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Appendix F: STORMWATER MANAGEMENT AND DRAINAGE TECHNICAL MEMORANDUM

TO	**:**	**Rory O'Sullivan, P.Eng., Project Manager – City of Mississauga**
COPY TO	**:**	Stephen Keen, P.Eng.; David Hiett, P.Eng.
FROM	**:**	Madhav Baral, P.Eng. - CIMA+
DATE	**:**	August 5, 2022
SUBJECT	**:**	C11 – B001266 Review of Impacts to the Drainage System due to Clarkson Road and Lakeshore Road West Intersection Improvements in the City of Mississauga

1. Introduction

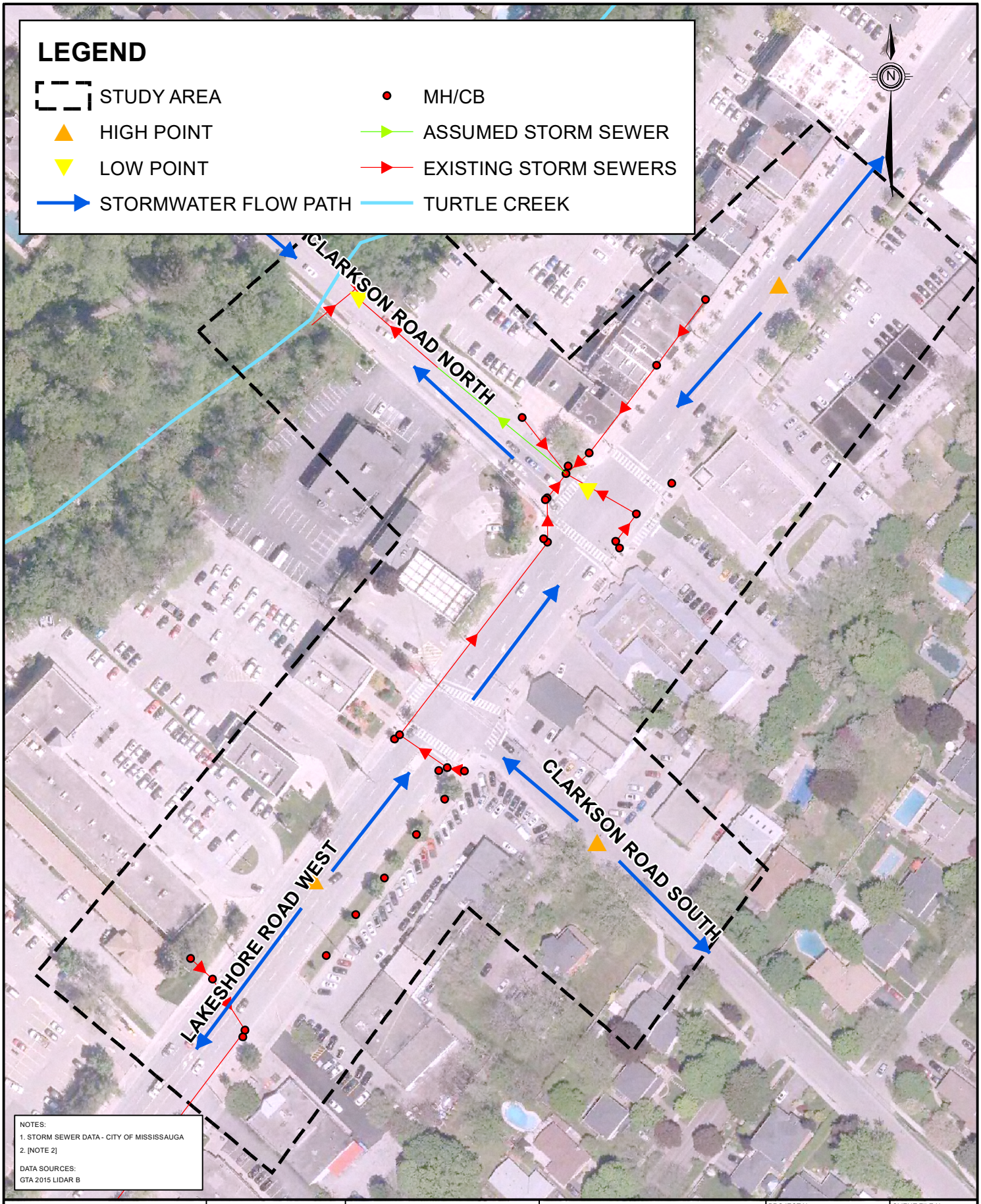
CIMA+ was retained by the City of Mississauga (City) to conduct an Environmental Assessment (EA) to evaluate improvements at the intersections of Lakeshore Road West and Clarkson Road North, as well as Lakeshore Road West and Clarkson Road South. Lakeshore Road West is a major east-west arterial road traversing the City's urban area. The study area can be seen on **Figure 1** below.

Figure 1 also shows the existing storm sewer network which was obtained from the City of Mississauga. This memo will summarize the proposed solutions and complete a high-level review of impacts to the drainage system by the preferred solution.

2. Existing Conditions Drainage

Existing minor system storm runoff within the study area is collected through existing storm sewers from high points approximately 50 m west of Clarkson Road South, 50 m south of Lakeshore Road West and 75 m east of Clarkson Road North to a low point at Clarkson Road North and Lakeshore Road West intersection. From the low point, the storm sewer is directed 85 m northerly along Clarkson Road North to the culvert crossing Turtle Creek. Major system runoff within the study area drains overland toward a road low point following the same flow paths as the minor system drainage, which ultimately drains to Turtle Creek by the existing roadways and storm sewers.

A high-level review of the existing drainage flow paths can be seen in **Figure 1** below. Due to the lack of consistent existing storm sewer data in the area, the storm sewers shown in **Figure 1** are not considered to be accurate and should be surveyed during the detailed design phase if information is still inadequate. As detailed further below, the ongoing Lakeshore Road West Complete Streets Study will be assessing the existing drainage conditions and it is anticipated information gathered by this study will be used during Detailed Design.



CIMA+

CLIENT: MISSISSAUGA

SCALE: 0 5 10 20 30 40 meters
1:1,500

PROJECT NAME: CLARKSON AND LAKESHORE INTERSECTION IMPROVEMENTS

SHEET TITLE: STUDY AREA AND DRAINAGE

PROJECT No: B001266		CLIENT FILE No: ---
DRAFTER: K. LUKAWIECKI	DESIGNER ---	DRAWING No: FIGURE 1
APPROVER M. BARAL	APPROVER ---	
DATE: 9/7/2021		SHEET No: 1 of 1

3. Proposed Solutions

Four improvement approaches were presented during an Introductory Public Information Centre (PIC #1) and these were refined to identify three alternative solutions, by combining the characteristics of the original four improvement approaches. These alternative solutions were presented during PIC #2 and PIC #3. Descriptions of the three alternative solutions are briefly discussed below and illustrated in **Figure 2**.

Solution 1 – This option includes the realignment of Clarkson Road North, eliminating the offset intersection of Clarkson Road North and South. While geometrically this solution is the most desirable, it will cause the most property impacts, be most costly and cause impacts for business access on Lakeshore Road West. This option would likely need for soil remediation at the existing gas station.

Solution 2 – This option includes a center median and the widening of Lakeshore Road West. This option would have a reduced impact on existing property, construction requirements, cost and would retain full movements at the existing intersections. This alternative would still have impacts to existing businesses along Lakeshore Road West and would likely need for soil remediation at the existing gas station.

Solution 3 – This option includes a Centre Median and an eastbound left turn via a laneway. This alternative will align with the City access management plan and use of laneways, but will cause major property impacts, be costly and cause impacts for business access on Lakeshore Road West. This option would likely need for soil remediation at the existing gas station.

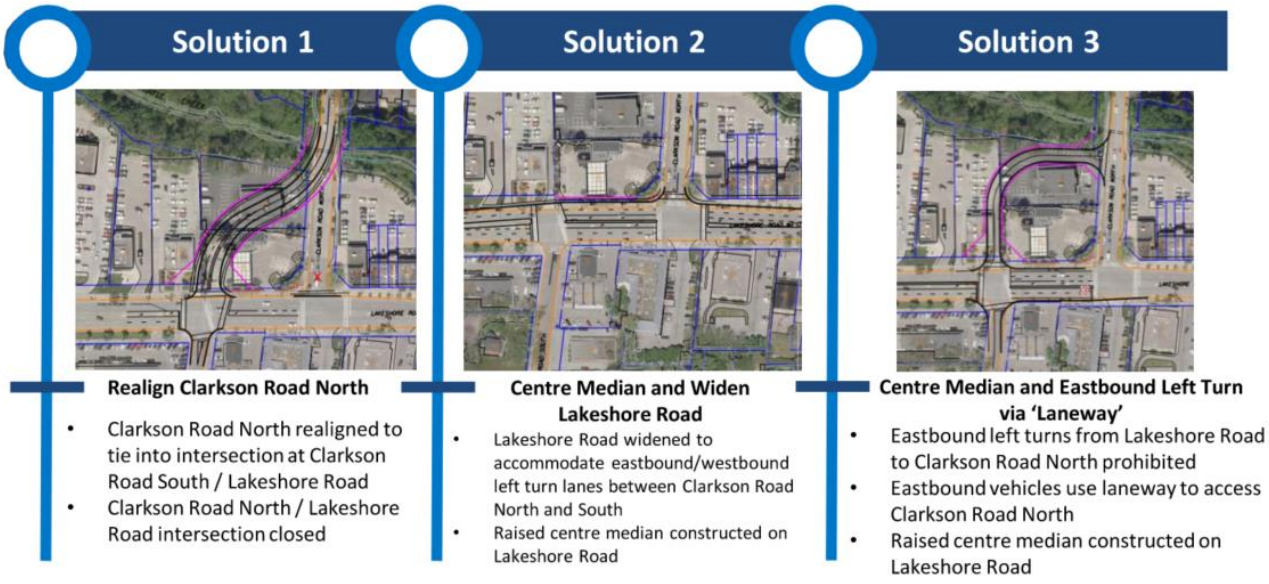


Figure 2 Alternative Solutions

4. Preferred Solution

Through the analysis and evaluation of alternative solutions, two alternatives were identified as preferred for the interim and longer-term, respectively. Solution 2 involves the construction of a centre median and widening of Lakeshore Road West and was identified as the 'Interim Preferred Solution'. Solution 1: Realign Clarkson Road North was identified as the 'Preferred Solution' and this would accommodate the transportation needs for the long term.

Currently, improvements to the intersections are identified within the Roads Service Area's 10-year Capital Program forecast. The City will leverage coordination opportunities with other operational improvements such as road resurfacing to implement the interim preferred solution (Solution 2). There is however no timeline for the preferred solution (Solution 1) and its implementation will be subject to opportunities created through the redevelopment of the area and funding considerations As such, this drainage and stormwater management technical memo will only consider the impacts associated with the Interim Preferred Solution (Solution 2), which is anticipated to be constructed as part of an Integrated Road Project for Lakeshore Road West.

In the future and during the Detailed Design phase of the preferred solution (Solution 1), further drainage and stormwater analysis will be required on its design and in relation to the surrounding conditions at that time. Solution 1 will likely have some edge impacts to the Turtle Creek natural corridor / valley land, and its future considerations are further detailed below. This EA study recommends reducing the footprint of the new construction to the maximum extent possible during the detailed design of the preferred solution to minimize encroachment into the valley lands.

The City of Mississauga has undertaken this EA study simultaneously with the ongoing Lakeshore Road West Complete Streets Study, that is also reviewing Lakeshore Road West through the study area. The existing drainage of Lakeshore Road West will be assessed to a further extent, and in greater detail, as part of that study.

5. Review of Drainage Impact – Interim Preferred

Impacts to the drainage system would be caused by increases in impervious area, modifications to minor storm sewers and modifications to roadways changing the major stormwater conveyance paths.

As the study area under existing conditions is already fully urbanized, the interim preferred solution will have negligible impacts on the overall imperviousness within the study area. This will cause no changes to the runoff volume and the quality of stormwater runoff.

As additional quality control and LID measures, pervious pavement may be considered along the bicycle track on Lakeshore Road West for both interim preferred and preferred solutions and enhanced bio-swale can be considered on the southside of realigned Clarkson Road North at approximately 70 m length of road stretch for the preferred solution. This will be further reviewed during the detailed design phase.

The storm sewer for minor system runoff will not have any modifications other than minor catch basin relocations towards the curb of the roadways to accommodate roadway widening.

There will be no impacts to the major system drainage as all existing roadways will remain, no changes will be made to the slopes of the existing roadways, no increase in asphalt area and no change in drainage pattern within the project limits. The existing drainage will be assessed to a further extent, and in more detail, under the ongoing Complete Streets Study project being completed by the City.

6. Review of Impact to Turtle Creek Crossing and Flood Plain

The interim preferred solution (Solution 2) will have no impact to the Turtle Creek crossing and its flood plain area.

The preferred solution (Solution 1) is not anticipated to trigger any culvert extension and have a reduced footprint at the culvert and within the floodplain. It is recommended the preferred solution have minimal impacts to the flood plain at Turtle Creek Crossing by reducing the proposed footprint to the extent possible. A roadway cross-section (St. 0+880) close to the Turtle Creek culvert crossing is shown in **Figure 3** and provides an example of how the footprint will be reduced and illustrates the relatively small encroachment into the creek valley. Although with a high level review, no impact to Turtle Creek is assumed, a complete hydraulic and SWM analysis will need to be completed in the detailed design stage to confirm grading as well as to ensure that there are no negative impacts to the floodplain and be presented to the Credit Valley Conservation (CVC).

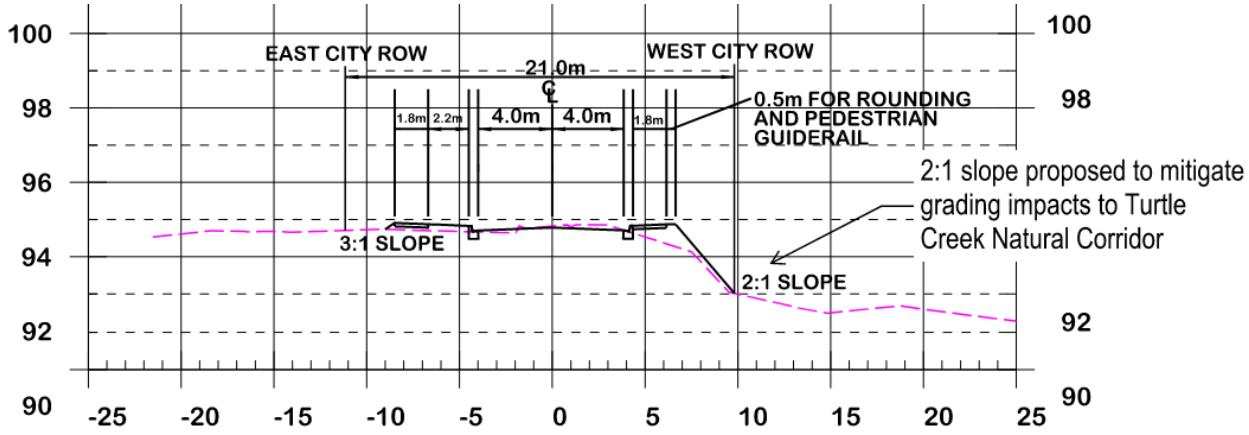


Figure 3: Road Section near Turtle Creek Crossing (St. 0+880)

7. Conclusion

This memo documents a high-level review of impacts to the drainage system due to the preferred interim and preferred solutions proposed for Clarkson Road and Lakeshore Road West Intersection Improvements Environmental Assessment. The analysis concludes that there would be no

significant impacts to the existing drainage system and drainage pattern on Lakeshore Road West from the interim preferred solution (Solution 2) or preferred solution (Solution 1).

Regarding the interim preferred solution, the improvements will have negligible impacts on the overall imperviousness within the study area. This will cause no changes to the runoff volume and the quality of stormwater runoff. The storm sewer for minor system runoff will not have any modifications other than minor catch basin relocations along the north side of Lakeshore Road West, to accommodate the pavement widening and boulevard improvements. Details of the modifications will be confirmed in Detailed Design and supported by further information gathered / assessment undertaken by the ongoing Lakeshore Road West Complete Streets Study.

The high level analysis shows that the interim preferred solution and preferred solution will not create any additional impact to the existing watercourse, which will be further reviewed during the detailed design phase.

Following additional analysis is recommended during the detailed design phase for the preferred solution (Solution 1):

- Capacity assessment of existing storm sewers as the new storm sewers will be connected to the existing system.
- Review potential LID measures such as pervious pavement and infiltration galleries if that can be implemented along the sidewalk area.
- Provide quality control measure, potentially OGS, for the runoff of new roadway area.
- Conduct hydraulic analysis of Turtle Creek and prepare flood plain mapping to ensure that there are no negative impacts to the floodplain. Additional consultation may be required with the CVC in this aspect.

During the detailed design phase, a permit will be required from the CVC as the alignment crosses Turtle Creek. An Environment Compliance Approval (ECA) may be required from the MECP for the stormwater management measure that would be considered during the detailed design phase.