Project: 20-117-100 August 16, 2023

Branthaven Development
720 Oval Court
Burlington, Ontario L7L 6A9
Attention: Mr. Thomas Kastelic
By email: tkastelic@branthaven.com

RE: Supplementary Slope Stability Study
Proposed Residential Development
5135 Fairview Street and 720-740 Oval Court
Burlington, Ontario

Dear Sir:

A slope stability study was conducted by DS Consultants Ltd. (DS) in 2020 for the slope located at the east side of the creek and to the north of Fairview Street, documented in DS (2020) Slope Report entitled "Slope Stability Assessment, 5135 Fairview Street and 720-740 Oval Court, Burlington, Ontario", DS Project No. 20-117-100, dated June 19, 2020.

This letter report presents a supplementary slope stability study for the east and west slopes located to the south of Fairview Street and for the slope located at the west side of the creek and to north of Fairview Street.

1. PREVIOUS SLOPE STABILITY STUDY

As indicated in DS (2020) Slope Report for the east side slope to the north of Fairview Street, the native soil below the fill consisted of clay soil, overlying shale bedrock. Shale bedrock was at depths ranging from 1.8 to 2.3 m. In DS (2020) Slope Report, a detailed slope stability assessment was carried out to determine the long-term stable top of slope (LTSTOS) line.

2. SLOPE SITE VISIT ON AUGUST 14, 2023

A site visit was made on August 14, 2023 by a senior geotechnical engineer from DS to visually examine the conditions of the east and west slopes located to the south of Fairview Street and for the slope located at the west side of the creek and to north of Fairview Street. Selected photographs (**Photos P1 to P26**) taken during the site visit are presented in **Appendix A**. A Google Image of the site and slope area is also shown in **Appendix A**.

Profiles of the existing slopes provided by Urbantech are presented in **Appendix B**.

For the convenience of discussions, Fairview Street at the site is assumed in the west-east alignment.

Based on our site observations, the site and slope conditions are described as follows:

- As typically indicated in the slope profiles In **Appendix B**, the height of the slopes was about 3 to 5m.
- The steepness of the slope typically ranged from approximate 1.5H:1V to flatter than 2H:1V.
- The slope was covered with trees, grasses and other vegetation (see Photos in **Appendix A**). No seepage from the slope surface was found during the site visit. No evidence of slope failures was observed during our site visit.
- A creek was generally located at the toe of the subject slopes or within 15 m from the toe of slopes. The creek is typically 3 to 10 m wide.
- The creek bed generally consisted of shale bedrock. The creek bank near the creek bed level also generally consisted of shake bedrock. Evidence of shale bedrock at the mid-height of the slopes at various locations was also observed during our site visit.
- In some areas, the creek was protected by gabion baskets (see Photos in **Appendix A**).
- At the north part of the west side slope near the GO Station facilities, a gabion retaining wall of up to 2 m in height was located along the top of the slope, as typically shown in **Photos P23 and P23** in **Appendix A**.

3. STABILITY ASSESSMENT OF EXISTING SLOPES

As indicated in DS (2020) Slope Report for the east side slope to the north of Fairview Street, the native soil below the fill consisted of clay soil, overlying shale bedrock. Shale bedrock was at depths approximately ranging from 1.8 to 2.3 m. In DS (2020) Slope Report, a detailed slope stability assessment was carried out to determine the long-term stable top of slope (LTSTOS) line, using the following long-term stable slope inclinations and slope toe erosion allowance:

- Long-term stable slope inclinations of 2H:1V in soils and 1.4H:1V in shale bedrock
- Erosion allowance of 2.0 m at the creek bank and toe of the slope for the setback of the long-term stable slope.

Based on the site conditions and our site visit on August 14, 2023, the long-term stable slope inclinations and the creek bank/slope toe erosion allowance mentioned above are considered also suitable for the long-term stability assessment of the slopes discussed in the following.

As shown in **Appendix B**, slope regrading is proposed for the east slope approximately from Sta. 0-090 to Sta. 0+200, and for the west side slope approximately from Sta. 0-090 to Sta. 0+025. The regrading of the slopes generally consisted of cut slopes, with occasional fill slopes (i.e. in area of Sta. 0-090, as shown in **Appendix B**).

Some retaining walls are also proposed for the slope regrading, as conceptually shown in **Appendix B**. DS should be retained to provide soil parameters and geotechnical recommendations for the detailed design of the retaining walls.

Based on the previous slope stability assessment in DS (2020) Slope Report and out site visit, the proposed slope regrading as shown in **Appendix B** are considered acceptable from a geotechnical slope stability perspective. The top of the regraded slopes as shown in **Appendix B** will be the long-term stable top of slope (LTSTOS).

We trust that the information contained in this letter is satisfactory. Should you have any questions, please do not hesitate to contact this office.

Yours Very Truly,
DS Consultants Ltd.



Alka Sangar, M.Eng., P.Eng.



Fanyu Zhu, Ph.D., P.Eng.

Attachments:
Appendix A – Site Google Image and Site Photographs (Photos P1 to P26)
Appendix B – Design Drawings of Proposed Slope and Profiles (Provided by Urbantech)

Appendix A

Site Google Image

Site Photographs (Photos P1 to P26, taken on August 14, 2023)

Site Google Image

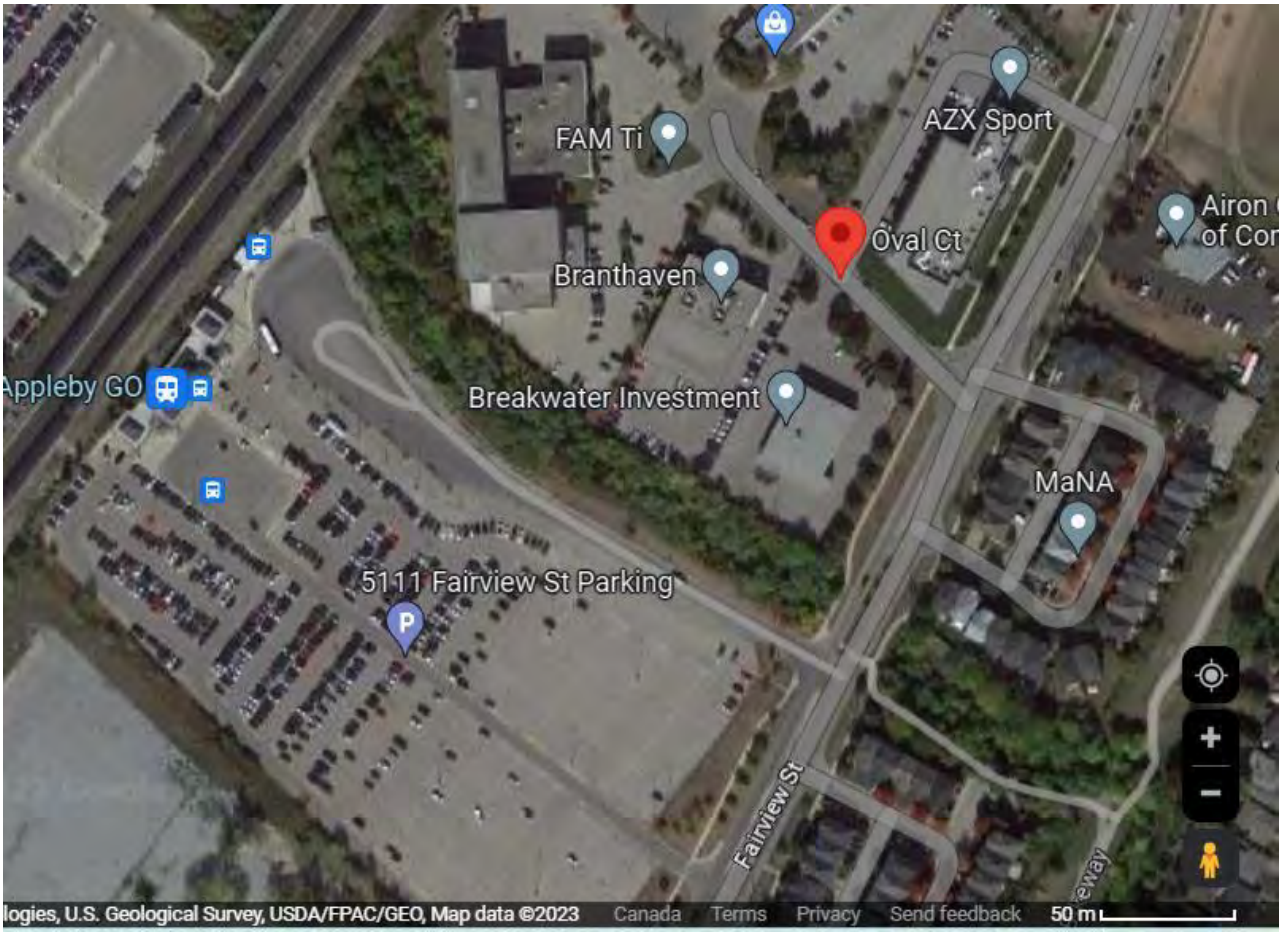


Photo P1: Top of slope area at west side of creek (looking north near Sta. 0-100)



Photo P2: Creek conditions (looking north near Sta. 0-100)



Photo P3: Lower portion of east side slope (looking north near Sta. 0-100)



Photo P4: Upper portion of east side slope (looking north near Sta. 0-100)



Photo P5: Gabion wall at west bank near Sta. 0-090 (looking northwest)



Photo P6: Bedrock at creek bed and west side slope near Sta. 0-060 (looking northeast)



Photo P7: Top of slope area at west side of creek (looking south from near Fairview St)



Photo P8: Top of slope area at east side of creek (looking south from near Fairview St)

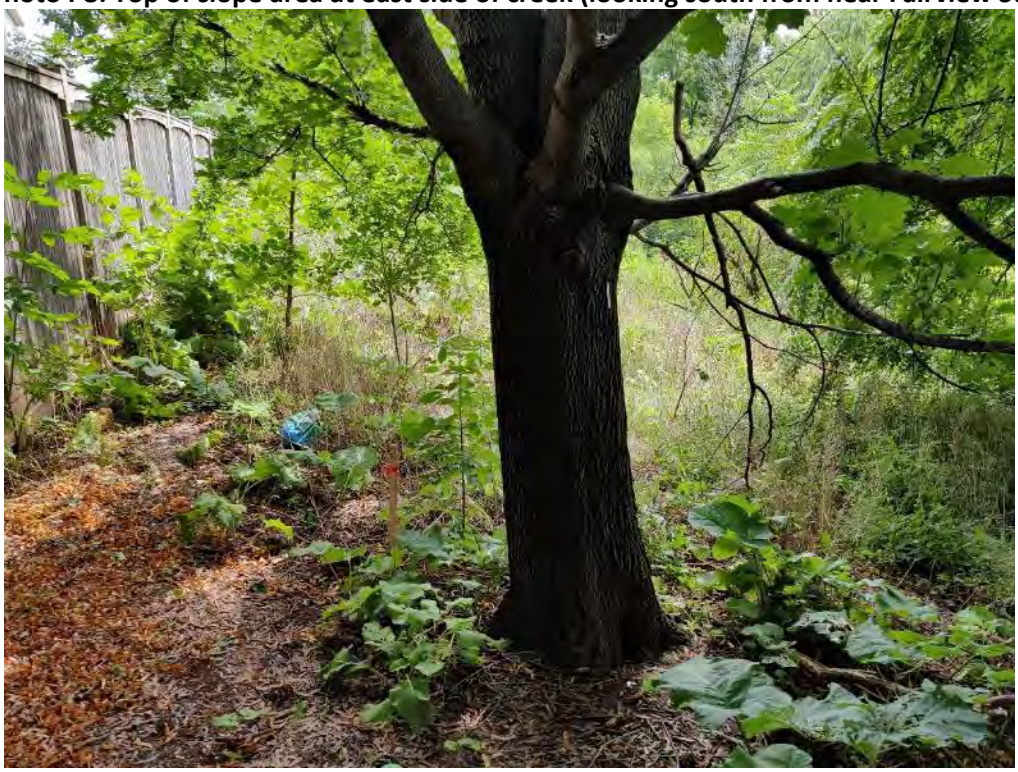


Photo P9: Creek conditions (looking south from Fairview St bridge)



Photo P10: Creek and Fairview St bridge (looking north)



Photo P11: Top of slope area at west side of creek (looking north from near Fairview St)

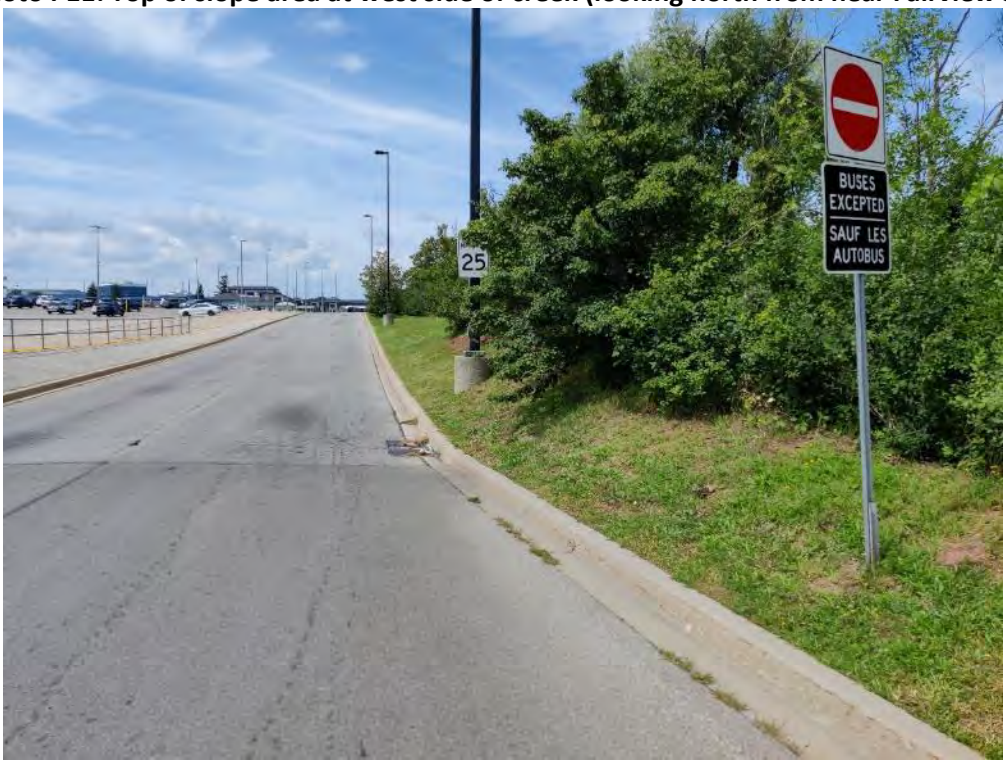


Photo P12: Creek and Fairview St Bridge (looking south)



Photo P13: Creek conditions near Fairview St (looking north)



Photo P14: Bedrock at creek bed and west side slope to north of Fairview St (looking northwest)



Photo P15: Top of slope area at west side of creek (looking north near Sta. 0+030)



Photo P16: Gabion wall at west side of creek near Sta. 0+030 (looking northwest)



Photo P17: Creek conditions near Sta. 0+100 (looking north)



Photo P18: Slope conditions at west side of creek near Sta. 0+100 (looking northwest)



Photo P19: Top of slope area at west side of creek (looking south near Sta. 0+140)



Photo P20: Top of slope area at west side of creek (looking north near Sta. 0+140)

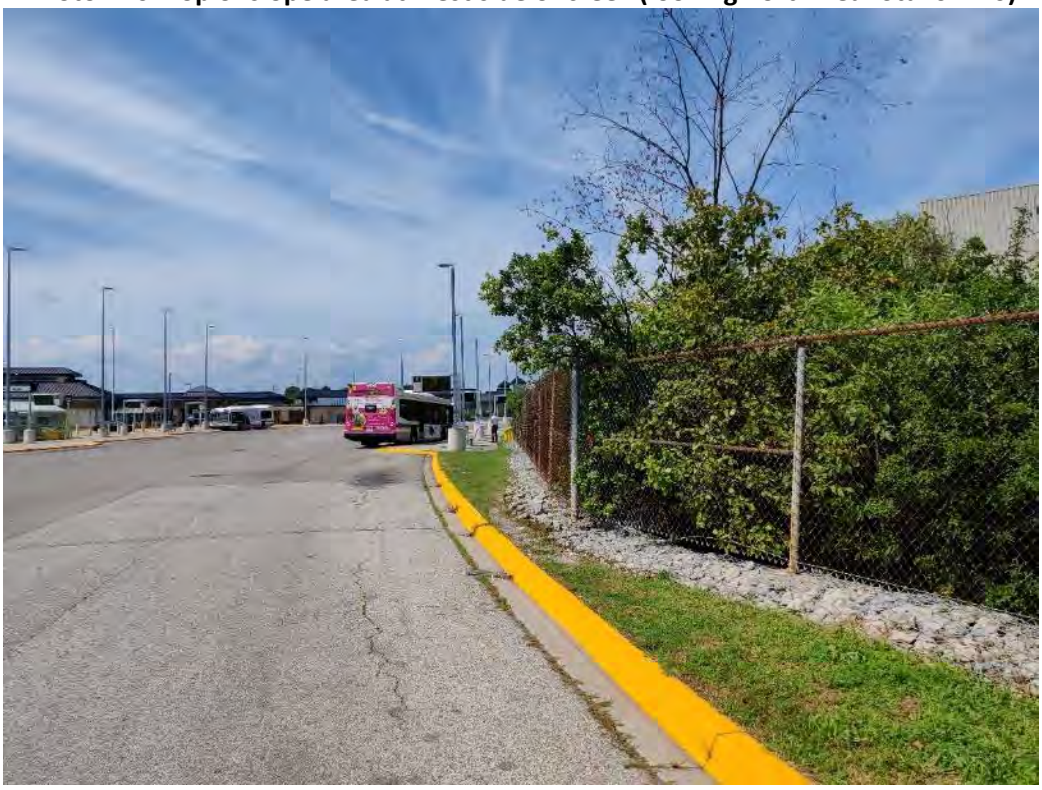


Photo P21: Storm sewer outlet near Sta. 0+175 (looking west)



Photo P22: Gabion wall near storm sewer at west side of creek (looking northwest)



Photo P23: Upper gabion wall along north part of top of west slope (looking south)



Photo P24: Upper gabion wall along north part of top of west slope (looking west)



Photo P25: West side slope at north part of site (looking north)



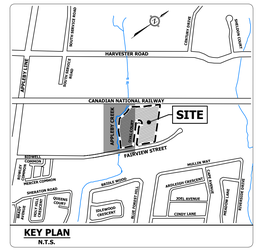
Photo P26: Creek conditions near west end of site (looking northeast)



Appendix B

Design Drawings of Proposed Slope and Profiles (Provided by Urbantech)

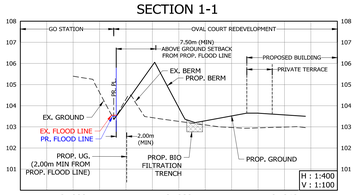




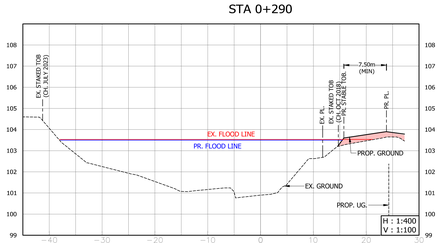
LEGEND:

- PROPOSED FLOOD LINE
- EXISTING FLOOD LINE
- PROPOSED TOP OF BANK
- LIMIT OF GRADING
- CUT
- FILL
- EXISTING CONTOUR AND ELEVATION
- PROPOSED CONTOUR AND ELEVATION

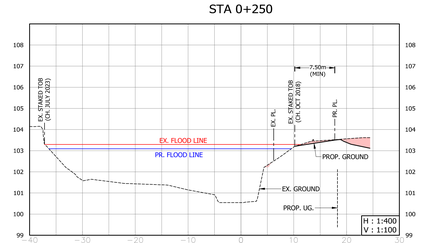
SECTION 1-1



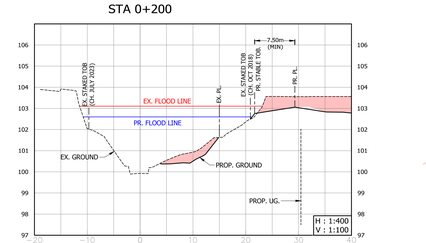
STA 0+290



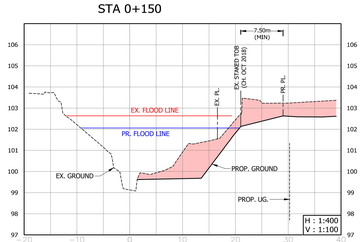
STA 0+250



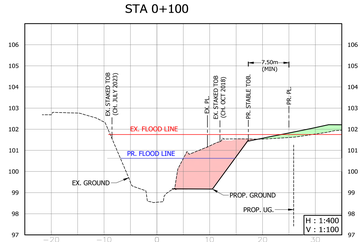
STA 0+200



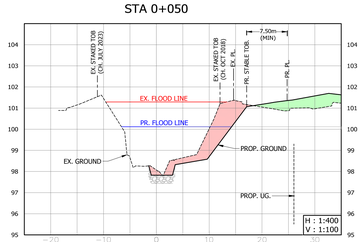
STA 0+150



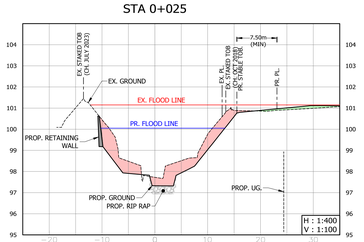
STA 0+100



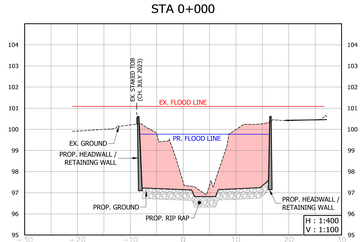
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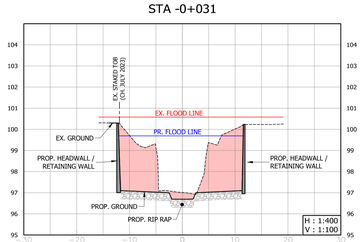
STA 0+025



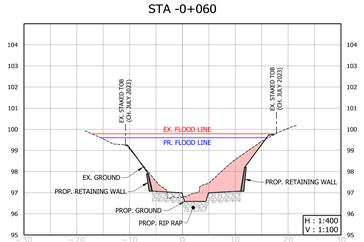
STA 0+000



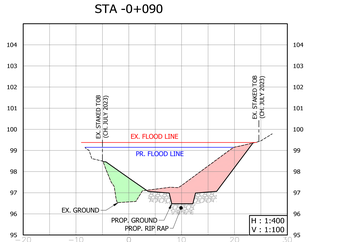
STA -0+031



STA -0+060



STA -0+090



FOR DISCUSSION PURPOSES ONLY

ALL GRADING BEYOND THE PROPOSED TOP OF BANK IS TO BE CONFIRMED AT SITE DESIGN.

BENCHMARK
ELEVATIONS ARE REFERRED TO THE CITY OF BURLINGTON BENCHMARK No. 1090, HAVING AN ELEVATION OF 98.243m.

URBANTECH®
Urbantech® Consulting
A Division of Leighton-Zec West Ltd.
2030 Bristol Circle, Suite 106
Oakville, ON. L6H 0H2
TEL 905.829.8818 • urbantech.com

WITHOUT PREJUDICE

FLOOD HAZARD MAPPING IS BASED ON THE EAST BURLINGTON CREEK (EBC) HYDROLOGIC MODEL FLOWS (JUNE 15, 2023)

OVAL COURT REDEVELOPMENT

CHANNEL SECTIONS

(5TH ISSUANCE - AUGUST 9 2023
FOLLOW UP TO JULY 17 2023 OLT MEDIATION)

PROJECT No.	DATE	SCALE	DWG No.
18-580	MAR. 2023	AS SHOWN	**CH-6**