

DST Consulting Engineers Inc.

203-2150 Thurston Drive

Ottawa ON, K1G 5T9

Tel: 613-748-1415

Fax: 613-748-1356

www.dstgroup.com

as identified in the report “Green’s Creek Watershed – Fluvial Risk Mapping”, prepared by JTB Environmental Systems Inc.

3. SCOPE OF WORK

It is important to emphasize that the Slope Stability Setback and the Meander Setback identified in the JTB document is large scale screening level assessment of each reach of the creek only. It is not an assessment of the Site itself. As part of this review, DST is intending to perform an additional review of the setback given our current knowledge of the Site geometry and existing soil conditions. This does not include boreholes, flow measurements, or slope modelling. DST’s scope of work for this mandate generally consisted of the following activities:

- Cross-sectional survey at both boundaries of the property,
- Shoreline inspection,
- Preparation of this summary letter.

DST visited AIM recycling facility on October 16, 2019, to inspect slope between the AIM property and Ramsay Creek. Following that, DST conducted a topographic survey to establish ground elevations at the boundaries of the mentioned property, to come up with two cross-sections (Refer to Figure 2, Appendix A for cross-section locations) , which demonstrate the shape of the slope and land between the mentioned property and Ramsay Creek.

Please refer to Appendix B for Slope Inspection Record.

4. DISCUSSION

According to the “Technical Guide – River and Stream Systems – Erosion Hazard Limit” (dated 2002) prepared by Ontario Ministry of Natural Resources, Water Resources Section, a meander belt allowance or setback is the maximum distance or extent that a water channel migrates, whereas a slope stability setback is the distance that ensures safety in case of slumping or slope failure. Some terminology that is associated with this term are amplitude, wavelength, bend radius, and bankfull width.

In order to identify type of hazards that are most likely to be in a specific area, the river or stream system must be defined. There are two types of systems, confined river and stream system, and unconfined river and stream system. A confined river and stream system is one where the physical presence of a valley corridor containing a river or a stream channel, which may or may not contain flowing water, is visibly discernible from the surrounding landscape by either field investigations, aerial photography and/or map interpretation. An unconfined river and stream system is one where a river or stream is present but there is no discernible valley slope or bank that can be

detected from the surrounding landscape by either field investigations, aerial photography and/or map interpretation.

The information provided in the JTB report indicates a recommended 46 m “Slope Stability Setback” and the 61 m Meander Setback”.

Based on the topographic survey that was completed by DST, along with slope inspection, DST recommends that this reach of the Ramsay Creek be considered as an unconfined river and stream system (Refer to site photos in Appendix C).

Meander Risk Setback

- In the JTB report, an amplitude of 111 m was assigned to the entire reach of Ramsay Creek. However, this is governed by large meanders which are approximately 700 m south of the Site. If we include the four closest meanders, then an amplitude of 61 m appears more applicable to this Site. This assessment is shown graphically in Figure 4, Appendix A.
- Erosion factor is calculated based on a percentage of the amplitude. If there is evidence of erosion along the reach that can be classified as accelerated, then the Erosion Factor is 20% of the Setback value. In all other cases the erosion factor is 10% of the Setback value. In the JTB report, they used 10% of the amplitude value or 11m. Based on the site inspection, there was no evidence of active erosion, which means it would not be classified as accelerated. Therefore, we agree with the generic erosion factor of 10% of the amplitude or **6m**.
- JTB used a Toe Slope Factor of **Zero (0)** since watercourse is not in direct contact with the valley wall. Based on the site inspection, DST confirms that watercourse is not in touch with the valley wall. Therefore, we agree with the Toe Slope Factor of **Zero (0)**.
- Meander Risk Setback is calculated by summing up Setback value, Erosion Factor, and Toe Slope Factor. This Setback is the total setback corridor for the watercourse. This value should be halved and applied to each side of the watercourse. The table below summarizes all the values calculated above:

Comparison of Meander Setback

Reach	Average Amplitude (m)	Erosion Factor (m)	Toe Slope Factor (m)	Meander Risk Setback (m)	Offset Distance from Bank (m)
Recommended Screening Level Setback GCMRM4 (JTB 2011)	111	11 (10%)	0	122	61
Recommended Site Specific Setback (DST 2019)	61	6.1 (10%)	0	67.1	33.55

Based on the above assessment, DST is of the opinion that a Site-specific setback meander of 33.55 m from the bank of the creek is suitable for this Site.

Preliminary Slope Stability

DST followed the MNR guideline River and Stream Systems: Erosion Hazard Limit (dated 2002) to assess the condition of the Site. The following results are based on the cross-sectional survey and site inspection. This assessment is intended to be in conformance with Section 4.3.2 of the MNR Guideline.

	Cross-section 1	Cross-section 2	Reference	Rating
Slope Inclination	3:1 or flatter	3:1 or flatter	DST Survey	0
Soil Stratigraphy	Clay, Silt* ¹	Clay, Silt* ¹	Geotechnical Report	12
Seepage from Slope Face	No Seepage	No Seepage	DST Site Visit	0
Slope Height	~3m	~3m	DST Survey	2
Vegetation Cover on Slope face	Well Vegetated, Shrubs, Trees	Well Vegetated, Shrubs, Trees	DST Site Visit	0
Table Land Drainage	Minor Drainage, No Active Erosion	Minor Drainage, No Active Erosion	DST Site Visit / Survey	2
Water Course to Slope Toe	~80 m	~45 m	DST Site Visit / Survey	0
Previous Landslide Activity	Yes	Yes	DST Site Visit	6
				22

After rating the 7 components of the chart individually, the sum comes to a total of 22, which, according to the MNR Guidelines, indicates stable slope conditions. According to the MNR Guideline, no further assessment is required.

Slope Stability Setback

- In the JTB report, it was assumed that the material comprising the slopes in the study are all considered to be Leda Clay. The geotechnical investigation that was performed previously by DST shows that the material at the specified Site is Silty Clay.
- The Stable Slope Allowance used by JTB is based on a 5:1 slope. Based on DST's site visit and topographic survey, the toe of the valley slope is located more than 15 m away from the stream bank. Therefore, DST believes that a stable slope allowance based on a 3:1 slope should be used.
- JTB used a Toe Erosion Allowance of 15 m, assuming active erosion has occurred and the material comprising the slope is Leda Clay. Based on DST's site visit, no active erosion was observed. Referring to the geotechnical investigation report done by DST, the material comprising the slope is Silty Clay. Therefore, DST believes that a Toe Erosion Allowance of 8 m should be used.
- The Top of Bank allowance is a standard 6 meters. This ensures access to mitigate erosion sites if necessary.
- The setback is calculated based on the maximum elevation between the two cross-sections at the boundaries of the property
- The Hazard Setback is calculated as the sum of the Stable Slope Setback, Toe Erosion Allowance, and Top of Bank Allowance. The table below summarizes all the values calculated above.
- The Hazard Setback is offset from the base of the slope.

Comparison of Slope Stability Setback

Reach	Elevation Change (m)	Stable Slope Setback (m)	Toe Erosion Allowance (m)	Top of Bank Allowance (m)	Offset Distance from Bank (m)
Recommended Screening Level Setback GCMRM4 (JTB 2011)	5	25	15	6	46
Recommended Site Specific Setback (DST 2019)	5	15	8	6	34

Based on the above assessment, DST is of the opinion that a Slope Stability Setback of 34 m from the base of the slope is suitable for this Site.

CN Rail Track and Existing Site Uses

The Site is currently being used as a recycling facility. AIM's current operations on Site create vibrations, which has not been a concerning issue with the slope stability at the mentioned location. Most of the vibration is created in the middle of the property, where most of the operations occur. Going on with the new proposed buildings on site will not have any effects on the slope stability, as the new buildings will be used as storage facilities, and the general operations on site will not be different from what is currently being done.

On the other hand, the CN track is located at the slope face, and the CN track operations create greater vibration levels on the slope than AIM's Recycling Facility.

Also, the CN track is closer to Ramsay Creek, and if the creek's meanders were to affect any structures, it would affect the CN track first.

Conclusion

After performing a screening level review of the slope stability setback and the meander setback for Green's Creek at 2555 Sheffield Road, Ottawa, ON., DST believes that AIM's operations will have no effect on the stability of the slope. Also, DST believes that the Meander Risk Setback should be lowered to 66 meters, which gives an offset distance of 33 meters from bank, and the Slope Stability Setback should be lowered to 34 meters offset from base of slope (Refer to Figure 5, Appendix A for new setbacks) , which gives AIM enough distance to proceed with their new buildings at the specified proposed location.

We trust that the information herein meets your current requirements. Should you have any questions, please do not hesitate to contact the undersigned at your convenience.

Sincerely,

DST Consulting Engineers Inc.



Ahmad Hassan, EIT
Engineering Intern



Shane Dunstan, P.Eng
Geotechnical Project Manager

Appendix A

Figures



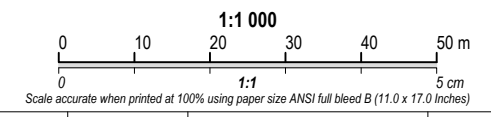
Drawing: 1 site plan.dwg Folder: L:\TISCAD\Projects\TIS-SO-037029 2555 Sheffield\Recycling Facility\DWGs Wednesday, November 13, 2019 @ 14:53 by Kris Morin

Source:
Google Earth 2019



Note
1. This drawing shall be read in conjunction with the associated technical report.

Legend
+ Survey point
⊗ Cross section reference
⊗ Drawing with cross section



0	11/13/2019	Original	
Revision	Date	Issue	Approval

Client
American Iron and Metal (AIM)

Site
2555 Sheffield Road, Ottawa, ON

Report Title
Sheffield Recycling Facility

Drawing Title
Site Plan

Designed By A.H.	Scale As shown
----------------------------	--------------------------

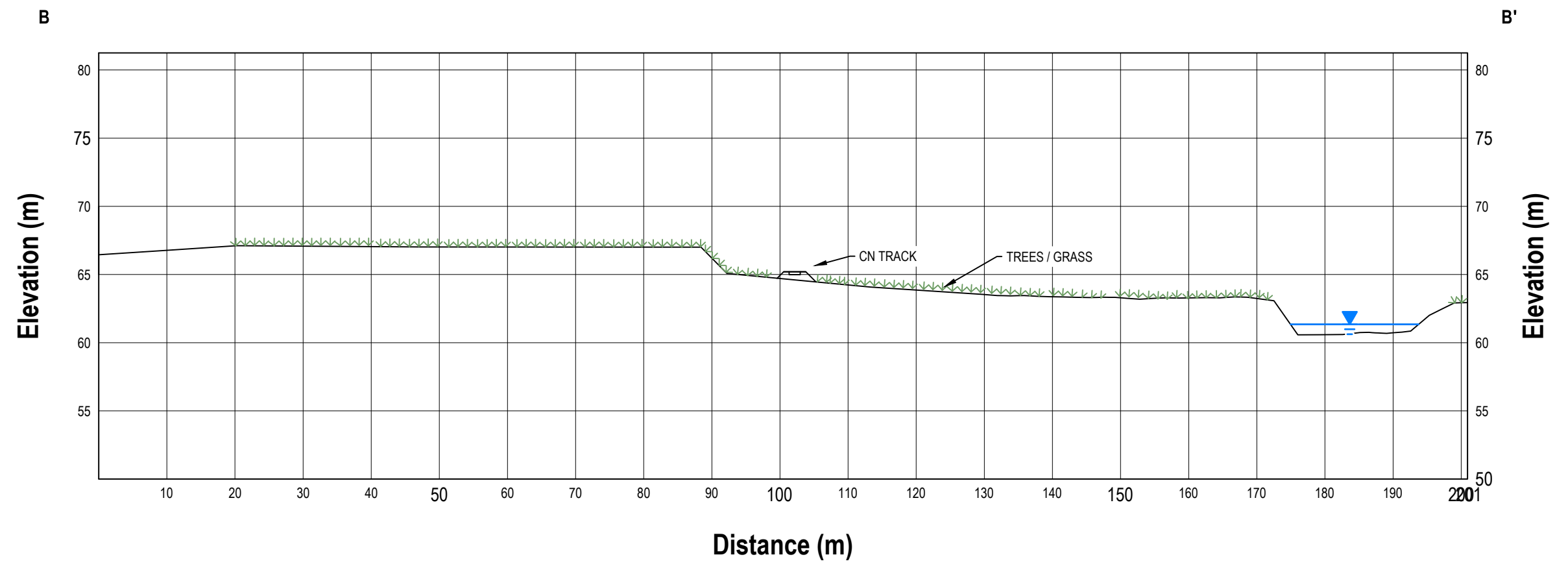
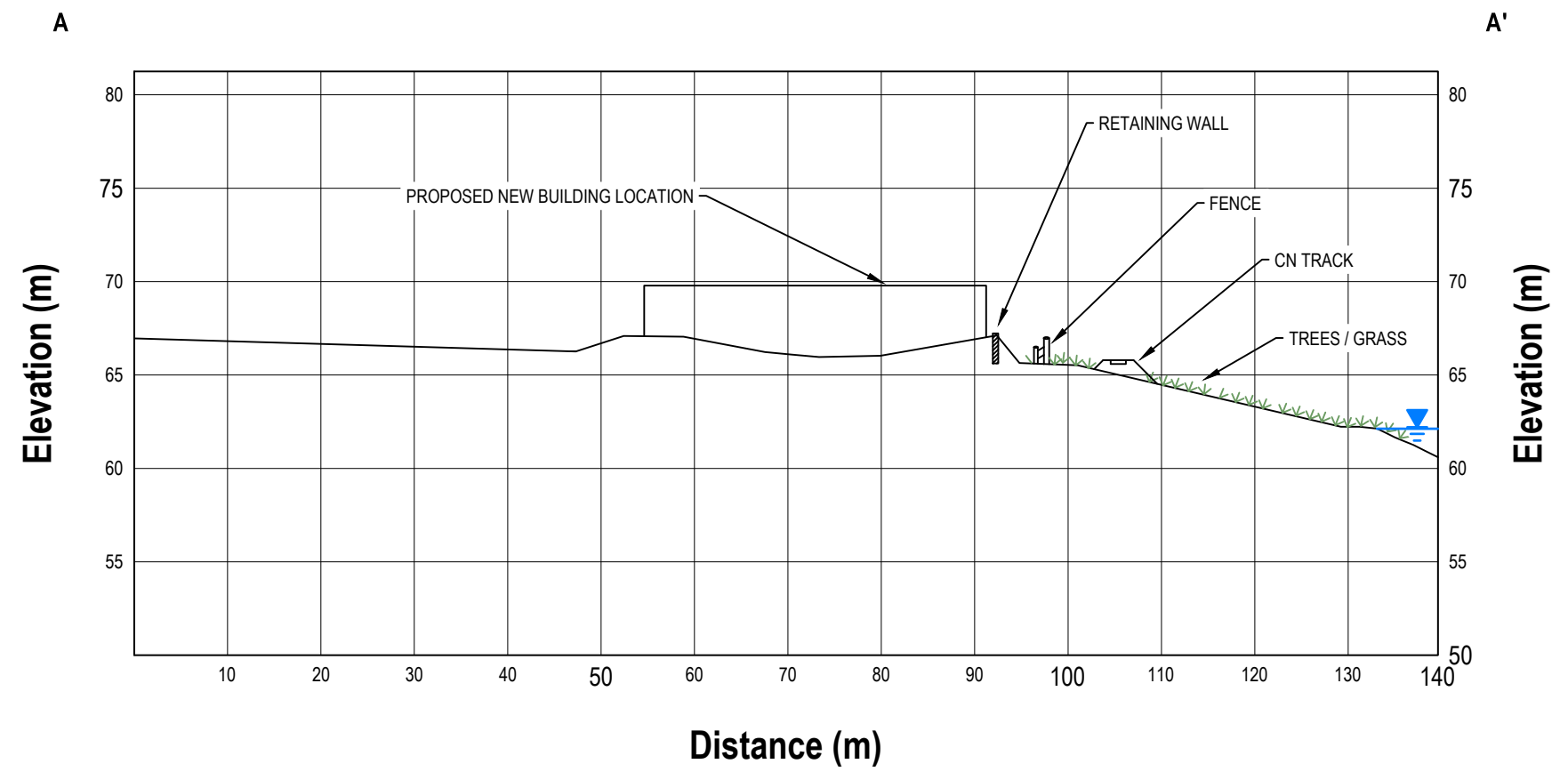
Drawn By K.M.	Date October 2019
-------------------------	-----------------------------

Approved By	Project No. TS-SO-037029
-------------	------------------------------------

Figure No.	1
------------	----------

Note
1. This drawing shall be read in conjunction with the associated technical report.

Legend
 Approximate water level of Ramsay Creek (October 24, 2019)



Revision	Date	Issue	Approval
0	11/13/2019	Original	

Client: **American Iron and Metal (AIM)**

Site: **2555 Sheffield Road, Ottawa, ON**

Report Title: **Sheffield Recycling Facility**

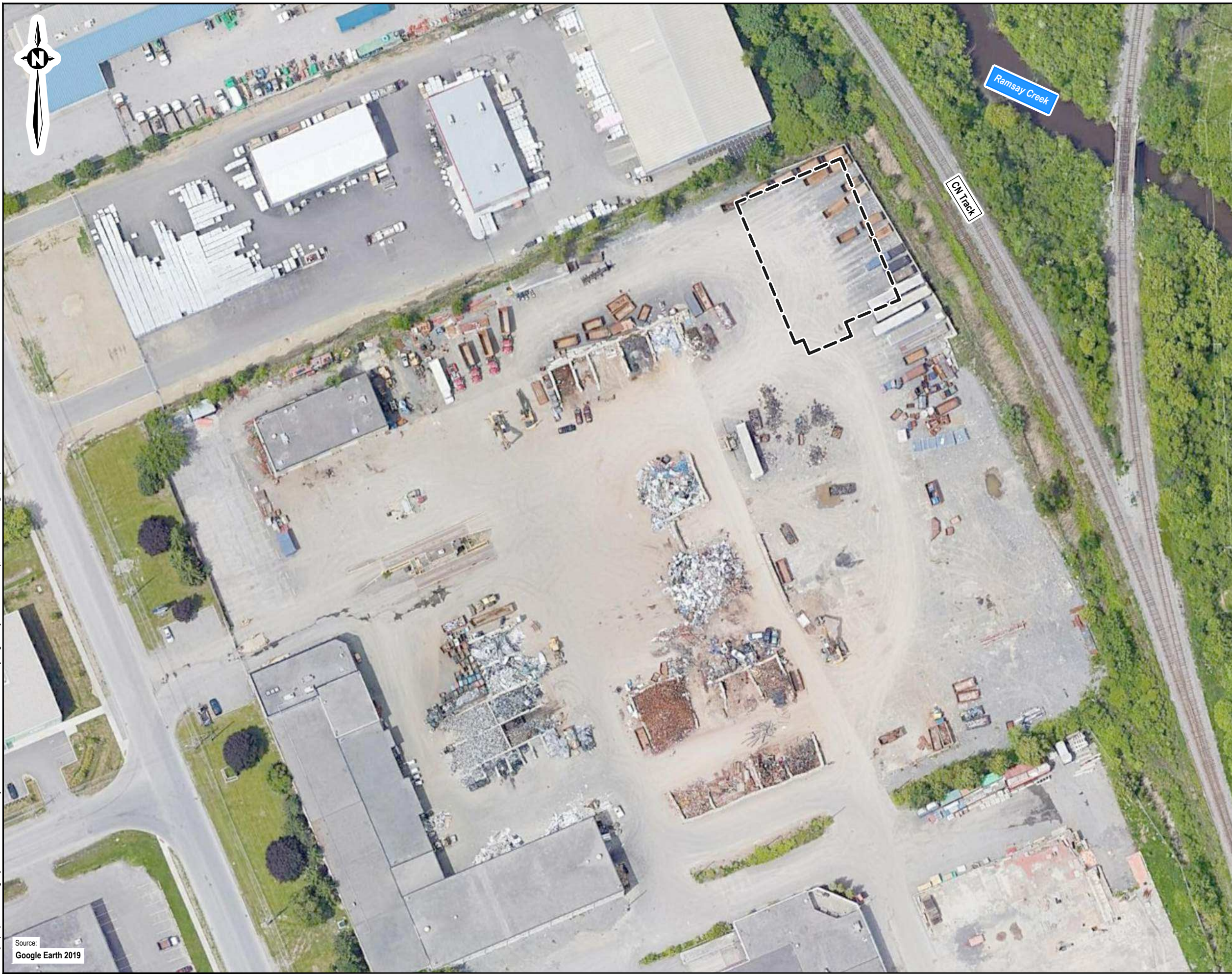
Drawing Title: **Cross-Section Views**

Designed By: **A.H.** Scale: **As shown**

Drawn By: **K.M.** Date: **October 2019**

Approved By: _____ Project No.: **TS-SO-037029**

Figure No.: **2**

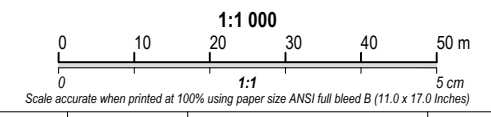


Note

1. This drawing shall be read in conjunction with the associated technical report.
2. Location of proposed building taken using measurements from METAL RECYCLING PLANT 2555 SHEFFIELD ROAD OTTAWA, ONT SITE PLAN Revision 01 ISSUED FOR SPC, Novatech, 2019/07/18.

Legend

--- Proposed new building location



Revision	Date	Issue	Approval
0	11/13/2019	Original	

Client
American Iron and Metal (AIM)

Site
2555 Sheffield Road, Ottawa, ON

Report Title
Sheffield Recycling Facility

Drawing Title
Proposed Building Location

Designed By
A.H. Scale
As shown

Drawn By
K.M. Date
October 2019

Approved By
Project No.
TS-SO-037029

Figure No.
3

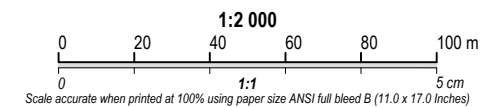
Drawing: 3 proposed building.dwg Folder: L:\TS\CAD\Projects\TS\TS-SO-037029 2555 Sheffield\Recycling Facility\DWGs Thursday, November 14, 2019 @ 15:19 by Kris Morn

Source:
Google Earth 2019



Note
1. This drawing shall be read in conjunction with the associated technical report.

Legend
 Amplitude of the meander



0	11/13/2019	Original	
Revision	Date	Issue	Approval

Client
American Iron and Metal (AIM)

Site
2555 Sheffield Road, Ottawa, ON

Report Title
Sheffield Recycling Facility

Drawing Title
Amplitude of the Meander

Designed By A.H.	Scale As shown
----------------------------	--------------------------

Drawn By K.M.	Date October 2019
-------------------------	-----------------------------

Approved By	Project No. TS-SO-037029
-------------	------------------------------------

Figure No. **4**

Drawing: 4 amplitude.dwg Folder: L:\TSCAD\Projects\TS-SO-037029 2555 Sheffield\Recycling Facility\DWGs Wednesday, November 13, 2019 @ 14:49 by Kris Morn

Source:
Google Earth 2019



Drawing: 5 setbacks.dwg Folder: L:\TSCAD\Projects\TSTS-SO-037029 2555 Sheffield\Recycling Facility\DWGs Thursday, November 14, 2019 @ 15:17 by Kris Morin

Source: Google Earth 2019

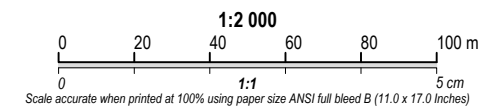


Note

1. This drawing shall be read in conjunction with the associated technical report.
2. Location of proposed building taken using measurements from METAL RECYCLING PLANT 2555 SHEFFIELD ROAD OTTAWA, ONT SITE PLAN Revision 01 ISSUED FOR SPC, Novatech, 2019/07/18.

Legend

- - - Location of meander belt setback
- Location of slope stability setback
- - - Proposed new building location



Revision	Date	Issue	Approval
0	11/13/2019	Original	

Client: **American Iron and Metal (AIM)**

Site: **2555 Sheffield Road, Ottawa, ON**

Report Title: **Sheffield Recycling Facility**

Drawing Title: **Setbacks**

Designed By: **A.H.** Scale: **As shown**

Drawn By: **K.M.** Date: **October 2019**

Approved By: Project No.: **TS-SO-037029**

Figure No.: **5**

Appendix B

Slope Inspection Record

TABLE 4.1 - Slope Inspection Record

1. FILE NAME / NO. IN-SO-37029

INSPECTION DATE (DDMMYY): 25/10/2019

WEATHER (circle):

• sunny • partly cloudy • **cloudy**

• calm • breeze • windy

• clear • fog • rain • snow

• cold • cool • warm • hot

estimated air temperature:

INSPECTED BY (name): Ahmad Hassan

2. SITE LOCATION (describe main roads, features)

SKETCH Please refer to Site Drawing in Appendix

3. WATERSHED Green's Creek

4. PROPERTY OWNERSHIP (name, address, phone): AIM Recycling Facility, 2555 Sheffield Road, Ottawa ON.

LEGAL DESCRIPTION

Lot

Concession

Township

County

CURRENT LAND USE (circle and describe)

• vacant -field, bush, woods, forest, wilderness, tundra,

• passive -recreational parks, golf courses, non-habitable structures, buried utilities, swimming pools,

• **active -habitable structures, residential, commercial, industrial, warehousing and storage,**• infra-structure or public use - stadiums, hospitals,
schools, bridges, high voltage power lines, waste management sites,

5. SLOPE DATA

HEIGHT • **3 - 6 m** • 6 - 10 m • 10 - 15 m • 15 - 20 m

• 20 - 25 m • 25 - 30 m • > 30 m

estimated height (m):

INCLINATION AND SHAPE

• 4:1 or flatter

25 % 14°

• **up to 3:1****33 % 18°**

• up to 2:1

50 % 26°

• up to 1:1

100 % 45°

• up to :1

200 % 63°

• steeper than :1

> 63°

6. SLOPE DRAINAGE (describe)

TOP Negligible

FACE Negligible - Surface water table running towards stream - No Erosion

BOTTOM Negligible

<p>7. SLOPE SOIL STRATIGRAPHY (describe, positions, thicknesses, types)</p> <p>TOP Clay, Silt</p> <p>FACE Clay, Silt</p> <p>BOTTOM Clay, Silt</p>
<p>8. WATER COURSE FEATURES (circle and describe)</p> <p>SWALE, CHANNEL</p> <p>GULLY</p> <p>STREAM, CREEK, RIVER Creek with a depth of 60 cm to 80 cm depending on position</p> <p>POND, BAY, LAKE</p> <p>SPRINGS</p> <p>MARSHY GROUND</p>
<p>9. VEGETATION COVER(grasses, weeds, shrubs, saplings, trees)</p> <p>TOP Grass, Shrubs</p> <p>FACE Shrubs, Trees, Weeds</p> <p>BOTTOM Trees, Grass</p>
<p>10. STRUCTURES(buildings, walls, fences, sewers, roads, stairs, decks, towers,)</p> <p>TOP Buildings, Wall, Fence, Sewers</p> <p>FACE Train Track, Deck</p> <p>BOTTOM None</p>
<p>11. EROSION FEATURES(scour, undercutting, bare areas, piping, rills, gully)</p> <p>TOP None</p> <p>FACE None</p> <p>BOTTOM Some bare areas/ land loss near banks</p>
<p>12. SLOPE SLIDE FEATURES(tension cracks, scarps, slumps, bulges, grabens, ridges, bent trees)</p> <p>TOP None</p> <p>FACE None</p> <p>BOTTOM None</p>
<p>13. PLAN SKETCH OF SLOPE Please refer to CAD Drawing in Figure 2, Appendix A</p>
<p>14. PROFILE SKETCH OF SLOPE Please refer to CAD Drawing in Figure 3, Appendix A</p>

Appendix C

Site Photos



Figure 1: Proposed Location of New Building at 2555 Sheffield Road



Figure 2: Proposed Location of New Building at 2555 Sheffield Road



Figure 3: Retaining Wall at North East Side of Property



Figure 4: Retaining Wall at North East Side of Property

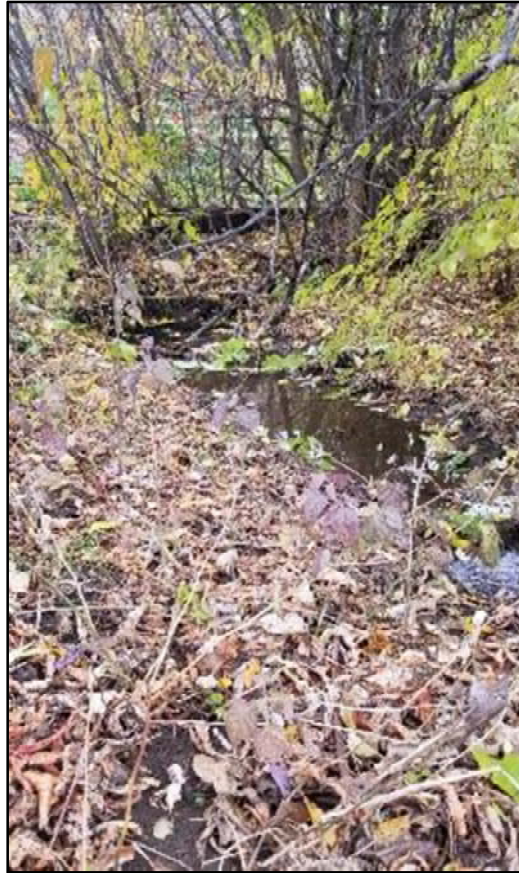


Figure 5: Surface Water Running on Slope Face at Cross-Section 1



Figure 6: Vegetation at Cross-Section 1

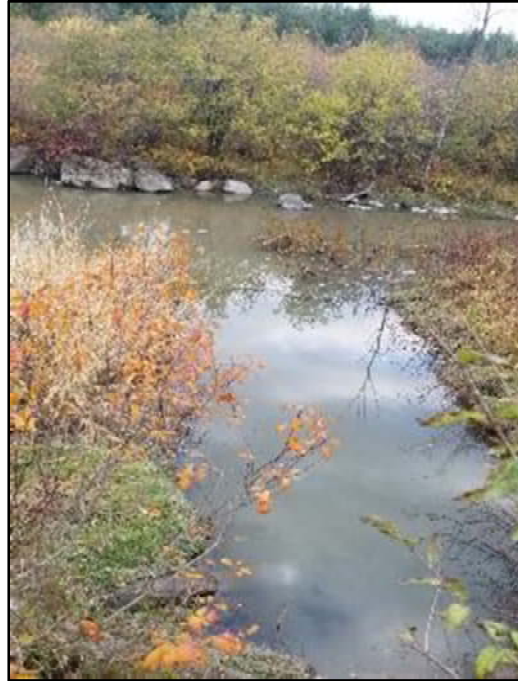


Figure 7: Creek Banks at Cross-Section 1



Figure 8: Concrete Box at Cross-Section 1



Figure 9: Creek Bank at Cross-Section 1



Figure 10: Water Covering Vegetation at Cross-Section 2 Near Creek Bank



Figure 11: Aquatic Plants at North East Side of Property



Figure 12: Ditch Below Retaining Wall at North East Side of Property