically sustainable.
- Plain concrete is more environmentally sustainable – its life expectancy of 30 years will result in significantly less construction waste compared to demolishing and installing new pavers or asphalt every 15 years.

On approval of the staff recommendation of plain concrete we will implement our project plan as follows: construction work will start in August 2018 and will take approximately 5-6 weeks to complete weather permitting.

FINANCIAL CONSIDERATIONS:

Staff recommend Option 4 with an estimated capital cost of \$55,000. There is an approved capital project 17182 "Library Facility Improvements" in the amount of \$25,000. The budget of \$25,000 includes replacement of new unit pavers (status quo) and does not include installation of a drainage system. Therefore, there is a potential shortfall of \$30,000 (\$55,000 - \$25,000).

The total costs will be confirmed upon contract award. Staff recommend the potential shortfall to a maximum amount of \$30,000 will be funded from the Life Cycle Replacement and Capital Reserve Fund.

ENVIRONMENTAL CONSIDERATIONS:

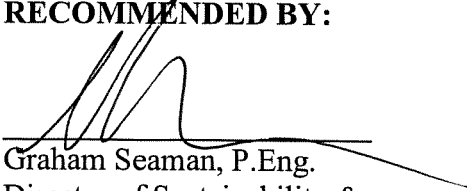
A permeable pavement is not an option due to the high water table. Plain concrete is the recommended option and is the most sustainable from a construction waste perspective (lifespan of 30 years) and it can be recycled.

The weeping tile installed below the pavement directs ground water to the storm system. Environmental Services stated that the storm system can handle this additional demand.

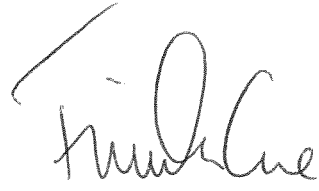
The estimated green house gas (GHG) emissions from the production of plain concrete for the recommended option is approximately 9.5 tonnes, in comparison to the option of asphalt this is approximately 20% of the total GHG that would be produced.

BUSINESS UNITS CONSULTED AND AFFECTED:

The comments from Operations, Environmental Services, Finance, and Planning & Urban Design and the Heritage Markham Committee have been incorporated into this report.

RECOMMENDED BY:

Graham Seaman, P.Eng.
Director of Sustainability &
Asset Management



Trinela Cane,
Commissioner, Corporate Services

Attachment: Heritage Markham Committee Extract, August 9, 2017