Robinson Consultants

Preliminary Engineer's Report
Safari Road Municipal Drain

Prepared For:

Hamilton

Prepared By:

Robinson Consultants Inc.
Consulting Engineers

Our Project No. B22048
June 2023

Robinson Consultants

June 23, 2023

Mayor and Members of Council
City of Hamilton
71 Main St W.
Hamilton, ON L8P 4Y5

Attention: **Mr. Donald Young**
Superintendent, WD & WCC
Public Works

Reference: **Preliminary Engineer's Report**
Safari Road Municipal Drain
Our Project No. B22048

Dear Sir:

This Preliminary Engineer's Report for the Safari Road Municipal Drain, which is respectfully submitted for Council's consideration, was initiated by a petition of the Road Superintendent under Section 4 (Petition) of the Drainage Act, R.S.O. 1990, c D.17. The purpose of this report, which is completed in accordance with Section 10 of the Drainage Act is to review considerations with regard to outside agency concerns, alternative proposals, and a costing analysis of possible solutions.

All costs associated with the preliminary report will be assessed against the City of Hamilton.

If you have any questions, please feel free to contact the undersigned at 613-592-6060 extension 123.

Yours very truly,

ROBINSON CONSULTANTS INC.

Lorne Franklin, L.E.T., C.E.T., rcca, CISEC.
Licensed Drainage Technologist - Drainage Services

LJF: plw

c.c. Hector Quintero, Project Manager of Stormwater Operations and Maintenance, City of Hamilton

TABLE OF CONTENTS

1.0 INTRODUCTION

Robinson Consultants Inc. was appointed by the City of Hamilton by purchase order dated September 28, 2022, to complete a Preliminary Engineer's Report on the proposed Safari Road Municipal Drain. The Preliminary Engineer's Report for the Municipal Drain was requested by the City of Hamilton due to concerns expressed by municipal staff for site specific constraints including the adjacent Provincially Significant Wetland (PSW) and that undertaking a full (typical) municipal drain construction as petitioned under Section 4 of the Drainage Act by the City of Hamilton Road Superintendent may not be feasible. The purpose of the proposed drain is to provide adequate drainage to the lands and roads within the drainage area.

The Preliminary Engineer's Report will discuss alternative solutions to drainage preferred by the Agencies as well as the solution proposed by the Drainage Engineer, estimate costs for drainage works and alternative solutions, and will provide a costing analysis. Requirements for Preliminary Reports are outlined under Section 10 of the Drainage Act, R.S.O. 1990, c D.17, and are as noted below:

- A sketched plan of the drainage works.
- An estimated cost of the works (to the extent practicable to do so).
- An environmental appraisal (where required).
- And a Benefit/Cost Statement (where required).

These items as well as any additional considerations are outlined in the sections below.

1.1 History

Robinson Consultants Inc. was retained by the City of Hamilton for the preparation of the Preliminary Engineer's Report. Site investigations and a preliminary survey were completed. The preliminary survey collected, where possible, geospatial data with regard to perceived problematic areas (water blockages or restrictions), including channel restrictions, culverts, and landform restrictions. The primary area of concern lies between the area of roadway flooding concerns (adjacent to the culvert crossing Safari Road) at the upper reach conveying flows from the south to north of Safari Road and the outlet culvert (returning flow South of Safari Road) and ultimately to the crossing of Kirkwall Road. The approximate drainage area and collected geospatial data are shown on Plan 22048-A1 with consideration for three (3) potential routing options. The three (3) options are shown on Profile Dwg's (22048-P1-P3 for Option 1, 22048-P4-P6 for Option 2 and 22048-P7-P9 for Option 3/3a). All plans and profiles are provided in **Appendix A**.

Safety, flooding, and previously required road closures were noted as the primary concern of the City Road Superintendent, along with on-going road maintenance issues. Concerns include:

- Flooding of Safari Road resulting in road closures or restricted access.
- Flooding resulting in unstable or poor road conditions.
- Safety concerns with regard to deep water immediately adjacent to the road.
- Emergency and public vehicle access (ambulance, police, fire, school-bus, etc.)
- On-going maintenance required due to poor road conditions.

Portions of the area of concern lie within the designated Provincially Significant Wetland (PSW), known as the Sheffield Rockton PSW Complex, part of larger and interconnected complex of regenerating natural areas known as the Hyde-Rockton-Beverley Complex (or Environmentally Significant Area #22 in the City of Hamilton Official Plan). This is considered the primary area of concern for the Agencies/Authorities. The area of PSW is also shown on Dwg. No. 22048-A1.

Arrangements were made for preliminary discussions and consultations with the Grand River Conservation Authority (GRCA), the Federal Department of Fisheries and Oceans (DFO), Ontario Ministry of Environment Conservation and Parks (MECP) and the Ontario Ministry of Natural Resources and Forestry (MNRF) to determine areas of concern and to discuss Agency preferred alternative solutions. All parties were invited to an initial consultation meeting, however, only the GRCA attended the meeting completed on October 18, 2022. In follow-up, the GRCA provided their initial comments and concerns via e-mail dated October 26, 2022. A copy of this correspondence is provided in **Appendix B**.

In general, the GRCA indicated that any preferred solution would address the natural/environmental concerns and limit disruption to the PSW to the fullest extent possible.

Further consultation with all agencies is anticipated to be completed through the submission of this Preliminary Report.

1.2 Supplemental information and Consultation Meeting

In advance of finalization of the Preliminary Engineer's Report, a supplementary information and consultation meeting was completed to discuss the findings of the Engineer with the affected landowners and provide the opportunity for further input. The meeting was held on May 9, 2023, at 5:30pm at the Valens Community Centre.

At the time of this consultation, Safari Road was again closed due to flooding. Aerial video and imagery of the flooding event was captured on May 5, 2023, and presented along with the findings of the Engineer. In general, the imagery confirmed findings that blockages (including driveways with inadequate conveyance of flow) to be the primary issue of concern. Beyond these blockages there was no flooding evident and flow in the channel appeared minimal. The photo provided below best represents these findings.

Concerns expressed by the affected owners at the meeting included the following:

- Concern with delay – why is the process moving slow/what can be done now?
- Why should everyone have to pay if there are only a few properties causing issues?
- What authority do we have to enter on someone's land if they do not want the drain?
- Next Steps?

Ultimately, these questions/concerns were satisfactorily addressed at the information/consultation meeting. Therefore, it is our recommendation to proceed to distribution of the Preliminary Engineer's Report, and to the "Meeting to Consider" as required under the Ontario Drainage Act, R.S.O. 1990, c. D.17.

2.0 DRAINAGE SOLUTIONS

Three (3) initial routing options were considered including roadside ditching on both the North and South sides of Safari Road and one (1) along the current natural flow-path (through the PSW).

The primary drainage solutions included constructing or cleaning a continuous channel of sufficient capacity to provide adequate drainage for the lands and roads affected, outletting to the outlet crossing of Kirkwall Road. However, through engineering review in consultation with the various Agencies, it was determined that full/direct drainage would not meet Agency preferred solution requirements due to the potential impacts of drainage on the PSW.

Through survey and engineering review it was determined that routing along roadside ditches on the North or South Side of Safari Road would not be feasible as there is a significant height of land along the road of up to 9m. As such a determination was made that the natural flow path through the PSW was the only viable routing option.

As an alternative solution to a full trapezoidal channel drainage solution, consideration was given to a drainage management solution incorporating natural/existing conditions thorough investigation of restrictions or blockages within the system, removing any permanent blockages, including beaver dams, and associated accumulated sediment, providing beaver management, and allowing the establishment of a natural channel (identified as solution 3a). Additionally, vegetation removal within the channel may be required as necessary to provide a positive conduit for flows which in turn will permit restoration of the natural channel. This will reduce the potential negative impacts of future maintenance activities. The baseline natural channel would then be incorporated as a Municipal Drain so that maintenance of the baseline channel, ongoing beaver management and other routine maintenance can be provided by the municipality.

As a primary finding of the completed survey, it was noted that there are three (3) existing laneways that transect the PSW, allowing access from Safari Road to residences located on adjacent higher lands (outside of the limits of the PSW). The two (2) upstream laneways have culverts on the flow path allowing flow to pass. However, the condition of the culverts was generally considered to be poor and proper sizing is required to provide sufficient capacity. The third (downstream) laneway had no culvert to allow flow to pass on the natural flow path.

3.0 ALTERNATIVE SOLUTIONS

No additional alternative solutions have been given consideration for the purpose of this Preliminary Report.

4.0 SOLUTION ANALYSIS

A list of possible and/or proposed solutions and their pros and cons are provided in **Table 4.1 (following this page).**

For the purpose of this report "Partial Drainage – Drainage Act" is define as follows:

"Partial Drainage - Drainage Act" allows for the creation of a naturalized channel through the removal of major impediments, beaver maintenance and associated sediment removal, replacement, addition and/or lowering of undersized and improperly placed culverts without modifying the natural grade and is anticipated to minimize impacts and overall disturbance within the Provincially Significant Wetland (PSW).

Whereas "Full Drainage – Drainage Act" is defined as follows:

"Full Drainage - Drainage Act" allows for the construction of a standard (trapezoidal) channel design to convey all flows related to a specific design/storm event. Consideration must then be given for the impact and effects the construction may have on the PSW.

Ultimately, Solution 3a is considered to be the only proposed viable solution.

5.0 CONSTRUCTION COSTING ANALYSIS

The construction costs associated with the only viable proposed solution is included in Table 5.1 and detailed in the Detailed Cost Estimate provided in **Appendix C**.

Table 5.1
Construction and Land Costs – Proposed Solutions

No.	Description	Cost (Detailed in Appendix B)
3a	**Partial Drainage – Drainage Act** Allowance for the creation of a naturalized channel through the removal of major impediments, beaver maintenance and associated sediment removal, replacement, addition and/or lowering of undersized and improperly placed culverts.	**$197,250.00**

6.0 RECOMMENDATIONS

In consideration of Construction Costs, and Costing Analysis provided above, Robinson Consultants Inc. recommends Solution #3a – "Partial Drainage – Drainage Act." This Solution is reasonably cost effective, makes allowance for future maintenance, provides right of access without expropriation, allows for cost distribution and is considered to be an Agency approvable solution.

Solution #1 and Solution #2 – "Full Drainage – Drainage Act – Roadside Ditch" are not viable due to 9m in differential grade along the road.

Table 4.1
Proposed Solutions - Analysis

No.	Solution	Pro	Con
1	Full Drainage – Drainage Act Roadside Ditch (South of Safari Rd.)		• Not viable due to 9m height of differential grade along the road.
2	Full Drainage – Drainage Act Roadside Ditch (North of Safari Rd.)		• Not viable due to 9m height of differential grade along the road.
3	Full Drainage – Drainage Act Natural Flow Path (Through PSW)	• Effective, controlled and engineered drainage with legislated control and provisions for future maintenance. • Ability to proceed with elimination of all potential drainage restrictions. • Payment assessed to affected landowners within the drainage boundary. • Ability to assess outside agencies for requested environmental assessments. • Replacement or lowering of culverts, adequately sized for flows and fish passage.	• Substantial anticipated impacts on the PSW. • Inability to secure Agency approvals. • Difficulty of construction through the wetland area. • Anticipated substantial maintenance in the wetland area due to sedimentation and overgrowth. • Engineered Channel.
3a	Partial Drainge - Drainage Act Natural Flow Path (Through PSW) Alternative Stratagies	• Effective drainage with legislated control and provisions for future maintenance. • Ability to proceed with elimination of significant drainage restrictions. • Payment assessed to affected landowners within the drainage boundary. • Replacement or lowering of culverts, adequately sized for flows and fish passage. • Restoration of natural flows along the natural flow path	• Some (limited) disturbance of the PSW • Ultimately may not provide full relief from flooding concerns.

Solution #3 – "Full Drainage – Drainage Act – Natural Flow Path" is not recommended, as it is generally considered to not meet the Environmental Agencies requirements for approval and would result in significant disruption to the PSW and natural environmental features.

7.0 ENVIRONMENTAL CONSIDERATIONS

7.1 Grand River Conservation Authority Pre-Screening

7.1.1 Fish and Fish Habitat

Through preliminary consultation the GRCA identified the follow potential fish and fish habitat concerns:

- The watercourse flowing south of Safari Road is currently unclassified. This watercourse flows into a branch of Fairchild Creek, which is classified as warm water fish habitat by the Ontario Ministry of Natural Resources and Forestry.
- The watercourse contains a relatively diverse community of fish consisting of Blacknose Shiner, Blackside Darter, Bluntnose Minnow, Common Shiner, Creek Chub, Fathead Minnow, Greenside Darter, Hornyhead Chub, Johnny Darter, Largemouth Bass, Northern Pike, Pumpkinseed, Rainbow Darter, Rock Bass, and White Sucker.
- Several of these species prefer cool water conditions.
- GRCA recommends that no in-water take place between March 15 and July 15. Conversely, in-water work should be limited to the period between July 16 and March 14, in accordance with guidance provided by Fisheries and Oceans Canada (DFO).
- If work is being proposed in fish habitat and the appropriate mitigation measures to protect fish and fish habitat cannot be followed, consultation with Fisheries and Oceans Canada (DFO) would be highly recommended.

7.1.2 Species at Risk

Pre-Screening of the proposed Safari Road Municipal Drain was provided through the GRCA and identified the following potential Species at Risk (SAR) concerns:

According to the Ontario Natural Heritage Information Centre (NHIC), the following species at risk have been observed within the vicinity of the proposed project area:

- Bobolink (Threatened) – suitable habitat is present in hayfields and meadow areas.
- Eastern Meadowlark (Threatened) - suitable habitat is present in hayfields and meadow areas.
- Blanding's Turtle (Threatened) – suitable habitat is present throughout the wetland complex.
- Least Bittern (Threatened) – known to be breeding within the "Safari Road Wetland" as of 2022.

According to the Ontario Natural Heritage Information Centre (NHIC), the following species of conservation concern have been observed within the vicinity of the proposed project area:

- Canada Warbler (Special Concern) – suitable habitat is present within swamp and forest areas.
- Wood Thrush (Special Concern) – suitable habitat is present within swamp and
- forest areas.
- Eastern Ribbonsnake (Special Concern) – suitable habitat is present within and
- adjacent to this wetland complex.

- Snapping Turtle (Special Concern) – suitable habitat is present within and
- adjacent to this wetland complex.

7.1.3 Natural Heritage

Pre-Screening of the proposed Safari Road Municipal Drain was provided through the GRCA and identified the following potential Natural Heritage concerns

- In accordance with Section 6.2.16 of the GRCA's 2003 Wetlands Policy (approved March 28, 2003, Resolution No. 40-03), we would discourage any drainage works that would destroy or degrade wetlands.
- The wetland complex is mapped as being part of the Provincial Natural Heritage System and is subject to the Greenbelt Act and Greenbelt Plan.
- The wetland is identified as a Core Area, Key Natural Heritage Feature and Key Hydrologic Feature in Hamilton's Rural Official Plan.
- The wetlands within the Sheffield Rockton PSW Complex are part of a larger and interconnected complex of regenerating natural areas known as the Hyde-Rockton-Beverley Complex or Environmentally Significant Area #22 in the City of Hamilton Official Plan. Marsh, open alvar, and treed alvar communities are considered regionally significant and provide habitat for a variety of locally and provincially significant plant and animal species. Additional information regarding the important hydrological and ecological functions of this area may be found in the Natural Areas Inventory (NAI) Site Summary Report compiled by representatives of the Hamilton Conservation Authority, the Hamilton Naturalists' Club (HNC), and the City of Hamilton.
- Field inventories were last completed in 2002.

7.1.4 Habitat Features

Pre-Screening of the proposed Safari Road Municipal Drain was provided through the GRCA and identified the following potential Habitat Feature concerns:

- Based on a cursory review of available background information, the following Significant Wildlife Habitat (SWH) classifications would apply. Please note that additional SWH may be present within the wetland and/or adjacent areas:
  - The marsh area would be considered Confirmed SWH for marsh breeding birds as the following four target species are known to be breeding here as of 2022 (per eBird records):
    - Virginia Rail
    - Sora
    - Common Gallinule
    - Marsh Wren

The shallow marsh areas would be considered Candidate SHW due to the presence of the following:

- Amphibian Breeding Habitat (wetlands)
- Turtle Wintering Area

7.2 Ministry of Environment Conservation and Parks Pre-Screening

Pre-Screening of the proposed Safari Road Municipal Drain was provided through the MECP and identified the following potential Species at Risk (SAR) concerns:

- Red-headed Woodpecker
- Eastern Whip-poor-will

8.0 CONCLUSIONS

8.1 Recommended Solution

Robinson Consultants Inc. recommends that, should the City decide to proceed to a full Engineer's Report and subsequent Agency review, it should be on the basis of Solution # 3a – "Partial Drainage – Drainage Act", following the procedures of the Drainage Act.

9.0 ESTIMATED TOTAL COST OF RECOMMENDED SOLUTION

The estimated cost of this solution, including the required Engineer's Report, Inspection, Administration, and Construction is $197,250.00. This solution is considered to be the only viable proposed and cost-effective solution for the intended purpose. It is believed that this solution is generally "approvable" by Environmental Agencies and will provide a reasonable level of drainage for Safari Road as well as providing some relief for adjacent property owners.

The major benefit of the recommended works is associated with reducing the potential flooding of Safari Road, improving reliability for emergency vehicles, school busses and private vehicles as well as improving safety for residents of the City of Hamilton who are not property owners in the drainage basin of the proposed Safari Road Municipal Drain.

The costs associated with this benefit have been reasonably accommodated through the assessment of the full cost of the Preliminary report to the City of Hamilton General Levy, a total of $37,230.00.

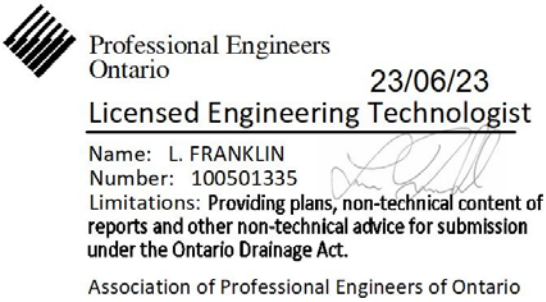
Therefore, all costs associated with the future Engineer's Report and any associated construction should be assessed to the affected owners in accordance with the Drainage Act, a total of $160,020.00.

All of which is respectfully submitted,

ROBINSON CONSULTANTS INC.

A.J. Robinson, P.Eng.
Drainage Engineer

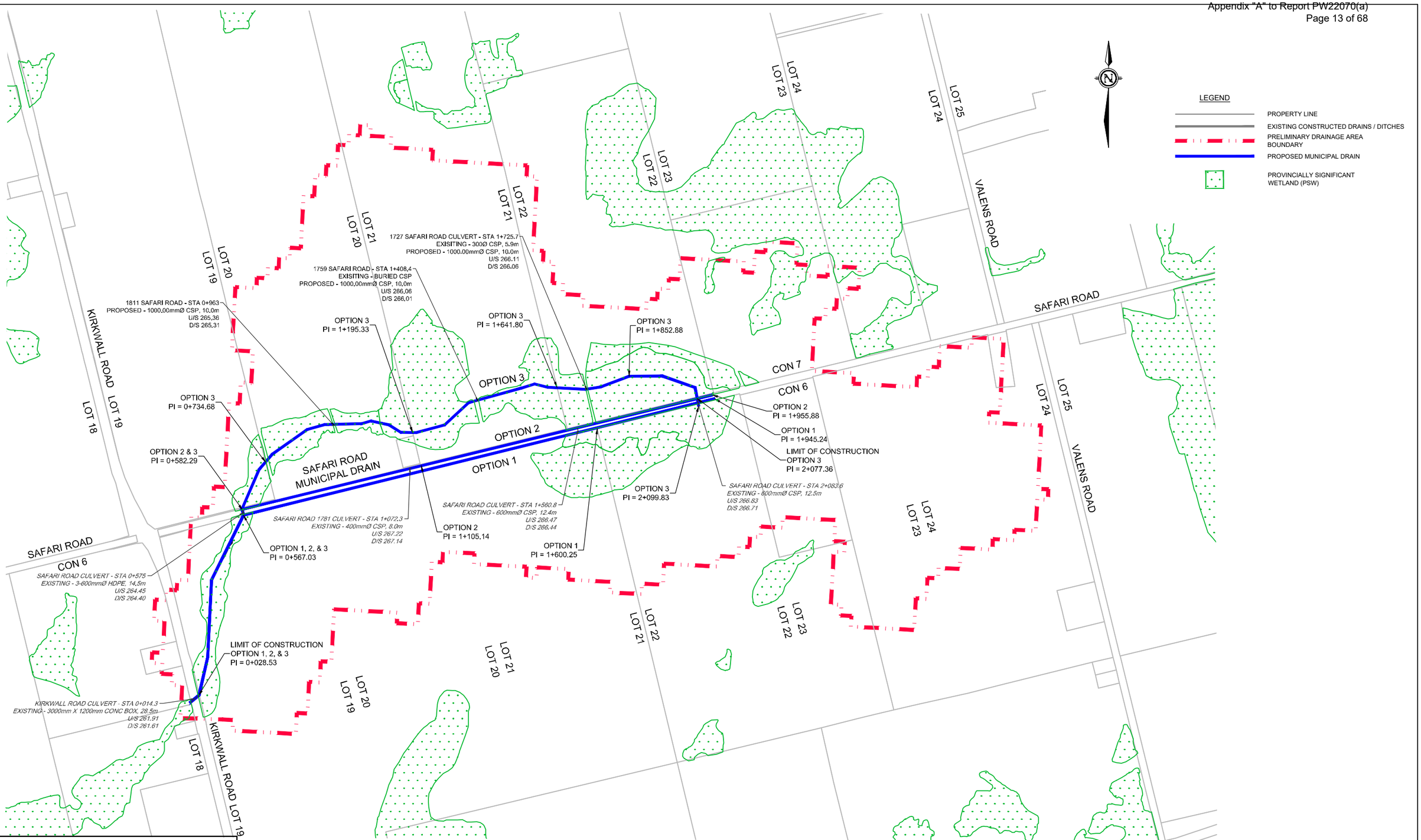
Lorne Franklin
L.E.T., C.E.T., rcca, CISEC
Licensed Engineering Technologist
Drainage Services



Appendix A

Drawings

- Plan B22048– A1
- Profile B22048-P1-P9



NOT FOR CONSTRUCTION

No.	DATE dd.mm.yy	REVISION	BY
1	23.06.23	ISSUED FOR PRELIMINARY REPORT	AR

REGISTERED PROFESSIONAL ENGINEER A. J. ROBINSON 23/06/23 PROVINCE OF ONTARIO

Professional Engineers Ontario
23/06/23
Licensed Engineering Technologist
Name: L. FRANKLIN
Number: 100501335
Limitations: Providing plans, non-technical content of reports and other non-technical advice for submission under the Ontario Drainage Act.
Association of Professional Engineers of Ontario

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HORIZONTAL

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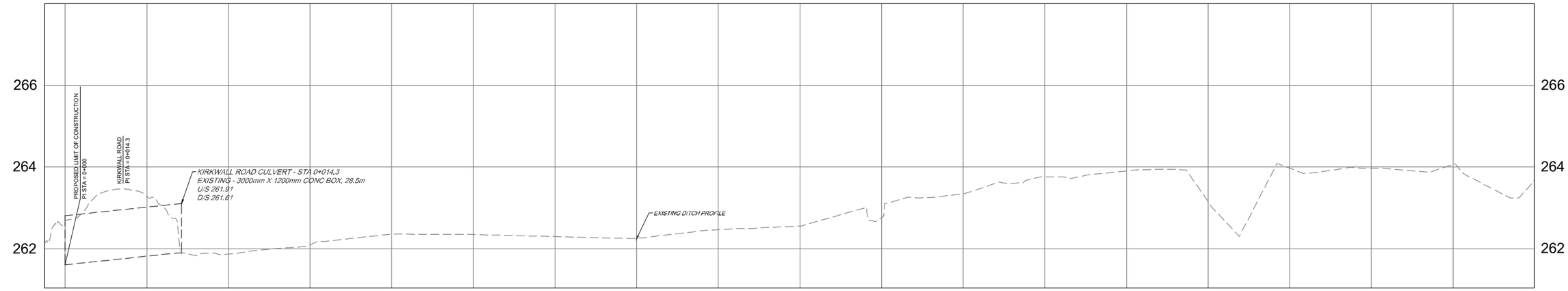
DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF HAMILTON

SAFARI ROAD MUNICIPAL DRAIN

DRAINAGE AREA PLAN

PROJECT No.	22048
CONTRACT No.	
DATED	JUN 2023
DWG. No:	22048-A1



STATION	EXISTING FIRM BOTTOM	PROPOSED GRADE
0+000	262.67	
0+020	263.28	
0+040	261.67	
0+060	262.10	
0+080	262.36	
0+100	262.35	
0+120	262.20	
0+140	262.25	
0+160	262.47	
0+180	262.58	
0+200	262.75	
0+220	263.35	
0+240	263.76	
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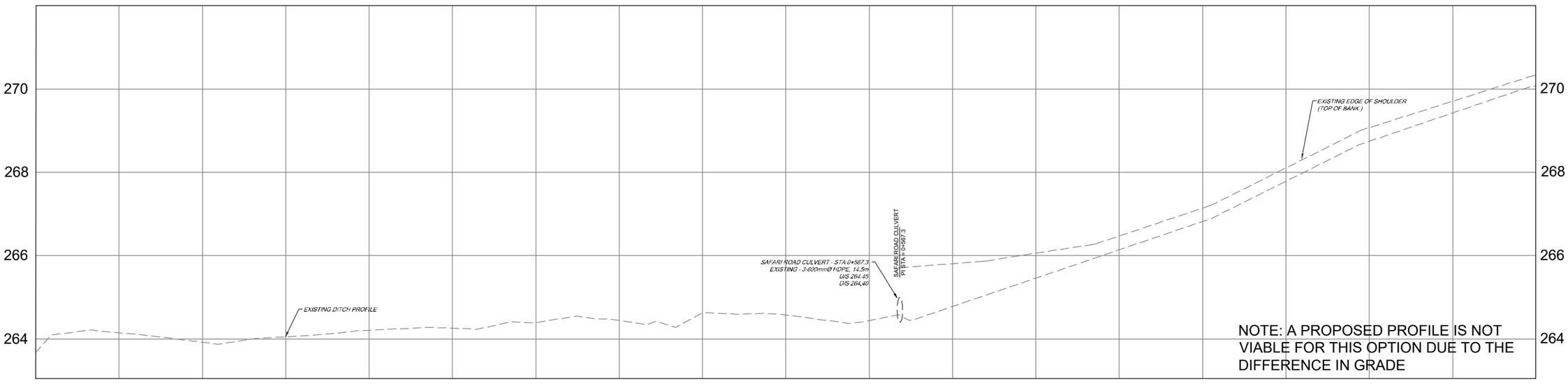
0+360	263.68	



STATION	EXISTING FIRM BOTTOM	PROPOSED GRADE
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0+380	264.15	
0+400	263.92	
0+420	264.05	
0+440	264.21	
0+460	264.26	
0+480	264.39	
0+500	264.45	
0+520	264.63	
0+540	264.58	
0+560	264.44	
0+580	264.78	
0+600	265.46	
0+620	266.14	
0+640	266.82	
0+660	267.79	
0+680	268.75	
0+700	269.43	
0+720	270.07	

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DESIGN	LF
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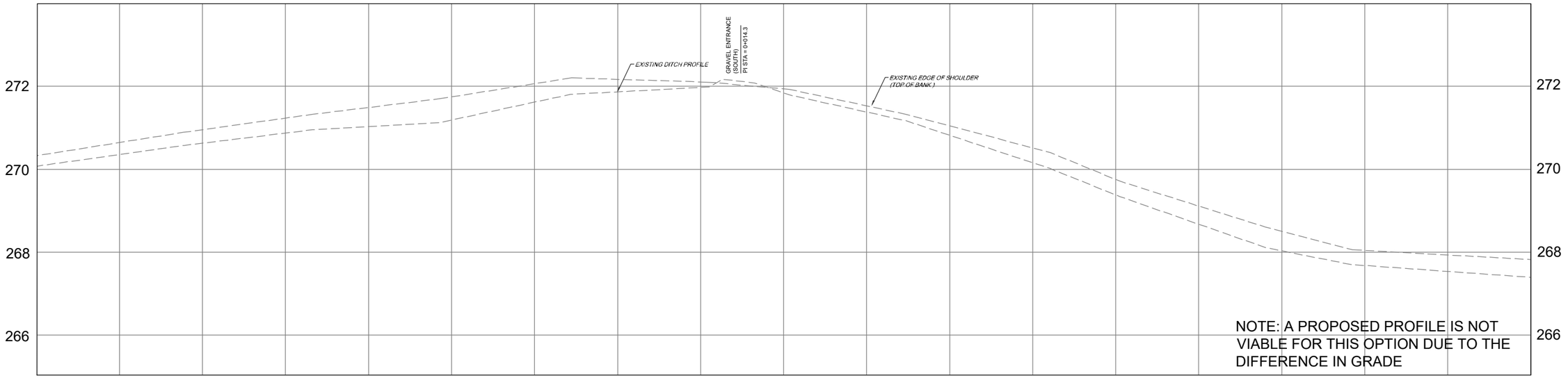
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF HAMILTON

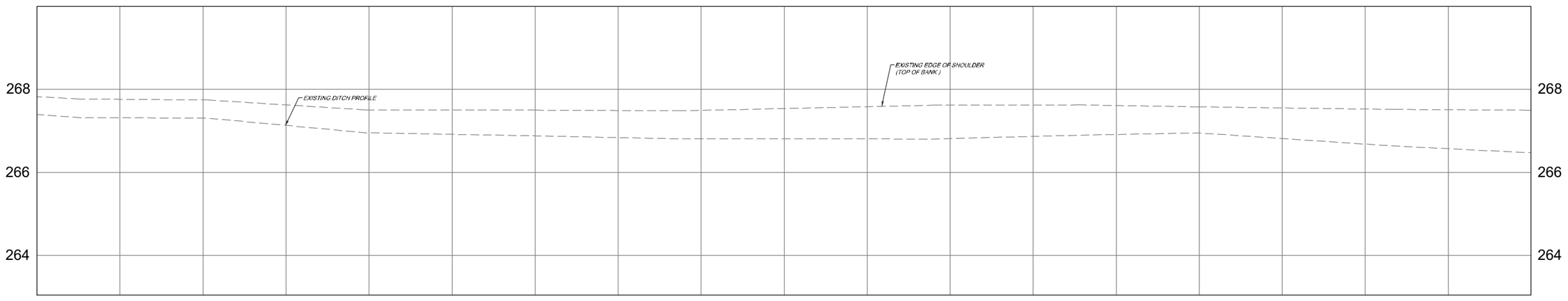
SAFARI ROAD
MUNICIPAL DRAIN

DRAIN PROFILE OPTION 1
STA. 0+000 TO STA. 0+720

PROJECT No.	22048
CONTRACT No.	
DATED	JUN 2023
DWG. No:	22048-P1



PROPOSED GRADE																			
EXISTING FIRM BOTTOM	270.07	270.35	270.63	270.87	271.03	271.19	271.62	271.87	271.97	271.84	271.38	270.82	270.16	269.38	268.67	268.03	267.68	267.54	267.59
STATION	0+720	0+740	0+760	0+780	0+800	0+820	0+840	0+860	0+880	0+900	0+920	0+940	0+960	0+980	1+000	1+020	1+040	1+060	1+080



PROPOSED GRADE																			
EXISTING FIRM BOTTOM	267.39	267.32	267.31	267.13	266.98	266.82	266.86	266.84	266.81	266.81	266.81	266.82	266.87	266.91	266.95	266.82	266.68	266.67	266.48
STATION	1+080	1+100	1+120	1+140	1+160	1+180	1+200	1+220	1+240	1+260	1+280	1+300	1+320	1+340	1+360	1+380	1+400	1+420	1+440

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CITY OF HAMILTON

SAFARI ROAD
MUNICIPAL DRAIN

DRAIN PROFILE OPTION 1
STA. 0+720 TO STA. 1+440

PROJECT No.	22048
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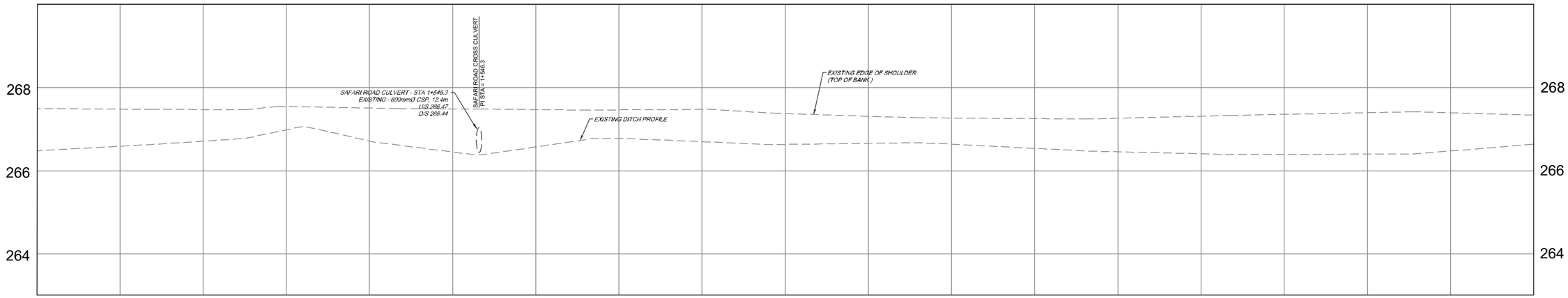

STATION	EXISTING FIRM BOTTOM	PROPOSED GRADE
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1+560	266.58	
1+580	266.78	
1+600	266.70	
1+620	266.64	
1+640	266.66	
1+660	266.64	
1+680	266.54	
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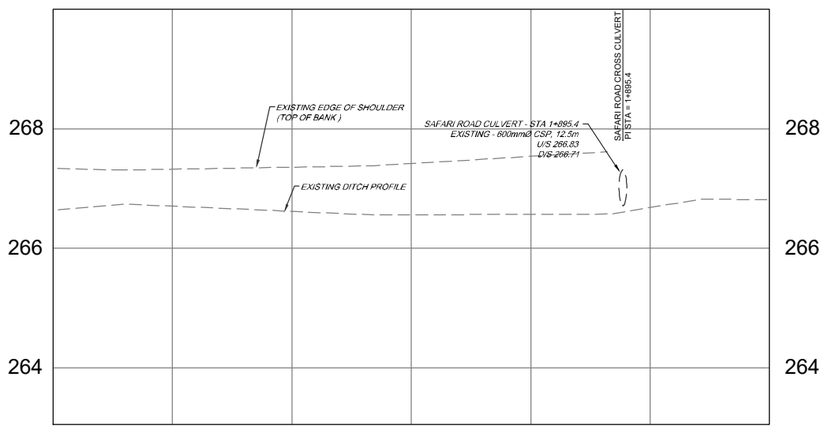
1+800	266.64	



STATION	EXISTING FIRM BOTTOM	PROPOSED GRADE
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1+820	266.70	
1+840	266.62	
1+860	266.56	
1+880	266.57	
1+900	266.68	
1+920	266.81	

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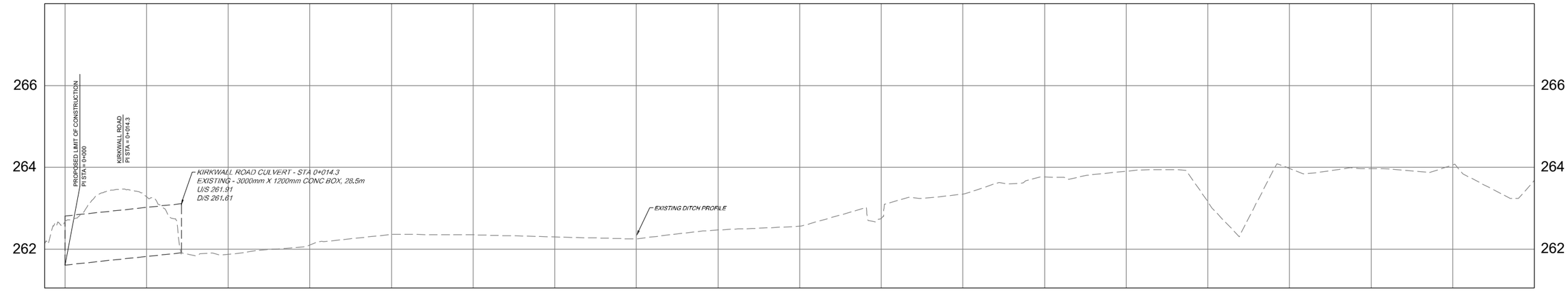
CITY OF HAMILTON

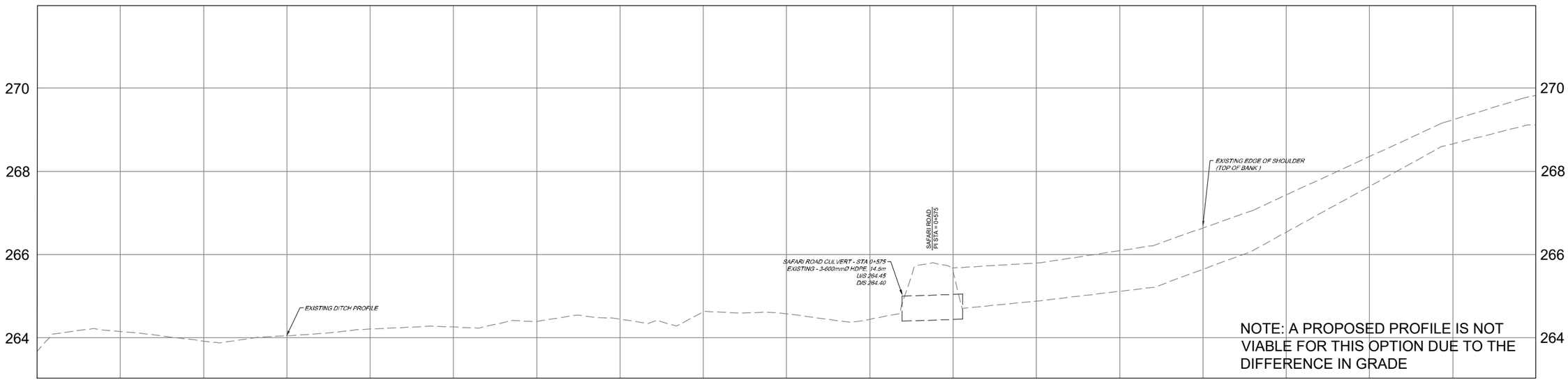
SAFARI ROAD
MUNICIPAL DRAIN

DRAIN PROFILE OPTION 1
STA. 1+440 TO STA. 1+920

PROJECT No.	22048
CONTRACT No.	
DATED	JUN 2023
DWG. No:	22048-P3



STATION	EXISTING FIRM BOTTOM	PROPOSED GRADE
0+000	262.67	
0+020	262.28	
0+040	261.67	
0+060	262.10	
0+080	262.36	
0+100	262.35	
0+120	262.30	
0+140	262.25	
0+160	262.47	
0+180	262.59	
0+200	262.75	
0+220	263.35	
0+240	263.76	
0+260	263.80	
0+280	263.16	
0+300	263.67	
0+320	263.97	
0+340	264.06	
0+360	263.68	



STATION	EXISTING FIRM BOTTOM	PROPOSED GRADE
0+380	263.68	
0+380	264.15	
0+400	263.92	
0+420	264.05	
0+440	264.21	
0+460	264.26	
0+480	264.39	
0+500	264.45	
0+520	264.63	
0+540	264.58	
0+560	264.44	
0+580	265.60	
0+600	264.58	
0+620	265.12	
0+640	265.65	
0+660	266.54	
0+680	267.64	
0+700	266.66	
0+720	269.11	

NOT FOR CONSTRUCTION

No.	DATE dd.mm.yy	REVISION	BY
1	23.06.23	ISSUED FOR PRELIMINARY REPORT	AR

REGISTERED PROFESSIONAL ENGINEER
A. J. ROBINSON
23/06/23
PROVINCE OF ONTARIO

Professional Engineers Ontario
23/06/23
Licensed Engineering Technologist
Name: L. FRANKLIN
Number: 100501335
Limitations: Providing plans, non-technical content of reports and other non-technical advice for submission under the Ontario Drainage Act.
Association of Professional Engineers of Ontario

SCALES
5 0 10
HORIZONTAL
0.5 0 1
VERTICAL

Robinson Consultants
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

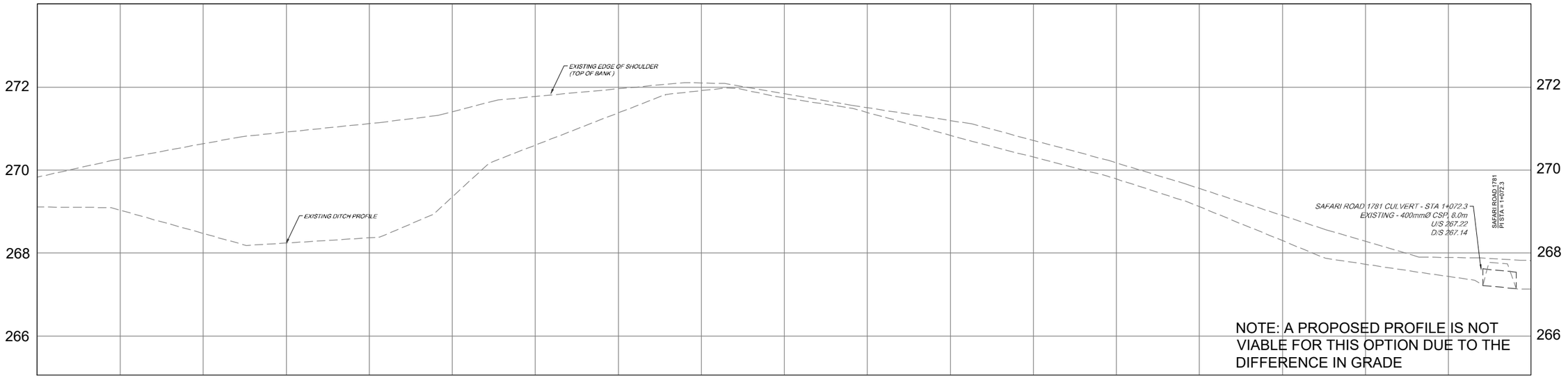
DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF HAMILTON

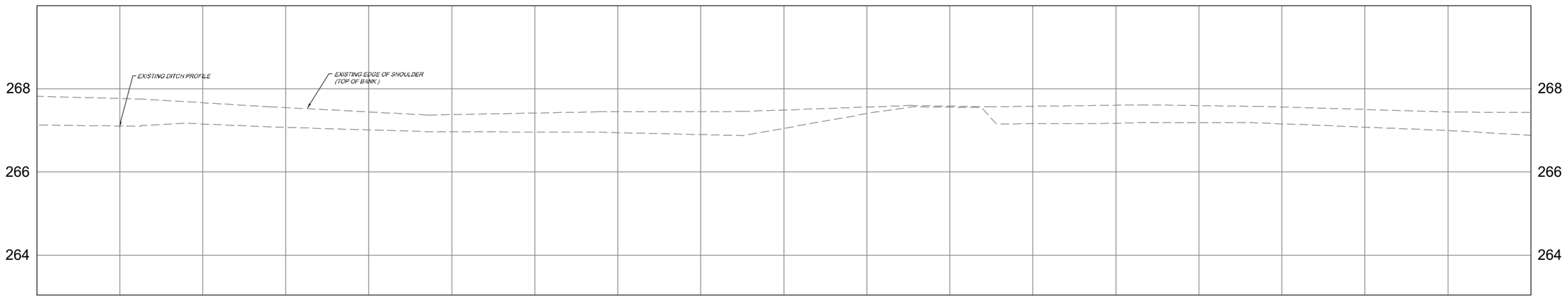
SAFARI ROAD
MUNICIPAL DRAIN

DRAIN PROFILE OPTION 2
STA. 0+000 TO STA. 0+720

PROJECT No.	22048
CONTRACT No.	
DATED	JUN 2023
DWG. No:	22048-P4



PROPOSED GRADE																		
EXISTING FIRM BOTTOM	269.71	269.03	268.47	268.24	268.37	269.35	270.60	271.38	271.62	271.74	271.39	270.84	270.31	269.78	269.12	268.30	267.73	267.44	267.13
STATION	0+720	0+740	0+760	0+780	0+800	0+820	0+840	0+860	0+880	0+900	0+920	0+940	0+960	0+980	1+000	1+020	1+040	1+060	1+080



PROPOSED GRADE																		
EXISTING FIRM BOTTOM	267.13	267.10	267.15	267.07	267.01	266.97	266.96	266.84	266.80	267.05	267.40	267.56	267.16	267.17	267.19	267.16	267.08	267.00	266.88
STATION	1+080	1+100	1+120	1+140	1+160	1+180	1+200	1+220	1+240	1+260	1+280	1+300	1+320	1+340	1+360	1+380	1+400	1+420	1+440

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5 0 10
HORIZONTAL
0.5 0 1
VERTICAL

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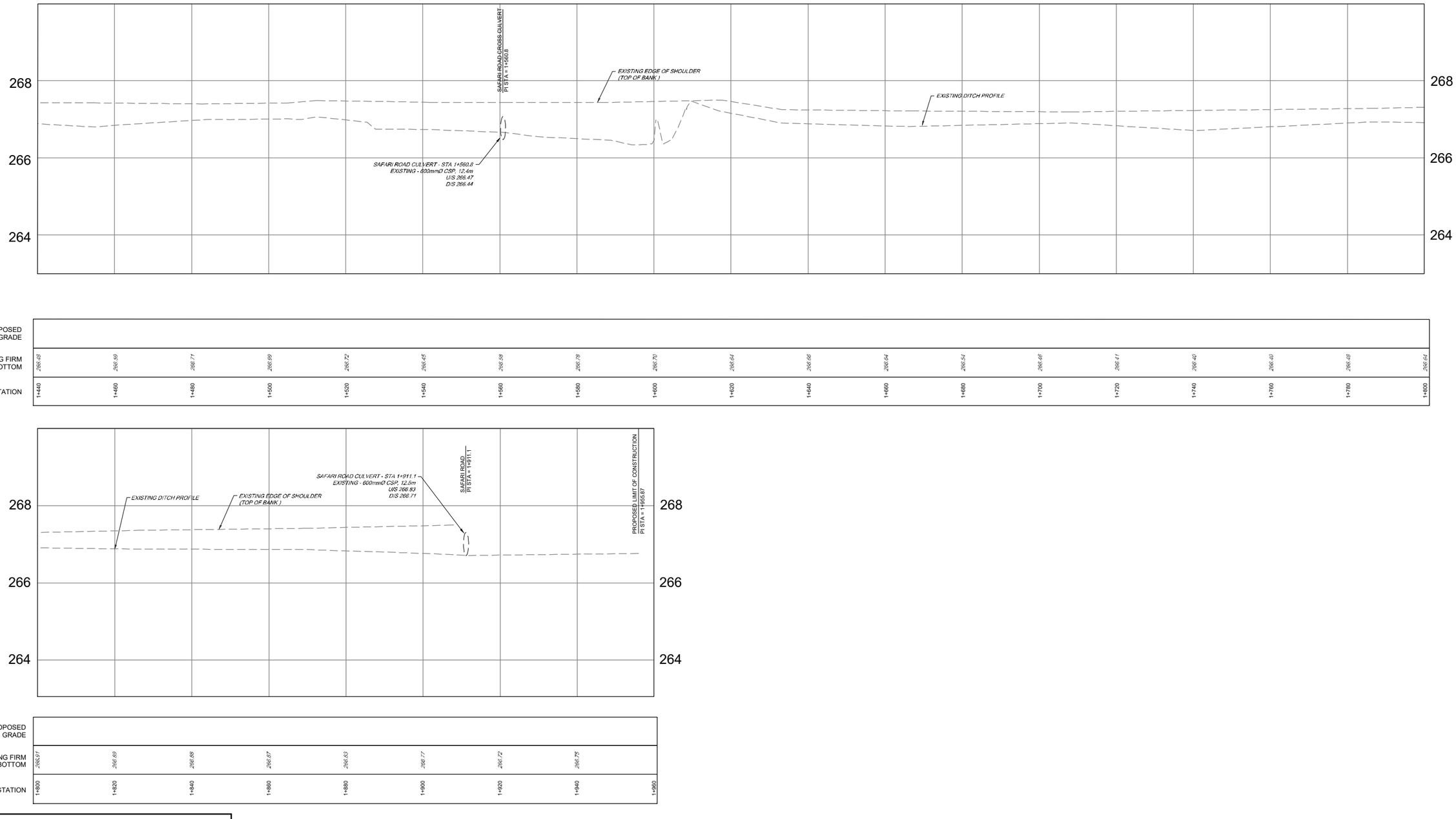
DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF HAMILTON

SAFARI ROAD
MUNICIPAL DRAIN

DRAIN PROFILE OPTION 2
STA. 0+720 TO STA. 1+440

PROJECT No.	22048
CONTRACT No.	
DATED	JUN 2023
DWG. No:	22048-P5



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DESIGN	LF
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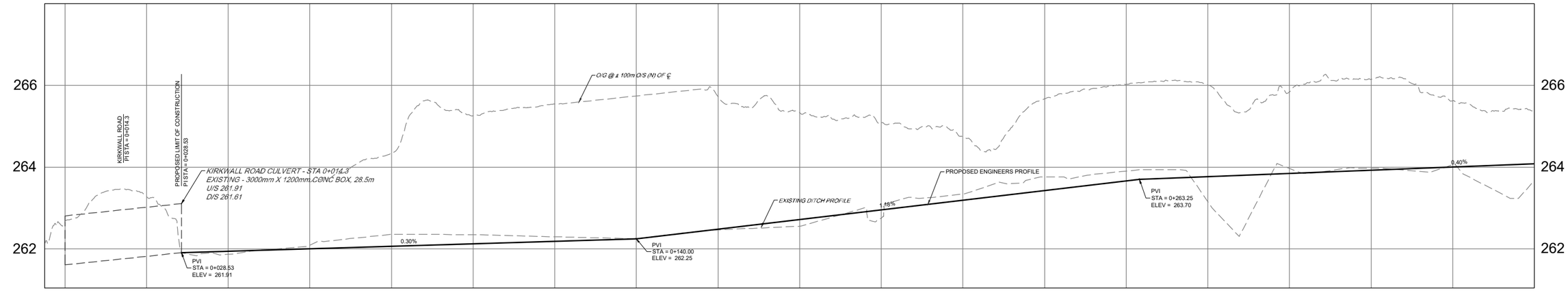
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF HAMILTON

SAFARI ROAD
MUNICIPAL DRAIN

DRAIN PROFILE OPTION 2
STA. 1+440 TO STA. 1+920

PROJECT No.	22048
CONTRACT No.	
DATED	JUN 2023
DWG. No:	22048-P6



STATION	PROPOSED GRADE	EXISTING FIRM BOTTOM
0+000		262.67
0+020		263.28
0+040	261.94	261.67
0+060	262.01	262.10
0+080	262.07	262.36
0+100	262.13	262.35
0+120	262.19	262.30
0+140	262.25	262.25
0+160	262.49	262.47
0+180	262.72	262.56
0+200	262.96	262.75
0+220	263.19	263.35
0+240	263.43	263.78
0+260	263.66	263.90
0+280	263.77	263.16
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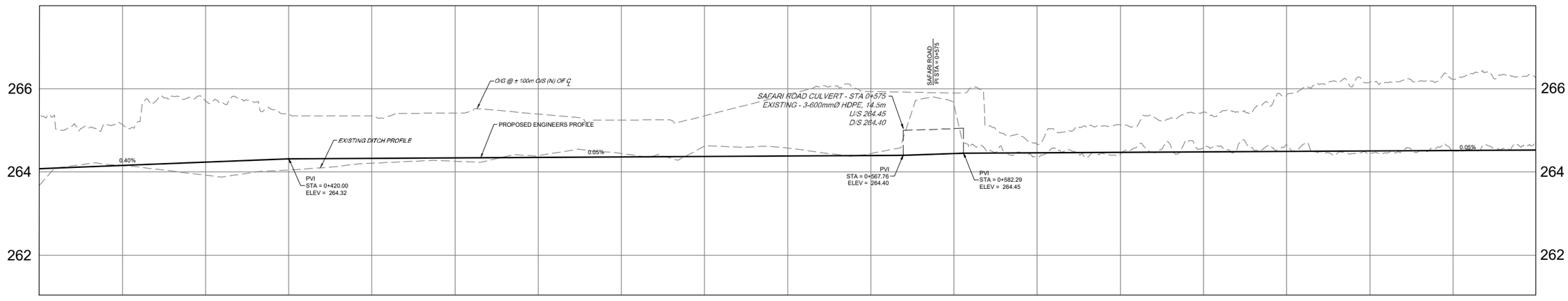
0+340	264.00	264.06
0+360	264.08	263.68



STATION	PROPOSED GRADE	EXISTING FIRM BOTTOM
0+380	264.08	263.68
0+380	264.16	264.15
0+400	264.24	263.92
0+420	264.32	264.05
0+440	264.33	264.21
0+460	264.34	264.26
0+480	264.35	264.39
0+500	264.36	264.45
0+520	264.37	264.63
0+540	264.38	264.58
0+560	264.40	264.44
0+580	264.44	265.60
0+600	264.46	264.36
0+620	264.47	264.42
0+640	264.48	264.60
0+660	264.49	264.65
0+680	264.50	264.47
0+700	264.51	264.51
0+720	264.52	264.71

NOT FOR CONSTRUCTION

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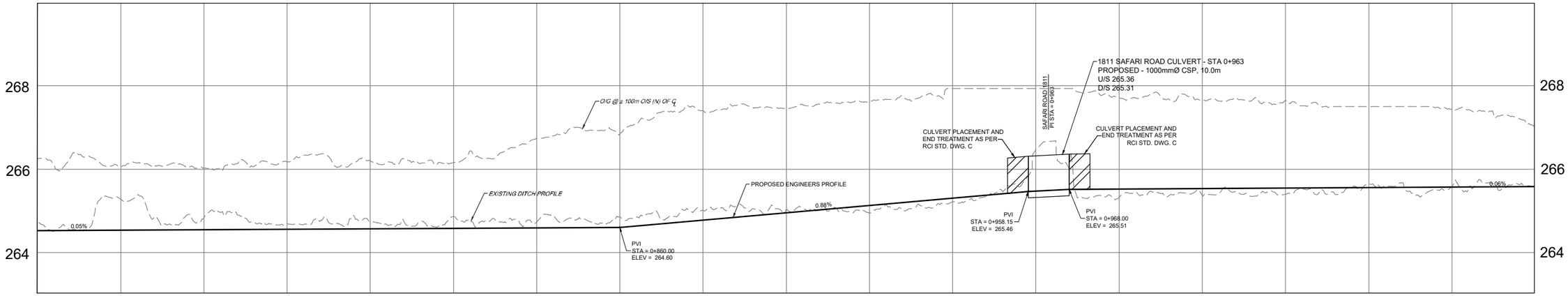
DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF HAMILTON

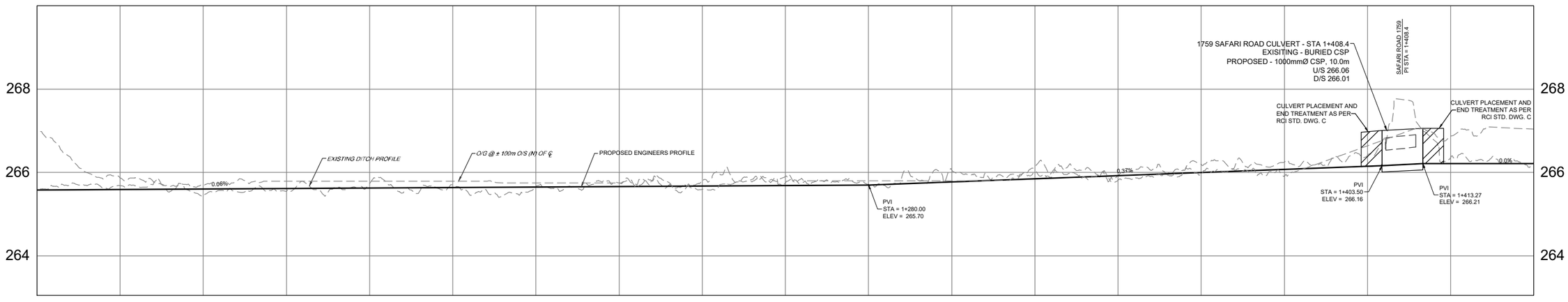
SAFARI ROAD
MUNICIPAL DRAIN

DRAIN PROFILE OPTION 3
STA. 0+000 TO STA. 0+720

PROJECT No.	22048
CONTRACT No.	
DATED	JUN 2023
DWG. No:	22048-P7



STATION	PROPOSED GRADE	EXISTING FIRM BOTTOM
0+720	264.52	264.71
0+740	264.54	265.28
0+760	264.55	264.62
0+780	264.56	264.69
0+800	264.57	264.74
0+820	264.58	264.86
0+840	264.59	264.74
0+860	264.60	264.05
0+880	264.78	265.01
0+900	264.95	265.03
0+920	265.13	264.95
0+940	265.30	265.22
0+960	265.47	265.46
0+980	265.52	265.31
1+000	265.53	265.37
1+020	265.55	265.39
1+040	265.56	265.63
1+060	265.57	265.58
1+080	265.58	265.59



STATION	PROPOSED GRADE	EXISTING FIRM BOTTOM
1+080	265.58	265.59
1+100	265.59	265.68
1+120	265.60	265.44
1+140	265.62	265.85
1+160	265.63	265.73
1+180	265.64	265.70
1+200	265.65	265.68
1+220	265.66	265.75
1+240	265.68	265.79
1+260	265.69	265.75
1+280	265.70	265.69
1+300	265.77	266.07
1+320	265.85	266.16
1+340	265.92	265.93
1+360	266.00	266.19
1+380	266.07	266.25
1+400	266.15	266.41
1+420	266.21	266.35
1+440	266.21	266.23

NOT FOR CONSTRUCTION

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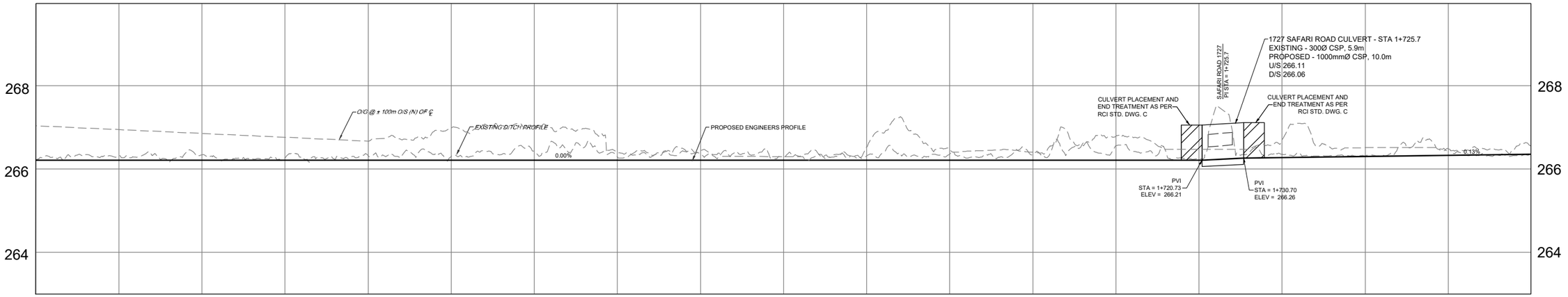
DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF HAMILTON

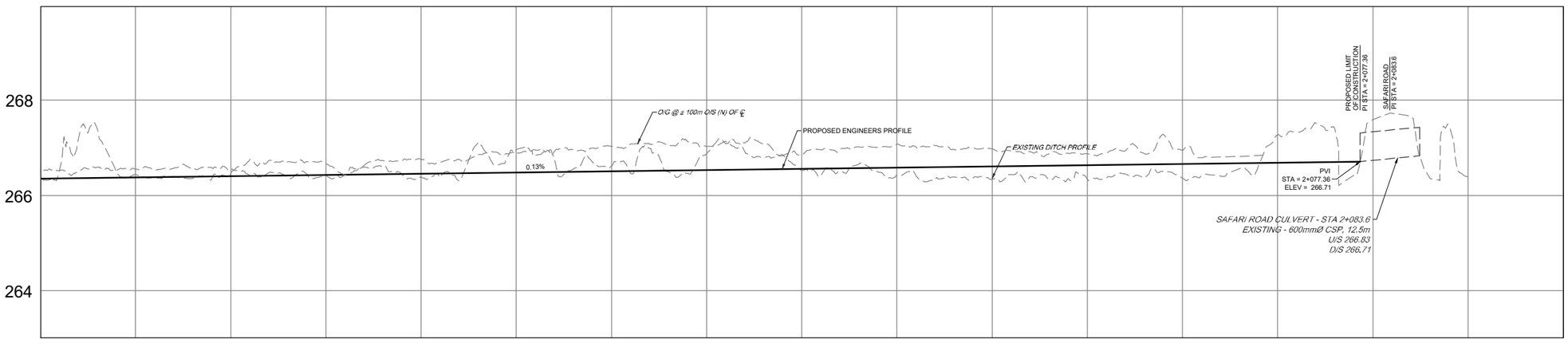
SAFARI ROAD
MUNICIPAL DRAIN

DRAIN PROFILE OPTION 3
STA. 0+720 TO STA. 1+440

PROJECT No.	22048
CONTRACT No.	
DATED	JUN 2023
DWG. No:	22048-P8



STATION	PROPOSED GRADE	EXISTING FIRM BOTTOM
1+440	266.21	266.25
1+460	266.21	266.32
1+480	266.21	266.34
1+500	266.21	266.27
1+520	266.21	266.30
1+540	266.21	266.20
1+560	266.21	266.43
1+580	266.21	266.40
1+600	266.21	266.44
1+620	266.21	266.29
1+640	266.21	266.32
1+660	266.21	266.39
1+680	266.21	266.36
1+700	266.21	266.56
1+720	266.21	266.29
1+740	266.27	266.35
1+760	266.30	266.37
1+780	266.33	266.46
1+800	266.35	266.34



STATION	PROPOSED GRADE	EXISTING FIRM BOTTOM
1+800	266.35	266.34
1+820	266.38	266.43
1+840	266.40	266.46
1+860	266.43	266.42
1+880	266.46	266.39
1+900	266.48	266.96
1+920	266.51	266.62
1+940	266.53	266.87
1+960	266.56	266.53
1+980	266.58	266.41
2+000	266.61	266.34
2+020	266.64	266.34
2+040	266.66	266.36
2+060	266.69	267.27
2+080		267.59
2+100		

NOT FOR CONSTRUCTION

No.	DATE dd.mm.yy	REVISION	BY
1	23.06.23	ISSUED FOR PRELIMINARY REPORT	AR

REGISTERED PROFESSIONAL ENGINEER
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23/06/23
PROVINCE OF ONTARIO

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SCALES
5 0 10
HORIZONTAL
0.5 0 1
VERTICAL

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350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF HAMILTON

SAFARI ROAD
MUNICIPAL DRAIN

DRAIN PROFILE OPTION 3
STA. 1+440 TO STA. 2+120

PROJECT No.	22048
CONTRACT No.	
DATED	JUN 2023
DWG. No:	22048-P9

Appendix B

GRCA Consultation

Grand River Conservation Authority

Administration Centre: 400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6

Phone: 519-621-2761 Toll free: 1-866-900-4722 Fax: 519-621-4844 www.grandriver.ca

October 26, 2022
Via email

Lorne Franklin
Robinson Consultants
350 Palladium Drive, Suite 210
Ottawa, Ontario, K2V 1A8
lfranklin@rcii.com

Re: Safari Road Municipal Drain Petition

Dear Lorne,

The requested OWES record and Site Summary for the Hyde-Rockton-Beverly Complex has been appended to this letter. Please note that the information contained in these reports are not specific to any one area of the wetland complex and that this complex was last evaluated in 1988.

The Grand River Conservation Authority (GRCA) offers the following comments pertaining to the Safari Road Municipal Drain Petition:

Natural Heritage

1. In accordance with Section 6.2.16 of the GRCA's 2003 Wetlands Policy (approved March 28, 2003, Resolution No. 40-03), we would discourage any drainage works that would destroy or degrade wetlands.
2. The wetland complex is mapped as being part of the Provincial Natural Heritage System and is subject to the Greenbelt Act and Greenbelt Plan.
3. The wetland is identified as a Core Area, Key Natural Heritage Feature and Key Hydrologic Feature in Hamilton's Rural Official Plan.
4. The wetlands within the Sheffield Rockton PSW Complex are part of larger and interconnected complex of regenerating natural areas known as the Hyde-Rockton-Beverley Complex or Environmentally Significant Area #22 in the City of Hamilton Official Plan. Marsh, open alvar, and treed alvar communities are considered regionally significant and provide habitat for a variety of locally and provincially significant plant and animal species. Additional information regarding the important hydrological and ecological functions of this area may be found in the Natural Areas Inventory (NAI) Site Summary Report compiled by representatives of the Hamilton Conservation Authority

(HCA), the Hamilton Naturalists' Club (HNC), and the City of Hamilton. Field inventories were last completed in 2002.

5. According to the Ontario Natural Heritage Information Centre (NHIC), the following species at risk have been observed within the vicinity of the proposed project area:
    a. Bobolink (Threatened) – suitable habitat is present in hayfields and meadow areas.
    b. Eastern Meadowlark (Threatened) - suitable habitat is present in hayfields and meadow areas.
    c. Blanding's Turtle (Threatened) – suitable habitat is present throughout the wetland complex.
    d. Least Bittern (Threatened) – known to be breeding within the "Safari Road Wetland" as of 2022.
6. According to the Ontario Natural Heritage Information Centre (NHIC), the following species of conservation concern have been observed within the vicinity of the proposed project area:
    a. Canada Warbler (Special Concern) – suitable habitat is present within swamp and forest areas.
    b. Wood Thrush (Special Concern) – suitable habitat is present within swamp and forest areas.
    c. Eastern Ribbonsnake (Special Concern) – suitable habitat is present within and adjacent to this wetland complex.
    d. Snapping Turtle (Special Concern) – suitable habitat is present within and adjacent to this wetland complex.
7. Based on a cursory review of available background information, the following Significant Wildlife Habitat (SWH) classifications would apply. Please note that additional SWH may be present within the wetland and/or adjacent areas:
    a. The marsh area would be considered **Confirmed SWH** for marsh breeding birds as the following 4 target species are known to be breeding here as of 2022 (per eBird records):
        - Virginia Rail
        - Sora
        - Common Gallinule
        - Marsh Wren
    b. The shallow marsh areas would be considered **Candidate SHW** due to the presence of the following:
        - Amphibian Breeding Habitat (wetlands)
        - Turtle Wintering Area
8. The watercourse flowing south of Safari Road is currently unclassified. This watercourse flows into a branch of Fairchild Creek, which is classified as warm water fish habitat by the Ontario Ministry of Natural Resources and Forestry. The watercourse contains a relatively diverse community of fishes consisting of Blacknose Shiner, Blackside Darter, Bluntnose Minnow, Common Shiner, Creek Chub, Fathead Minnow, Greenside Darter, Hornyhead Chub, Johnny Darter, Largemouth Bass, Northern Pike, Pumpkinseed, Rainbow Darter, Rock Bass, and White Sucker. Several of these species prefer cool water conditions. GRCA recommends that no in-water take place between March 15 and July 15. Conversely, in-water work should be limited to the period between July 16 and

March 14, in accordance with guidance provided by Fisheries and Oceans Canada (DFO).

9. If work is being proposed in fish habitat and the appropriate mitigation measures to protect fish and fish habitat cannot be followed, consultation with Fisheries and Oceans Canada (DFO) would be highly recommended.
10. A scoped environmental impact assessment (EIS) in accordance with the GRCA's guidelines is recommended to provide an updated characterization of the wetland areas that could be impacted by drainage works. We further recommend that the impact on hydrologic and ecological features and functions be minimized to the greatest extent possible, in accordance with GRCA policy.
11. Early consultation with the Ontario Ministry of Environment, Conservation and Parks (MOECP) is highly recommended in order to determine the need for specialized surveys of species at risk and to confirm that any drainage works would not contravene Ontario's Endangered Species Act.

Engineering

12. To assess potential downstream floodplain impacts from upstream storage removal, it is recommended that hydrologic and hydraulic models be created. The loss of storage would be accounted for in the hydrologic model, and would result in an increase to the flow in the hydraulic model.

We trust this information is of assistance. If you have any questions or require additional information, please contact me at 519-621-2763 ext. 2236 or clorenz@grandriver.ca.

Sincerely,

Chris Lorenz, M.Sc.
Resource Planner
Grand River Conservation Authority

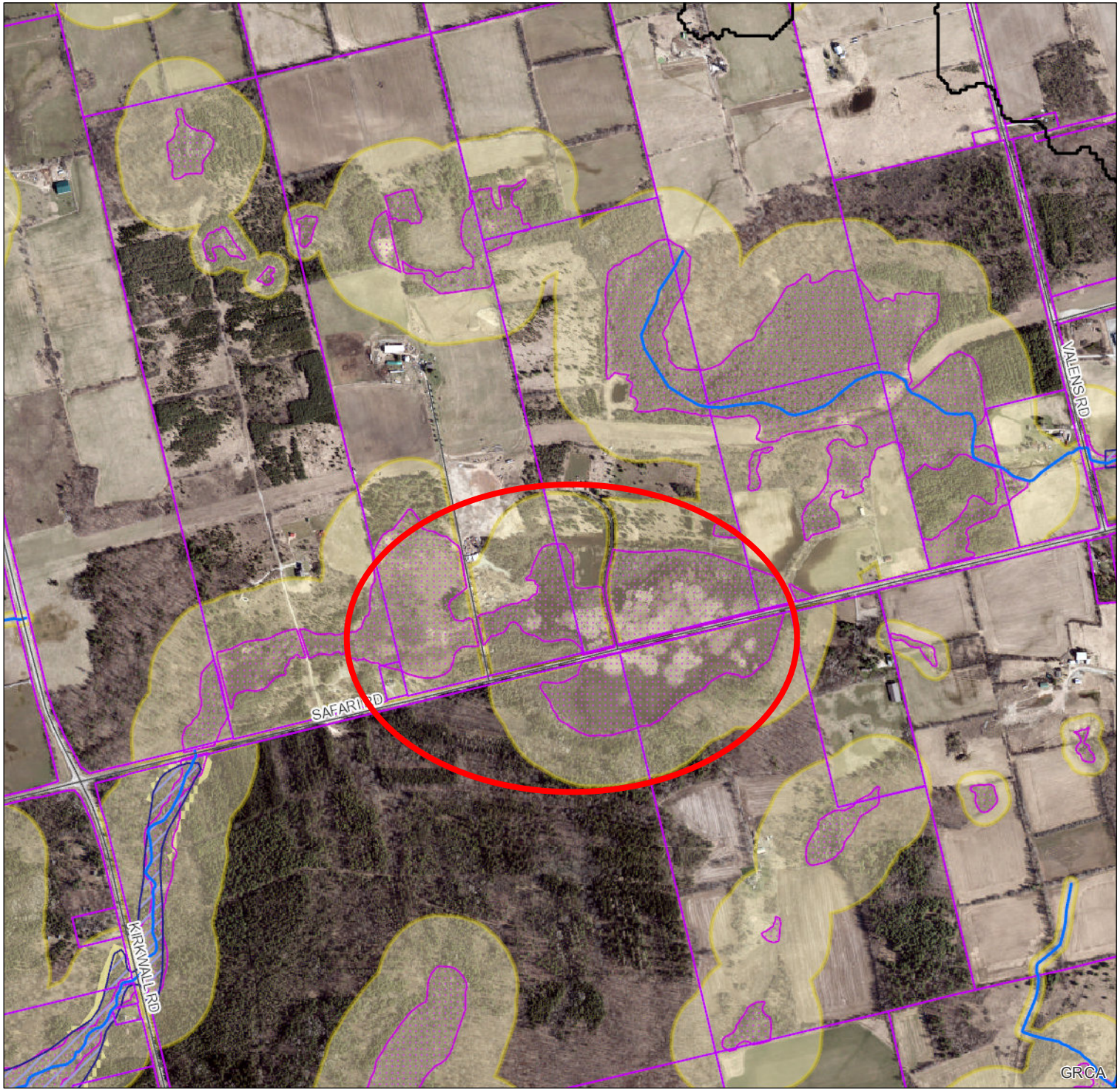
Attachments: GRCA Resource Mapping
Sheffield-Rockton Wetland Data Record
Hyde-Rockton-Beverly Complex Site Summary
eBird Field Checklist – Westover-Safari Road – Marsh

c.c. Hector Quintero (City of Hamilton; via email)
Don Young (City of Hamilton; via email)
Amanda Wong (City of Hamilton; via email)

Grand River Conservation Authority

Date: Jul 22, 2022

Safari Road



Legend

- Regulation Limit (GRCA)
- Regulated Watercourse (GRCA)
- Regulated Waterbody (GRCA)
- Wetland (GRCA)
- Floodplain (GRCA)
  - Engineered
  - Estimated
  - Approximate
  - Special Policy Area
- Slope Valley (GRCA)
  - Steep
  - Oversteep
  - Steep
- Slope Erosion (GRCA)
  - Oversteep
  - Toe
- Lake Erie Flood (GRCA)
- Lake Erie Shoreline Reach (GRCA)
- Lake Erie Dynamic Beach (GRCA)
- Lake Erie Erosion (GRCA)
- Parcel - Assessment (MPAC/MNRF)

This legend is static and may not fully reflect the layers shown on the map. The text of Ontario Regulation 150/06 supercedes the mapping as represented by these layers.

Area requiring drainage

0 80 160 320 480 Metres

N

Map Centre (UTM NAD83 z17): 569,876.87 4,799,535.55

This map is not to be used for navigation | 2020 Ortho (ON)

NAD 1983 UTM Zone 17N

Scale: 13,248

0259

WETLAND DATA RECORD

(i). WETLAND NAME AND/OR NUMBER SHEFFIELD-ROCKTON WETLAND COMPLEX

(ii). ADMINISTRATIVE REGION CENTRAL, AND DISTRICT CAMBRIDGE OF ONTARIO MINISTRY OF NATURAL RESOURCES

(iii). CONSERVATION AUTHORITY JURISDICTION GRCA / HAMILTON REGION CA.

If not within a designated Conservation Authority, check here ___

(iv). COUNTY OR REGIONAL MUNICIPALITY HAMILTON - WENTWORTH / WATERLOO/BRANT

(v). TOWNSHIP FLAMBOROUGH / NORTH DUMFRIES / SOUTH DUMFRIES

(vi). LOTS AND CONCESSIONS SEE ATTACHED

(vii). MAP AND AIR PHOTO REFERENCES

(a) Longitude and Latitude 43° 19' 20" N 80° 10' 45" W

(b) U.T.M. Grid Reference Zone: 17T; Grid: NT 670 970

(c) National Topographic Series Scale and Map Number(s) & Name 40 P/8 CAMBRIDGE (1:50,000)

(d) Air Photos

(1) Date photo taken 1978

(2) Scale of air photos 1:10,000

(3) Flight and plate numbers 4320 # 123, 4321 # 39-51, 4322 # 417-430, 4323 # 4-12, 224-229, 4324 # 136-148 4325 # 45-56

(viii). WETLAND SIZE AND BOUNDARIES

(a) Single contiguous wetland area: _____ hectares

OR

(b) "Wetland Complex" comprised of 28 individual wetlands as follows:.

Wetland Number (for reference purposes)	Size of each wetland in the complex
Wetland No. 1	_____ hectares
Wetland No. 2	_____ "
Wetland No. 3	_____ " SEE ATTACHED
Wetland No. 4	_____ " LIST
Wetland No. 5	_____ "
Wetland No. 6	_____
Total size of wetland complex:	_____ "

735-2

1.0. BIOLOGICAL COMPONENT

1.1. PRODUCTIVITY VALUES

1.1.1. Growing Degree-Days

Number of accumulated growing degree-days (check one)

____	<2800
____	2800 to 3200
✓	3200 to 3600
____	>3600

1.1.2. Soils

	Estimated % of Area
- Clays, loams or silts (mineral)	90
- Organic	10
- Undesignated	

1.1.3. Type of Wetland

(check one or more)		Estimated % of Area
____	Bog	
____	Fen	
✓	Swamp	94 (692.7 ha)
✓	Marsh (includes Open Water Marsh)	6 (42.5 ha)

1.1.4. Site

(check one or more)		Estimated % of Area
____	Isolated	
✓	Palustrine (permanent or intermittent outflow)	90
✓	Riverine	10
____	Riverine (at rivermouth)	
____	Lacustrine (at rivermouth)	
____	Lacustrine (on enclosed bay)	
____	Lacustrine (exposed to lake)	

1.1.5. Nutrient Status of Surface Water

(a) Write conductivity bridge reading and calculate T.D.S. at 25°C as per tables in Appendix VIII.

Location Sampled (i.e. inflow, outflow, etc.)	Initial Specific Conductance (µmhos/cm)	Temperature (°C)		Total Dissolved Solids (T.D.S.) (mg/l)
1 OUTFLOW	450	22	=	318.8
2 INFLOW	490	22	=	347.2
3 OUTFLOW	410	18	=	317.5
4 OUTFLOW	690	19	=	522.2
		Average T.D.S.	=	376.4

(b) Check appropriate category (from (a))

Average T.D.S. mg/l	
<100	
100-500	✓
501-1500	
>1500	
NO READING	

1.2. DIVERSITY VALUES

1.2.1. Number of Wetland Types

(check one)

____ One
✓ Two
____ Three
____ Four

1.2.2. Vegetation Communities

(enter form and map code if available, or enter dominant species if known, and appropriate code/symbol)

a) One form SEE ATTACHED

Code

____ _____
____ _____
____ _____
____ _____

b) Two forms

Code

c) Three forms

Code

d) Four forms

Code

e) Five forms

Code

f) Six or more forms

Code

WETLAND VEGETATION COMMUNITIES

	Nº OF FORMS	CODE	FORMS	SPECIES	FIELD CODE	AREA
	2	S_1	h*	silver maple, ash	4,9,42	14.5
			gc	herbs		
	2	S_2	ts*	black ash, aspen, elm	6,21	3.9
			gc	herbs		
	3	S_3	ts*	silver maple, willow	7	1.3
			gc	herbs		
			ne	grass, sedge		
	3	S_4	h*	black ash, aspen, oak, willow	5,10	7.4
			ts	willow, aspen		
			gc	herbs		
	3	S_5	c*	cedar	8	9.9
			h	black ash		
			gc	jewelweed, ferns		
	3	S_6	h*	elm, willow	11	6.4
			ts	" "		
			gc	herbs		
b	3	S_7	h*	white ash, elm	24,68	22.5
			ts	" , dogwood, buckthorn, elm		
			gc	herbs		
b	3	S_8	h*	silver maple, balsam poplar, elm	26	2.0
			ts	" " " , dogwood		
			gc	herbs		
b	3	S_9	ts*	willow, dogwood	29,35, 38	11.5
			gc	herbs		
			ne	grass, sedge		
b	3	S_{10}	h*	silver maple, elm, willow	37,39,40, 46	20.4
			ts	dogwood, willow		
			gc	herbs		

WETLAND VEGETATION COMMUNITIES

	NO OF FORMS	CODE	FORMS	SPECIES	FIELD CODE	AREA
6	3	S_{11}	h*	elm, white ash, aspen, silver maple	41,68,81, 82,89	36.7
			ts	" , aspen, silver maple		
			gc	herbs		
6	3	S_{12}	h*	trembling aspen, white ash	48,61	12.9
			ts	" , dogwood		
			gc	herbs		
6	3	S_{13}	h*	balsam poplar, trembling aspen, willow, sil. maple	49,55,60 63,73	25.1
			ts	aspen, willow, sil. maple		
			gc ne	herbs		
6	3	S_{14}	h*	sil.maple, trembling aspen, willow	62,64	18.3
			ts	willow, dogwood, elm		
			gc	herbs		
6	3	S_{15}	h*	white ash, aspen	75,89	8.2
			ts	" " , dogwood		
			gc	herbs		
6	3	S_{16}	ts*	willow, black ash, silver maple	72,76,85, 88	3.5
			gc	herbs		
			ne	grass, sedge		
7	4	S_{17}	h*	black ash, oak, elm, silver maple	13,14,15 22,33, 34,67,69, 2,23,50, 52,79	81.0
			ts	dogwood, basswood, willow		
			gc	herbs		
			ne	grass, sedge		
7	4	S_{18}	h*	silver maple, ash	18,25,33, 31,36,43, 44,51,53, 54,87,90 57,58,47, 65,74,77, 78,84,71 80,28	299.7
			ts	" basswood, buckthorn		
			gc	herbs		
			ne	grass, sedge		
8	4	S_{19}	ts*	willow, dogwood	27,45, 66	36.2
			h	sil. maple, aspen		
			gc	herbs		
			ne	grass, sedge		

WETLAND VEGETATION COMMUNITIES

	No OF FORMS	CODE	FORMS	SPECIES	FIELD CODE	AREA
	5	S_{20}	ts*	willow, dogwood, aspen, cedar	3, 12, 16, 20, 30	23.7
			h	willow, ash		
			gc	herbs		
			ne	grass, sedge		
			dh			
	5	S_{21}	ts*	willow, dogwood	wastover DS_5	1.2
			ls	" "		
			gc	seedlings, jewelweed, smartweed		
			ne	grass, sedge		
			re	cattail		
	5	S_{22}	h*	silver maple, black ash, elm	wastover DS_4	46.4
			ts	" " "		
			ls	" " " , cedar		
			gc	sensitive fern, horsetail, jewelweed		
			ne	sedges		
0	1					
3	2					
16	3					
6	4					
3	5					
0	6					

WETLAND VEGETATION COMMUNITIES

	NO OF FORMS	CODE	FORMS	SPECIES	FIELD CODE	AREA
	2	M_1	gc*	mixed herbs	17	1.3
			ne	grass, sedge		
	3	M_2	ne*	grass	19	12.7
			ts	willow, buckthorn		
			gc	herbs		
	3	M_3	re*	cattail	Westover DM_2 54,70,83	14.6
			gc	willow herb, nightshade		
			ne	grass, sedge		
1076	4	M_4	gc*	herbs	1,91	3.1
			ts	willow		
			ne	grass, sedge		
			re	cattail		
1077	4	M_5	ne*	grass, sedge	32,69	8.3
			ts	willow		
			gc	herbs		
			dh			
	4	M_6	gc*	joe pye weed, nightshade, jewelweed, marsh marigold	Westover DM_3	2.5
			ts	willow		
			ne	grass, sedge		
			re	cattail, iris		
1078	M_6	M7	su	submerged veg		
1079	M_4	M8	ne	grasses, sedges		
			gc	herbs,		
			re	cattails		
1080	M_8	M9	ds	deadshrubs		
			re	cattails		
			su			

1.2.3. Diversity of Surrounding Habitat
(check all appropriate items)

- ✓ row crops
- ✓ pasture
- ✓ abandoned agricultural land
- ✓ deciduous forest
- ✓ coniferous forest
- ✓ urban or cottage development
- ✓ pits, quarries or mining waste disposal
- ___ open lake or deep river
- ✓ fence rows with cover, or shelterbelts
- ✓ terraine undulating or hilly with ravines
- ✓ creek(s)

Enter Total = 10

1.2.4. Proximity to Other Wetlands
(check first appropriate category)

i) Hydrologically connected by surface water to other wetlands (different dominant type) or open water within 1.5 km. ✓

ii) Hydrologically connected by surface water to other wetlands (same dominant type) within 0.5 km. ___

iii) Hydrologically connected by surface water to other wetlands (different dominant type) or open water body from 1.5 to 4 km away. ___

iv) Hydrologically connected by surface water to other wetlands (same dominant type) from 0.5 to 1.5 km away. ___

v) Within 0.75 km of other wetlands (different dominant type) or open water body, but not hydrologically connected by surface water. ___

vi) Within 1 km of other wetlands, but not hydrologically connected by surface water. ___

vii) No wetland within 1.5 km. ___

1.2.5. Interspersion
(check one)

- Type 1 ___
- Type 2 ___
- Type 3 ✓
- Type 4 ___

1.2.6. Open Water Types
(check one)

No open water	✓
Type 1	
Type 2	
Type 3	
Type 4	
Type 5	
Type 6	
Type 7	
Type 8	

1.3. SIZE (Biological Component)
(refer to viii)
735.2 hectares

2.0. SOCIAL COMPONENT

2.1. RESOURCE PRODUCTS WITH CASH VALUE

2.1.1. Timber (lumber and firewood)
(1) ✓ 51 to 100% of wetland area has mature trees (>10 cm dbh, >25% cover)
(2) ____ 10 to 50% of wetland area has mature trees (as above)
(3) ____ Wetland has few, immature or no trees
Source of information: FIELD

2.1.2. Wild Rice
(1) ____ Present
(2) ✓ Absent
Source of Information: MNR

2.1.3. Commercial Fish (Bait Fish and/or Coarse Fish)
(1) ____ Fish harvested from the wetland (as per MNR)
(2) ____ Abundant during at least part of the year
(3) ✓ Not abundant or only occasional
(4) ____ Habitat not suitable for fish
Source of Information: MNR

2.1.4. Bullfrogs
(1) ____ Present
(2) ✓ Absent
Source of Information: FIELD

2.1.5. Snapping Turtles

(1) ____ Present
(2) ✓ Absent
Source of Information: FIELD

2.1.6. Furbearers
(check if present)

✓	muskrat	____	mink
✓	raccoon	____	other
✓	beaver		

Source of Information: FIELD

2.2. RECREATIONAL ACTIVITIES
(check appropriate spaces)

	Type of Wetland Associated Use			
Intensity of Use	Hunting	Nature Appreciation or Study	Fishing	Canoeing/Boating
High				
Moderate	✓	✓		
Low				
None Known			✓	✓
Not Possible				

Source of Information: COULSON (MNR) →

2.3. AESTHETICS

2.3.1. Landscape Distinctness

(1) ✓ Clearly distinct
(2) ____ Indistinct

2.3.2. Absence of Human Disturbances

2.3.2.1. Level of Disturbance

(1) _____ Human disturbances absent or nearly so
(2) _____ One or several singular or localized disturbances
(3) ___✓___ Moderate disturbance or localized water pollution
(4) _____ Impairment of natural quality intense in some areas or severe localized water pollution
(5) _____ Extremely intense disturbance or water pollution severe and widespread.

2.3.2.2. Types of Disturbances

___✓___ roads
___✓___ utility corridor
_____ buildings
___✓___ channelization
___✓___ drainage
_____ filling
_____ water pollution
_____ other: _____.

2.4. EDUCATION AND PUBLIC AWARENESS

2.4.1. Educational Uses

(1) _____ Frequent - an average of 2 or more visits per year by one or more school groups, local clubs for the purpose of studying the animals, plants, environment, etc.
(2) ___✓___ Infrequent - use by organized groups (one visit or less per year or only casual visits)
(3) _____ No known visits

List groups utilizing the wetland

Name of Group(s)	Source of Information
K-W FIELD NAT.	T. CHESKEY

2.4.2. Facilities and Programs
(check one)

(1) _____ Staffed interpretation center with shelters, trails, literature
(2) _____ No interpretation center or staff, but a system of self-guiding trails and observation points or brochures available
(3) ___✓___ No facilities or programs

2.4.3. Research and Studies
(check one)

(1) _____ One or more wetland-related scientific research papers published in a scientific journal
(2) ✓ One or more reports written outlining some aspect of the wetland's natural resources
(3) _____ No reports or papers

List scientific papers, reports, etc.

ECOLOGISTICS LTD. 1976. HAMILTON-WENTWORTH REGION ENVIRONMENTALLY SENSITIVE AREAS STUDY. (HYDE TRACT + ROCKTON WETLAND)

2.5. PROXIMITY TO URBAN AREAS
(check one)

(1) _____ In an urban or suburan area
(2) ✓ <10 km from a population center greater than 10,000
(3) _____ 10 to 60 km from a population center greater than 10,000
(4) _____ Isolated or relatively remote

2.6. OWNERSHIP/ACCESSIBILITY

Estimate % of area and enter in the appropriate space(s)

ACCESSIBILITY	OWNERSHIP				
	Public, unrestricted activities	Public, restricted activities	Private, open to public for limited activities	Private Club, closed to public	Private or Private and posted
1) Easy at most times by road/waterway			5		95
2) Easy only at certain times of the year					
3) Limited, moderate effort required					
4) Difficult*					

* Requires extended effort due to distance from roads, navigable waterways or isolated geographical position.

Source of information FIELD

2.7. Size (Social Component)

135.2 hectares (refer to viii)

3.0. HYDROLOGICAL COMPONENT

3.1. EFFECT OF ADJOINING LARGE WATER BODY

(1) ____ Wetland located on the Ottawa, St. Lawrence, Niagara, Detroit or St. Clair Rivers (Go to 3.3)

(2) ____ Wetland bordering on one of the Great Lakes (Go to 3.3)

(3) ✓ Wetland not located as above (Go to 3.2)

If (1) or (2), omit Section 3.2, FLOW STABILIZATION. Continue with Section 3.3, WATER QUALITY IMPROVEMENT. If (3), proceed to Section 3.2.

3.2. FLOW STABILIZATION (All wetlands except those bordering on the Great Lakes or the 5 large rivers)

3.2.1. Detention Due to Surface Area

3.2.1.1. Size of Catchment Basin above Wetland Outflow

Catchment Basin Size 126.0 sq. km

3.2.1.2. Total Size of all Detention Areas (Lakes, Reservoirs and Wetlands) Draining into the Wetland (sq. km)

List Detention Areas	Size
Total	0 sq. km

3.2.1.3. Size of Adjoining Lake (Lacustrine wetlands only)

____ hectares

3.2.1.4. Size of Adjoining River (Riverine wetlands only) (not assessed)

3.2.1.5. Location and Size of Detention Areas (Lakes, Reservoirs and Wetlands) within 30 km above and below the wetland

(NOTE: 1 sq. km = 100 ha)

(a) Detention areas above the wetland (within 30 km)

Name and/or Number of Detention Area	Distance upstream from wetland (in km)	Size (hectares)	For Scoring Use

(b) Detention areas below the wetland (within 30 km)

Name and/or Number of Detention Area	Distance downstream from wetland (in km)	Size (hectares)	For Scoring Use
TROY WETLAND	5	54.9	-4
HARRISBURG EAST	6	45.4	-4
FAIRCHILD CREEK WETLAND	8	15	-4

3.2.1.6. Land Use along River or Stream Shoreline for 20 km Below the Wetland
(Palustrine and all Riverine wetlands except those located along the 5 large rivers).

(check one)

(1) Wetland outflow exits into a deep ravine ____
(2) A village, town or urban area is located along outflow within 20 km ✓
(3) Not as above, and actively farmed agricultural land borders onto outflow, and

length of agricultural border =	
(sum of shoreline	<1 km ____
on both sides of	1-3 ____
river within 20 km)	4-8 ____
	>8 ____

(4) Not as above, (eg. lands bordering outflow within 20 km are forested, or abandoned by agriculture, or outflow enters another wetland or lake, etc.) ____

3.2.1.7. Size (Hydrological Component)
(see viii)
735.2 ha

3.2.2. Flow Augmentation (Palustrine wetlands only)

Size of Catchment basin 1260 sq. km (See 3.2.1.1)
Wetland Area as a % of Catchment Basin Size 5.8 %
(Note: convert wetland area to sq. km before calculating %)

3.3. WATER QUALITY IMPROVEMENT (All wetlands)

3.3.1. Short Term Removal of Nutrients from Surface Water

3.3.1.1. Site Type (see 1.1.4 and check dominant site)
____ Isolated
✓ Palustrine (with permanent or intermittent outflow)
____ Riverine
____ Riverine (at rivermouth)
____ Lacustrine (at rivermouth)
____ Lacustrine (on enclosed bay)
____ Lacustrine (exposed to lake)

3.3.1.2. Actual Wetland Area Dominated by Robust Emergents and Submergents
(check one)

____	<5
✓	5 - 50
____	51 - 100
____	101 - 250
____	251 - 500
____	501 - 1000
____	>1000 hectares

3.3.1.3. Land Use in Catchment Basin
(check one)

(1) ✓ Mainly agriculture and/or urban
(2) ____ Roughly 40-60% agriculture; remainder forested or abandoned agriculture
(3) ____ Mainly forested and/or less than 40% agriculture

3.3.2. Long Term Nutrient Trap
(check one)

(1) ____ Wetland located on an active delta
(2) ____ Wetland rivermouth but without obvious delta
(3) ____ Wetland with organic soils occupying 50% or more of the area
(4) ✓ Wetland with organic soils occupying less than 50% of the area (i.e. mainly mineral or undesignated soils)

3.4. EROSION CONTROL

3.4.1. Erosion Buffer (Lacustrine and Riverine wetlands only)

NOTE: Assess for the dominant site type (see 3.3.1.1)

3.4.1.1. Riverine Wetlands (shoreland and flood plain)
(check principal vegetation form)

(1) ____ Trees or Shrubs
(2) ____ Emergents
(3) ____ Non-vegetated or nearly so

3.4.1.2. Lacustrine Wetlands (with or without barrier beach)
(check principal vegetation form)

(1) ____ Trees or Shrubs
(2) ____ Emergents
(3) ____ Submergents and Floating
(4) ____ Non-vegetated or nearly so

3.4.1.3. Fetch (Lacustine wetlands or Riverine wetlands on any of the 5 large rivers)

	Maximum distance
(1)	_____ barrier beach present
(2)	_____ <2 km
(3)	_____ 2 to 8 km
(4)	_____ >8 km

3.4.2 Sheet Erosion (All except Lacustrine wetlands)
(check the appropriate space)

Wetland Size (ha)	R FACTOR VALUE			
	<50	50-75	75-100	>100
<2				
2-5				
6-10				
11-15				
16-20				
>20			✓	

4.0. SPECIAL FEATURES COMPONENT

4.1. RARITY AND/OR SCARCITY

4.1.1. Individual Wetlands

Name of Physiographic Unit: LAKE ERIE PLAIN
Unit Number: 2

4.1.2. Wetland Type Representation (minimum size 0.5 ha)

(check one or more)

✓	Marsh
✓	Swamp
	Fen
	Bog

4.1.3. Individual Species

4.1.3.1. Breeding Habitat for an Endangered Animal or Plant Species

	Name of Species	Source of Information
(1)		
(2)		

4.1.3.2. Traditional Migration or Feeding Habitat for an Endangered Animal Species

	Name of Species	Source of Information
(1)		
(2)		

4.1.3.3. Breeding or Feeding Habitat for a Provincially Significant Animal Species

	Name of Species	Source of Information
(1)	OPPOSSUM	COULSON (MNR)
(2)	NORTHERN HARRIER	FIELD (1987)

4.1.3.4. Provincially Significant Plant Species

	Name of Species	Source of Information
(1)		
(2)		

4.1.3.5. Regionally Significant Species

	Name of Species	Source of Information
(1)	CARDINAL FLOWER	FIELD (1987, 1988)
(2)	SWAMP WHITE OAK	FIELD (1987)
(3)	YELLOW-BREASTED CHAT	ECOLOGISTICS 1976
(4)	BLACKNOSE SHINER	"
	MOURNING WARBLER	"

4.2. SIGNIFICANT FEATURES AND/OR FISH AND WILDLIFE HABITAT

4.2.1. Nesting of Colonial Waterbirds

(check one)

(1) _____ Currently nesting; species name(s) _____
(2) _____ Known to have nested within past 5 years; species name(s) _____
(3) ✓ Active feeding area
(4) _____ None known

Source of Information: COULSON (MNR)

4.2.2. Winter Cover for Wildlife

(check only highest level of significance)

(1) _____ Provincial signficance for Deer _____, Moose _____
(2) _____ Regional significance for Deer _____, Moose _____
(3) _____ Local significance for Deer _____, Moose _____
(4) ✓ Good winter cover for other species (list): _____ "SMALL GAME"
(5) _____ Poor winter cover

Source of Information: COULSON (MNR)

4.2.3. Waterfowl Staging

(check only highest level of significance)

(1) _____ National significance
(2) _____ Provincial significance
(3) _____ Regional signficance
(4) ✓ Local or no significance

Source of Information: MNR

4.2.4. Waterfowl Production

(check only highest level of significance)

(1) _____ Provincial significance
(2) _____ Regional significance
(3) ✓ Local significance
(4) _____ Little or no significance

Source of Information: MNR

4.2.5. Migratory Passerine and/or Shorebird Stopover Area
(check one)
(1) _____ High significance
(2) ✓ No significance
Source of Information: MNR

4.2.6. Significance for Fish Spawning and Rearing
(check one)
(1) _____ Regional significance
(2) _____ Present
(3) ✓ Unknown
(4) _____ Not possible
Species and Source of Information: MNR

4.2.7. Unusual Geological or other Surficial Features
(check one)
(1) _____ Present
Feature and Source of Information: _____

(2) ✓ Poorly expressed or absent

4.3. ECOLOGICAL AGE

Type of Wetland	Enter % of Area
_____ Bog	_____
_____ Fen	_____
✓ Swamp	94
✓ Marsh	6

INVESTIGATORS

1987: B. BERGMANN, M. RASS, N. SULLIVAN
1988: " , D. STEPHENSON

AFFILIATION

1987: CAMBRIDGE MNR, 1988 ECOLOGISTICS LTD.

DATE

1988 (UNKNOWN)
JULY 13 1988

ESTIMATED TIME DEVOTED TO COMPLETING THE FIELD SURVEY IN "PERSON HOURS"

1988: 4 hrs 1987: UNKNOWN

WEATHER CONDITIONS
(i) at time of field work: 1987: UNKNOWN, 1988: hot, overcast - rain
(ii) summer conditions in general:

WETLAND EVALUATION RECORD

WETLAND NAME AND/OR NUMBER SHEFFIELD - ROCKTON COMPLEX

1.0 BIOLOGICAL COMPONENT

1.1. PRODUCTIVITY VALUES

1.1.1.	Growing Degree-Days	14
1.1.2.	Soils	10
1.1.3.	Type of Wetland	12
1.1.4.	Site	4
1.1.5.	Nutrient Status of Surface Water	20
	TOTAL for Productivity Values	60

1.2. DIVERSITY VALUES

1.2.1.	Number of Wetland Types	6
1.2.2.	Vegetation Communities (not to exceed 30)	30
1.2.3.	Diversity of Surrounding Habitat	10
1.2.4.	Proximity to Other Wetlands	10
1.2.5.	Interspersion	20
1.2.6.	Open Water Types	0
	TOTAL for Diversity Values	76

1.3. SIZE (Biological Component) 50

TOTAL FOR BIOLOGICAL COMPONENT (not to exceed 250) 186

2.0 SOCIAL COMPONENT

2.1.	RESOURCE PRODUCTS WITH CASH VALUE		
	2.1.1. Timber (lumber and firewood)	20	
	2.1.2. Wild Rice	0	
	2.1.3. Commercial Fish (Bait Fish and/or Coarse Fish)	5	
	2.1.4. Bullfrogs	0	
	2.1.5. Snapping Turtles	0	
	2.1.6. Furbearers	15	
	TOTAL for Resource Products with Cash Value (not to exceed 60)		40
2.2.	RECREATIONAL ACTIVITIES (not to exceed 70)		40
2.3.	AESTHETICS		
	2.3.1. Landscape Distinctness	5	
	2.3.2. Absence of Human Disturbances	10	
	TOTAL for Aesthetics		15
2.4.	EDUCATION AND PUBLIC AWARENESS		
	2.4.1. Educational Uses	5	
	2.4.2. Facilities and Programs	0	
	2.4.3. Research and Studies	3	
	TOTAL for Education and Public Awareness		8
2.5.	PROXIMITY TO URBAN AREAS		16
2.6.	OWNERSHIP/ACCESSIBILITY		5
2.7.	SIZE (Social Component)		20
	TOTAL FOR SOCIAL COMPONENT (not to exceed 250)		144

3.0. HYDROLOGICAL COMPONENT

3.1. EFFECT OF ADJOINING LARGE WATER BODY

3.2. FLOW STABILIZATION

3.2.1. Detention Due to Surface Area

3.2.1.1. and 3.2.1.2.	FIRST step (from table)			110	
3.2.1.3.	SECOND step	minus 0	=	110	
3.2.1.5.	THIRD step	minus -12	=	98	
3.2.1.6.	FOURTH step	minus 0	=	98	←(minimum allowable = 0)
3.2.1.7.	FIFTH step	plus 40	=	138	

TOTAL for Detention Due to Surface Area: 138

3.2.2. Flow Augmentation (from table): 40

TOTAL for Flow Stabilization: 178

3.3. WATER QUALITY IMPROVEMENT

3.3.1. Short Term Removal of Nutrients from Surface Water

3.3.1.1. Site Type	2
3.3.1.2. Actual Wetland Area Dominated by Robust Emergents and Submergents	2
3.3.1.3. Land Use in Catchment Basin	10

TOTAL for Short Term Removal of Nutrients from Surface Water: 14

3.3.2. Long Term Nutrient Trap: 4

TOTAL for Water Quality Improvement: 18

3.4. EROSION CONTROL

3.4.1. Erosion Buffer

3.4.1.1. Riverine Wetlands	0
3.4.1.2. Lacustrine Wetlands	0
3.4.1.3. Fetch	0

TOTAL for Erosion Buffer: 0

3.4.2. Sheet Erosion: 4

TOTAL for Erosion Control: 4

TOTAL FOR HYDROLOGICAL COMPONENT (not to exceed 250): 200

4.0 SPECIAL FEATURES COMPONENT

4.1. RARITY AND/OR SCARCITY

4.1.1.	Individual Wetlands	35
4.1.2.	Wetland Type Representation	10
4.1.3.	Individual Species	
4.1.3.1.	Breeding Habitat for an Endangered Animal or Plant Species	0
4.1.3.2.	Traditional Migration or Feeding Habitat for an Endangered Animal Species	0
4.1.3.3.	Breeding or Feeding Habitat for a Provincially Significant Animal Species	150
4.1.3.4.	Provincially Significant Plant Species	0
4.1.3.5.	Regionally Significant Species	30
	TOTAL for Individual Species (not to exceed 250)	180
	TOTAL FOR RARITY AND/OR SCARCITY (not to exceed 250)	225

4.2. SIGNIFICANT FEATURES AND/OR FISH AND WILDLIFE HABITAT

4.2.1.	Nesting of Colonial Waterbirds	3
4.2.2.	Winter Cover for Wildlife	10
4.2.3.	Waterfowl Staging	0
4.2.4.	Waterfowl Production	5
4.2.5.	Migratory Passerine and/or Shorebird Stopover Area	0
4.2.6.	Significance for Fish Spawning and Rearing	0
4.2.7.	Unusual Geological or other Surficial Features	0
	TOTAL FOR SIGNIFICANT FEATURES AND/OR FISH AND WILDLIFE HABITAT (not to exceed 250)	18

4.3. ECOLOGICAL AGE

2

TOTAL FOR SPECIAL FEATURES COMPONENT (not to exceed 250) **245**

SUMMARY OF EVALUATION RESULTS

FOR THE SHEFFIELD - ROCKTON COMPLEX WETLAND
(name or number)

TOTAL FOR 1.0, BIOLOGICAL COMPONENT	186
TOTAL FOR 2.0, SOCIAL COMPONENT	144
TOTAL FOR 3.0, HYDROLOGICAL COMPONENT	200
TOTAL FOR 4.0, SPECIAL FEATURES COMPONENT	245
TOTAL:	775
CLASS:	1

INVESTIGATORS

D. STEPHENSON, B. BERGMANN, H. ROSS, N. SULLIVAN

AFFILIATION

MNR / ECOLOGISTICS LTD.

DATE

DEC. 1988

WETLAND	1	79.7
	2	114.6
	3	7.2
	4	1.7
	5	2.8
	6	55.4
	7	17.9
	8	1.7
	9	1.7
	10	38.6
	11	2.8
	12	2.8
	13	114.6
	14	18.9
	15	13.5
	16	2.0
	17	41.1
	18	27.6
	19	12.2
	20	25.0
	21	2.9
	22	25.2
	23	5.4
	24	23.8
	25	53.2
	26	11.3
	27	26.0
	28	5.6
TOTAL		735.2

HYDE–ROCKTON–BEVERLY COMPLEX

Municipality	ESA #	Conservation Authority
City of Hamilton	22	Grand River
Formerly	Lot	Watershed
Town of Flamborough	14-23	Fairchild Creek
Approximate Area	Concession	Ownership
732 hectares	5-7	Public/Private

GENERAL SUMMARY

The Hyde –Rockton – Beverly Complex site consists of an extensive area of previously disturbed, regenerating habitats. It is situated on a bedrock plain covered by shallow soils developed on varied substrates and moisture regimes. Outcrops of rocky ridges are scattered through the site[459].

The marsh, open alvar, and treed alvar communities at this site are considered regionally significant plant communities[528]. This natural area also supports a rich breeding bird community including many significant species[459].

Numerous studies have been conducted in this area including the 1991 NAI. Nature Counts surveyors collected data on birds, butterflies, herpetofauna, and plants in 2001 and 2002. This area was not surveyed as part of the Nature Counts 2 project.

EVALUATIONS

1976 Study[56]

Identified the following significant features:

- plant and animal communities of the area are identified as unusual or of high quality locally within the municipality, Ontario, or Canada
- has unusually high diversity of biological communities and associated plants and animals due to a variety of geomorphological features, soils, water, sunlight, and associated vegetation and microclimate effects
- provides habitat for rare or endangered species that are endangered regionally, provincially, or nationally (two rare birds)
- area is large and undisturbed, potentially affording a sheltered habitat for species which are intolerant of human disturbance

NAI (1993)[459]

Significant Natural Area

- serves an important ecological function
- serves an important hydrological function
- exhibits a high diversity of biotic features
- encompasses significant communities
- provides habitat for many significant species

OMNR

Provincially Significant Wetland - Sheffield – Rockton Complex

Niagara Escarpment Plan, 2005[675] - none

Greenbelt Plan, 2005[676]

Natural Heritage System
Protected Countryside

ESA Criteria (2003)[1008]

- Significant Ecological Function
  - the area provides habitat for significant species
  - the area contains interior forest habitat (at least 100-200m from forest edge)
  - the area contains a high diversity of native plant species
  - the area contains rare biotic communities
- Significant Hydrological Function
  - the area contains a sensitive bedrock recharge zone

PHYSICAL DESCRIPTION

Physiography and Topography

This study area is located in the southwestern portion of the Flamborough Plain physiographic region. This large natural area encompasses the central portion of the extensive, gently-sloping bedrock plain stretching from Rockton, north to Kirkwall, and east to Westover. The surface topography of this area is irregular due to the combination of the southwest-northeast trend of the bedrock ridges and creeks, and the west-northwest fabric of the overburden features. Elevations range from 253 to 270 m, except for the isolated drumlin in the northern end of study area that is some 20 m higher than the surrounding plain[459].

Bedrock Geology

Dolostone of the Guelph Formation is at or near surface through much of the study area and forms a gently southwest-sloping plain. The northeast-trending bedrock ridges may be resistant reefal structures. Glacial striae have been noted on outcrops along Safari Road east of Kirkwood Road[202].

Overburden Geology

Overburden is generally less than a metre deep and consists of sandy Wentworth Till. A well-formed drumlin is present in the northern part of this area, on the south side of Safari Road. Karrow and others have noted a wave-cut shoreline feature on the south face of this drumlin, and a borrow pit has exploited a beach gravel deposit on the northwestern end of this feature. The elevation of these shoreline features (275 m) indicates

they were created by glacial Lake Whittlesey[202]. A level area along the western boundary of the study area consists of an isolated glaciolacustrine sand plain. Other patches of sand and silt sediments may be present[202].

Soils
Well-drained Farmington loam soils are present on the shallow bedrock throughout this site. Well-drained Guelph loam has developed on the drumlin and on other drift-covered knolls. A variety of soil series (Tuscola, Toledo, Vineland Beverly, and Colwood) have developed on the patches of shallow, silty to sandy, poorly- to imperfectly-drained substrates[459].

Soil Type	Percentage of Study Area
BEVERLY SILT LOAM	3.26%
COLWOOD SILT LOAM	7.09%
FARMINGTON LOAM	46.95%
FLAMBORO SANDY LOAM	2.90%
GRIMSBY SANDY LOAM	0.16%
GUELPH LOAM	12.61%
LONDON LOAM	3.31%
MUCK	2.22%
PARKHILL LOAM	0.98%
STREAM COURSE	3.49%
TOLEDO SILT LOAM	9.91%
TUSCOLA SILT LOAM	4.94%
VINELAND SANDY LOAM	2.18%
TOTAL %	**100.00%**

Hydrogeology
Water wells in the vicinity tap a bedrock aquifer found at 12 to 20 m depth in the northern portion of the study area, and 6 to 9 m depth in the southern portion. A few wells encountered only sulphur water. The piezometric surface (250 to 268 m) slopes southwesterly, indicating that the direction of groundwater movement is coincident with that of the surface water drainage. As elsewhere in the Flamborough Plain region, the bedrock surface appears to be generally impermeable; however, groundwater recharge and/or discharge may be occurring along fracture zones. Because of the shallow soils, the bedrock aquifer is susceptible to contamination[459].

Hydrology and Surface Drainage
This area is located in the headwaters of the Fairchild Creek watershed. The small pockets of wetland help maintain base flow in the small creek that drains this area[459].

ECOLOGICAL LAND CLASSIFICATION

Total Area (ha)	Surveyed Area (ha)	Percentage Surveyed (%)
732.3	455	62

Number of Plant Community Types: 28
Number of Significant Plant Community Types: 2
Total Number of Significant Plant Community Polygons: 2
Survey Year: 2004

Summary (refer to accompanying CD)
Of the land surveyed in 2004, 47% (2316 ha) is coniferous plantation. The natural area is a patchwork of ecosystems primarily consisting of coniferous plantations, upland deciduous forests, lowland swamps, mixed forests, alvar, and cultural meadows and thickets.

Of the upland sites, Sugar Maple *(Acer saccharum spp. saccharum)* is the most abundant deciduous tree, with White Ash *(Fraxinus americana)*, Shagbark Hickory *(Carya ovata)*, Ironwood *(Ostrya virginiana)*, serviceberry species *(Amelanchier spp.)*, Black Cherry *(Prunus serotina)*, White Pine *(Pinus strobus)*, Prickly-ash *(Zanthoxylum americanum)*, and Red Oak *(Quercus rubra)* as common associates. The ground layer is commonly covered with asters (Aster spp.), moss, Running Strawberry-bush *(Euonymus obavata)*, Zig-zag Goldenrod *(Solidago flexicaulis)*, Selfheal *(Prunella vulgaris* ssp. *vulgaris)*, and violets *(Viola spp.)*.

Silver Maple *(Acer saccharinum)* and Green Ash *(Fraxinus pennsylvanica)* are the dominant species in the two largest swamps in this natural area. The Silver Maple swamp (polygon 8) has some Black Ash *(Fraxinus nigra)*, Bur Oak *(Quercus macrocarpa)*, and Shagbark Hickory *(Carya ovata)*. The understory is thick with European Buckthorn *(Rhamnus cathartica)*, Prickly Ash, Choke Cherry *(Prunus virginiana)*, and Black Raspberry *(Rubus occidentalis)*.

The meadows and thickets are located adjacent to or amongst the coniferous plantations. Due to the thin soil layer, all of these ecosystems have been identified as a bedrock system.

Community Descriptions[460]
2004
Polygon 1 – Coniferous Plantation (CUP3)

Polygon Description	Environmental Characteristic
Topographic Features	Rolling Upland
Community	Coniferous Plantation
Ranking	None
Complexes and Inclusions	
Inclusion	Bedrock Cultural Woodland (CUW2)
Inclusion Ranking	None

Polygon 2 – Cultural Plantation (CUP3)

Polygon Description	Environmental Characteristic
Topographic Features	Rolling Upland
Community	Coniferous Plantation
Ranking	None

Polygon 3 – Bedrock Cultural Woodland (CUW2)

Polygon Description	Environmental Characteristic
Topographic Features	Alvar
Community	Mid-Age Woodland
Ranking	None

Polygon 4 – Mixed Forest (FOM)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Mid-Age Forest
Ranking	None

Polygon 5 – Bedrock Cultural Meadow (CUM2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Young Meadow
Ranking	None

Polygon 6 – Bedrock Cultural Meadow (CUM2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Young Meadow
Ranking	None

Polygon 7 – Bedrock Cultural Woodland (CUW2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Coniferous Plantation
Ranking	None

Polygon 8 – Silver Maple Mineral Deciduous Swamp (SWD3-2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Swamp
Ranking	G4?, S5

Polygon 9 – Bedrock Cultural Thicket (CUT2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Alvar
Community	Mid-Age Thicket
Ranking	None
Complexes and Inclusions	
Inclusion	Mixed Forest (FOM)
Inclusion Ranking	None

Polygon 10 – Dry – Fresh White Cedar Mixed Forest (FOM4)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Mid-Age Forest
Ranking	None

Polygon 11 – Fresh – Moist Sugar Maple – Hardwood Deciduous Forest (FOD6-5)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Mid-Age Forest
Ranking	S5

Polygon 12 – Forb Mineral Meadow Marsh (MAM2-10)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Marsh
Ranking	G?, S4S5
Complexes and Inclusions	
Inclusion	Gray Dogwood Mineral Thicket Swamp (SWT2-9)
Inclusion Ranking	G5, S3S4

Polygon 13 – Scotch Pine Coniferous Plantation (CUP3-3)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Coniferous Plantation
Ranking	None

Polygon 14 – Cultural Savanna (CUS)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Mid-Age Savanna
Ranking	None

Polygon 15 – Dry – Fresh White Ash Deciduous Forest (FOD4-2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Mid-Age Forest
Ranking	G?, S5

Polygon 16 – Dry – Fresh Sugar Maple Deciduous Forest (FOD5-1)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Mature Forest
Ranking	G5?, S5
Complexes and Inclusions	
Inclusion	Bedrock Cultural Thicket (CUT2)
Inclusion Ranking	None

Polygon 17 – Treed Alvar Ecosite (ALT1)

Polygon Description	**Environmental Characteristic**
Topographic Features	Alvar
Community	Mid-Age Savanna
Ranking	None

Polygon 18 – Dry – Fresh Sugar Maple – Ironwood Deciduous Forest (FOD5-4)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Mid-Age Forest
Ranking	G?, S5
Complexes and Inclusions	
Inclusion	Dry – Fresh White Pine – Sugar Maple Mixed Forest (FOM2-2)
Inclusion Ranking	G?, S5
Inclusion	Coniferous Plantation (CUP3)
Inclusion Ranking	None

Polygon 19 – Red Pine Coniferous Plantation (CUP3-1)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Coniferous Plantation
Ranking	None
Complexes and Inclusions	
Inclusion	Coniferous Plantation (CUP3)
Inclusion Ranking	None

Polygon 20 – Coniferous Plantation (CUP3)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Coniferous Plantation
Ranking	None

Polygon 21 – Green Ash Mineral Deciduous Swamp (SWD2-2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Swamp
Ranking	G?, S5
Complexes and Inclusions	
Inclusion	Bedrock Cultural Woodland (CUM2)
Inclusion Ranking	None
Complex	Forb Mineral Meadow Marsh (MAM2-10)
Complex Ranking	None

Polygon 22 – Fresh – Moist Sugar Maple Deciduous Forest (FOD6)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Mid-Age Forest
Ranking	None
Complexes and Inclusions	
Inclusion	Bur Oak Mineral Deciduous Swamp (SWD1)
Inclusion Ranking	G2G3Q, S3

Polygon 23 – Mineral Meadow Marsh (MAM2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Graminoid Marsh
Ranking	None
Complexes and Inclusions	
Inclusion	Ash Mineral Deciduous Swamp (SWD2)
Inclusion Ranking	None

Polygon 24 – Dry – Fresh Deciduous Forest (FOD4)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Mid-Age Forest
Ranking	None
Complexes and Inclusions	
Inclusion	Forest (FO)
Inclusion Ranking	None

Polygon 25 – Bedrock Cultural Thicket (CUT2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Young Thicket
Ranking	None

Polygon 26 – Fresh – Moist Lowland Deciduous Forest (FOD7)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Young Forest
Ranking	None
Complexes and Inclusions	
Inclusion	Mixed Forest (FOM)
Inclusion Rank	None

Polygon 27 – Bedrock Cultural Thicket (CUT2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Young Thicket
Ranking	None

Polygon 28 – Bedrock Cultural Meadow (CUM2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Young Forb Meadow
Ranking	None

Polygon 29 – Bedrock Cultural Thicket (CUT2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Young Thicket
Ranking	None

Polygon 30 – Bedrock Cultural Thicket (CUT2)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Young Thicket
Ranking	None

Polygon 31 – Dry – Fresh Sugar Maple – White Ash Deciduous Forest (FOD5-8)

Polygon Description	**Environmental Characteristic**
Topographic Features	Rolling Upland
Community	Mid-Age Forest
Ranking	G?, S5

PLANT COMMUNITIES[459]

Summary

A considerable portion of the study area consists of conifer plantations, including an area being intensively managed as a private Christmas tree farm. Remnant and successional communities, including wetland and terrestrial systems, are interspersed within the plantations. Much of the site is returning to a more natural condition after being severely disturbed, generally by clearing for agricultural crops and/or pasture. The marsh, open alvar, and treed alvar communities present at this site are considered locally significant communities as they represent community types which are uncommon in the Hamilton area. Alvar and/or savannah communities may be more extensive than the few blocks indicated by the available community mapping. Moreover, additional surveys of potential remnant alvar and prairie/savannah areas in the City of Hamilton are needed to fully evaluate the relative significance of these unusual habitats.

Community Description

AQUATIC
POND
WETLAND
MARSH
WET MEADOW
BROADLEAF SWAMP

TERRESTRIAL
MIXED UPLAND WOODS
Sugar Maple – White Pine – Ironwood – Bur Oak – Shagbark Hickory / Mesic to Dry-Mesic.
BROADLEAF UPLAND WOODS
Red Oak – Sugar Maple – White Ash / Mesic.
Many limestone outcrops. Young to medium-aged stand.
Ironwood – Black Ash – Sugar Maple – White Pine / Mesic.
Bur Oak – Basswood – Sugar Maple – White Ash / Mesic.
TREED ALVAR
White Ash – White Elm – White Pine / Mesic to Dry Mesic.
Shallow sandy soils. Many patches of limestone pavement and outcrops. Dense shrub layer dominated by Prickly-ash, Choke Cherry and Downy Arrow-wood.
OPEN ALVAR
Widely-spaced Chinquapin Oak, Basswood, Trembling Aspen, Hop-hornbeam, Shagbark Hickory, Bur Oak, Black Maple, and Rock Elm. Shrub layer dominated by Prickly-ash with Gray Dogwood, Choke Cherry and Red Raspberry.
CONIFEROUS PLANTATION
Several tracts composed mainly of White Spruce and Scots, Red and White Pine. Other species planted include: Jack Pine, European Larch, Tamarack, Norway Spruce, Black Spruce, Eastern White Cedar.
OLD FIELD
MAINTAINED
Pipeline right-of-way.

FLORA AND FAUNA SUMMARY

Vascular Plants

Nature Counts surveyors recorded 199 species. Of these, 49 (25%) are introduced species[1001]. A total of 286 species were documented from 1977 to 1998[26, 432, 479, 996, 1000].

Floristic Summary[719]

The floristic summary includes data collected from the first and second NAI's, and data collect during ELC in 2004.

FLORISTIC SUMMARY & ASSESSMENT						
	1993		**2003**		**2004**	
Species Diversity						
Total Species	182		199		238	
Native Species	129	71%	150	75%	168	71%
Exotic Species	53	29%	49	25%	70	29%
Provincially Significant Species						
S1 - S3 Species	2	2%	0	0%	2	1%
S4 Species	12	10%	15	10%	12	7%
S5 Species	112	89%	131	90%	149	91%
Co-efficient of Conservatism and Floristic Quality Index						
Co-efficient of Conservatism (CC) (average)	4.5		4.2		4.3	
CC 0 to 3	37	30%	49	34%	59	36%
CC 4 to 6	65	52%	81	55%	77	47%
CC 7 to 8	19	15%	14	10%	23	39%
CC 9 to 10	3	2%	2	1%	4	2%
Floristic Quality Index (FQI)	50		51		55	
Presence of Weedy & Invasive Species						
mean weediness	-1.6		-1.8		-1.8	
weediness = -1	23	56%	16	41%	20	37%
weediness = -2	13	32%	15	38%	23	43%
weediness = -3	5	12%	8	21%	11	20%
Presence of Wetland Species						
average wetness value	1.3		1.3		1.1	
upland	46	28%	56	29%	65	29%
facultative upland	45	27%	55	28%	59	26%
facultative	32	19%	30	15%	34	15%
facultative wetland	28	17%	36	19%	45	20%
obligate wetland	16	10%	17	9%	23	10%

Butterflies

In 2001 and 2002, Nature Counts surveyors recorded a total of 20 species[1001]. During the 1991 NAI, 52 species were documented including a COSEWIC Special Concern species[998, 1000].

Odonates

No odonates data are available for this natural area.

Fish

No fisheries data are available for this natural area.

Herpetofauna

This natural area was surveyed during the Hamilton Herpetofaunal Atlas. A total of 20 species were recorded in this area from 1984 to 1996 including three COSEWIC Special Concern species and one COSEWIC Threatened species [999, 1000, 388]. Nature Counts surveyors recorded four incidental sightings of species, one of which is a new record for the area[1000].

Breeding Birds

This natural area provides habitat to many significant species including those that may require interior forest habitat. Publicly owned sections of this area are frequented by bird-watchers and many breeding bird surveys have been conducted here. Nature Counts surveyors recorded 35 species in 2001 and 2002. Of these, 10 are interior forest species. Previous to 2001, a total of 83 species were observed at this area including 18 significant species[83, 334, 393, 500, 997, 1000].

Mammals

The Nature Counts project conducted trapping in August of 2002. Nine common species were recorded[1001]. A total of 18 species were documented in 1977 and 1991[26, 1000].

SIGNIFICANT SPECIES

Species (Year Found)	SARA	ESA	SRank	City of Hamilton
Vascular Plants				
Butternut, *Juglans cinerea* (2004)[1004]	END	END	S3?	
Cranesbill, *Geranium bicknellii* (1993)[479]			S4	Rare
Fragrant Sumac, *Rhus aromatica* (1977, 1991, 1998, 2001, 2004)[26, 432, 1000, 1001, 1004]			S5	Rare
Grooved Yellow Flax, *Linum sulcatum* (1991)[1000]			S3	Rare
Handsome Sedge, *Carex formosa* (1993, 2001)[479, 1001]			S3S4	Rare
Large Canadian St. John's-wort, *Hypericum majus* (1990)[996]			S5	Rare
Marsh Horsetail, *Equisetum palustre* (2004)[1004]			S5	Rare
Marsh Rush, *Juncus canadensis* (2004)[1004]			S5	Rare
Pale Sedge, *Carex pallescens* (1993, 2001)[479, 1001]			S5	Rare
Red Mulberry, *Morus rubra* (2004)[1004]	END	END	S2	Rare
Sedge, *Carex gracilescens* (1993)[479]			S3	Rare
Smooth Ground-cherry, *Physalis subglabrata* (1991)[1000]				Rare
Thin-leaved Sunflower, *Helianthus decapetalus* (1991, 2001)[1000, 1001]			S5	Rare
Butterflies				
Black Dash, *Euphyes conspicua* (1990, 1991, 2002)[998, 1000, 1001]			S3	Common
Aphrodite Fritillary, *Speyeria aphrodite* (1990, 1991)[998, 1000]			S5	Rare
Eastern Pine-Elfin, *Incisalia niphon* (1991)[998]			S5	Rare
Monarch, *Danaus plexippus* (1989, 1990, 1991, 2004)[998, 1000, 1004]	SC	SC	S2N, S4B	

Species (Year Found)	SARA	ESA	SRank	City of Hamilton
White Admiral, *Basilarchia arthemis arthemis* (1991)[998, 1000]			S5	Rare
Herpetofauna				
Blanding's Turtle, *Emydoidea blandingii* (1996)[388]	THR	THR	S3	Rare
Blue-spotted Salamander, *Ambystoma laterale* (1990)[999]			S4	Rare
Eastern Milk Snake, *Lampropeltis triangulum triangulum* (1986, 1990, 1991)[999]	SC		S4	
Redbelly Snake, *Storeria occipitomaculata occipitomaculata* (1987)[999]			S5	Rare
Eastern Ribbonsnake, *Thamnophis sauritus* (1987)[999]	SC	SC	S3	Rare
Smooth Green Snake, *Opheodrys vernalis* (1987, 1990)[999]			S4	Rare
Snapping Turtle, *Chelydra serpentine* (1986, 1988)[999]	SC	SC	S5	
Breeding Birds				
American Bittern, *Botaurus lentiginosus* (1990, 1994)[83, 393]			S4	Rare
Blue-headed Vireo, *Vireo solitarius* (1992)[393]			S5	Rare
Bobolink, *Dolichonyx oryzivorus* (1991)[1000]	THR	THR	S4B	
Broad-winged Hawk, *Buteo platypterus* (1990, 1993, 2002)[83, 393, 1001]			S5	Rare
Carolina Wren, *Thryothorus ludovicianus* (1993)[393]			S4	Rare
Clay-colored Sparrow, *Spizella pallida* (1991, 1992, 1993, 1994, 1995, 1996)[393, 1000]			S4	Rare
Cooper's Hawk, *Accipiter cooperii* (1987, 1991, 1994, 1995)[393, 500, 997]	NAR	NAR	S4B	Rare
Eastern Meadowlark, *Sturnella magna* (1991, 2002)[1000, 583, 1001]	THR	THR	S5B	
Eastern Wood-pewee, *Contopus virens* (1991, 2002, 2004)[1000, 583, 1001, 1004]	SC		S5B	
Golden-crowned Kinglet, *Regulus satrapa* (1990, 1991, 1992, 1993, 1994)[83, 393, 1000]			S5	Rare
Golden-winged Warbler, *Vermivora chrysoptera* (1990, 1991)[83, 1000]	THR	SC	S4B	Rare
Long-eared Owl, *Asio otus* (1993)[393]			S4	Rare
Louisiana Waterthrush, *Seiurus motacilla* (1994)[393]	SC	SC	S3	Rare
Magnolia Warbler, *Dendroica magnolia* (1990)[83]			S5	Rare
Northern Harrier, *Circus cyaneus* (1991)[1000]	NAR		S4	Rare
Prairie Warbler, *Dendroica discolor* (1990, 1992, 1993, 1994, 1995)[83, 334, 393, 500]	NAR	NAR	S3S4B, SZN	Rare
Red-shouldered Hawk, *Buteo lineatus* (1990, 1991)[83, 1000]	SC	SC	S4	Rare
Sharp-shinned Hawk, *Accipiter striatus* (1993, 1995, 2002)[393, 1001]	NAR	NAR	S5	Rare
Upland Sandpiper, *Bartramia longicauda* (1990, 1991)[83, 1000]			S4	Rare
Whip-poor-will, *Caprimulgus vociferus* (1990, 1992, 1993, 1994, 1996)[83, 393]	THR	THR	S4B	Rare
Wood Thrush, *Hylocichla mustelina* (1990, 1991)[83, 1000]				
Yellow-billed Cuckoo, *Coccyzus americanus* (2002)[1001]			S4	Rare
Yellow-rumped Warbler, *Dendroica coronata* (1990, 1992, 1993, 1994, 1995)[83, 393]			S5	Rare

COVER

This section identifies habitat types available as per the most recent ELC surveys.

The following table illustrates forest coverage as a percent and in area (hectares). 100 meter and 200 meter interior forest habitat is available.

Forest Cover		
Total Forested Area	**100m Interior**	**200m Interior**
48.27% *(353.50ha)*	13.70% *(100.33ha)*	2.97% *(21.75ha)*

Other significant habitats comprise the Hyde-Rocktown-Beverly Complex ESA. The following table illustrates other habitats available in this Natural Area:

Grasslands	Thickets	Wetlands	Aquatic
1.88% *(13.74ha)*	3.45% *(25.27ha)*	6.25% *(47.78ha)*	0.00% *(0ha)*

LAND USE AND LINKAGES

Present Land Use

The Hyde – Rockton – Beverly Complex is situated north of Highway 8 in west-central Flamborough. This natural area includes diverse land uses including many plantations, a private Christmas tree farm, public lands used for hunting and passive recreational uses, and contiguous wetlands and successional habitats. Two gas pipelines run through the complex in an east-west direction: one through the most northerly section of the complex, the other through the centre of the site[459].

Adjoining lands are predominantly used for row crops and livestock but include recreational and residential areas. The Rockton airfield lies to the west. The Westfield Heritage Village and rural residential sites adjoin the eastern site boundary along Kirkwall Road[459].

Linkages with Other Natural Areas

Several natural areas lie in close proximity to the Hyde – Rockton – Beverly Complex. Nearby study areas, most of which are at least weakly linked to this core area, include the Savage Tract (FLAM-95), Kirkwall Southwest (FLAM-88), Rockton Airfield West (FLAM-89), Rockton Airfield South (FLAM-91), Lynden Road & 5th Concession (FLAM-87), Patterson Tract (FLAM-86), Rockton North (FLAM-93), Westover Lowland Forest (FLAM-25), and Valens Road Woodlot (FLAM-96)[459].

RECOMMENDATIONS

1. The area should be protected from development or other impacts.
2. The continuity of the entire study area and the existing linkages to peripheral natural areas should be maintained.
3. Additional field work should focus on monitoring significant species populations and include ELC surveys, especially in the alvar/savannah areas.

WATERSHED PLANS

None

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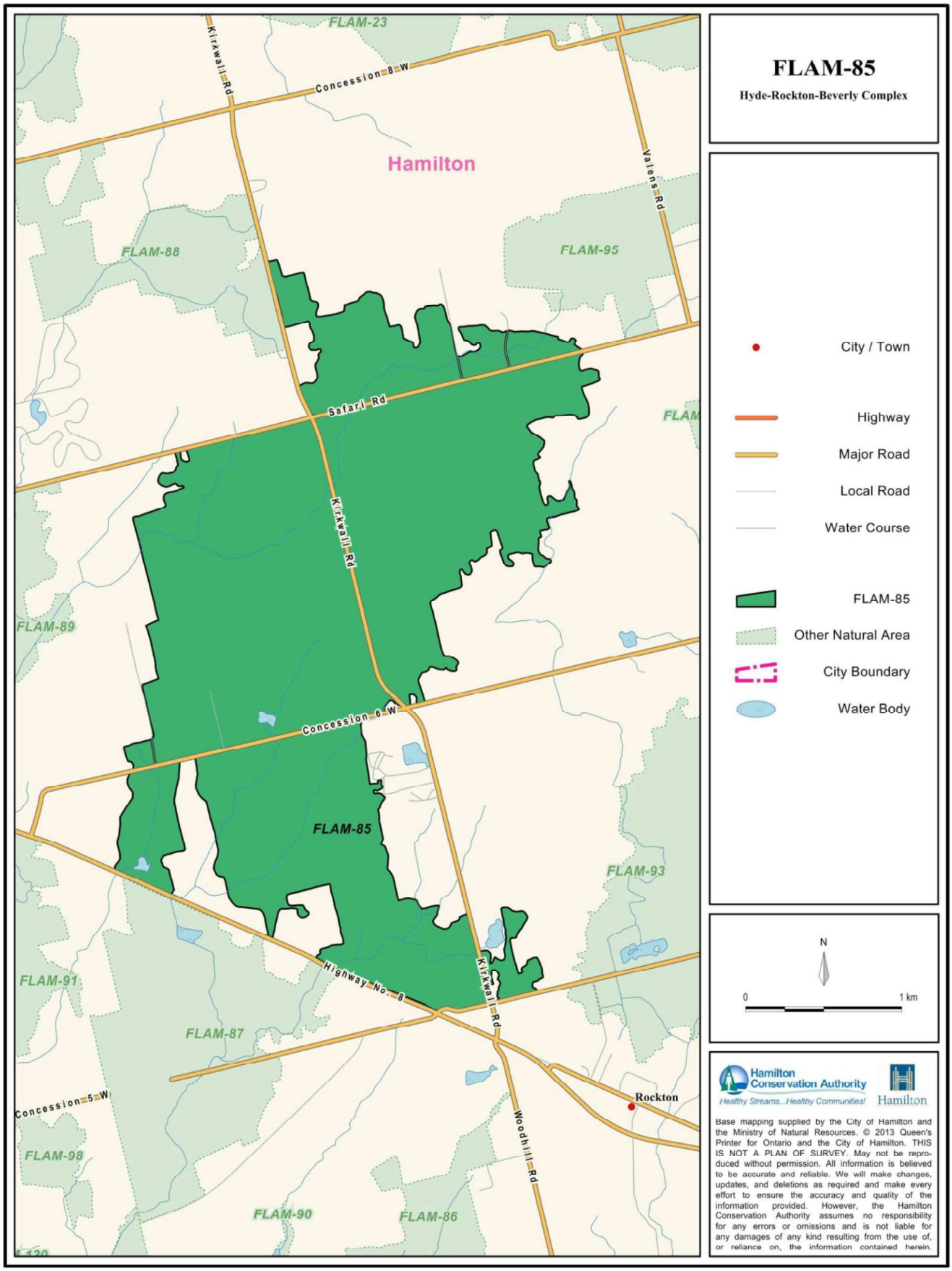
SITE VISITS

Date	Duration	Purpose	Observers
03-June-1990	1.0 h	Birds	R. Dobos
07-June-1990	2.8 h	Birds	L. Burr
19-June-1990	3.5 h	Birds	L. Burr, B. Smith
31-July-1990	3.5 h	Birds	L. Burr
23-April-1991	4.3 h	Biological	A. Wormington
03-May-1991	4.5 h	Flora	D. Bradley
08-May-1991	1.0 h	Birds	A. Wormington, B. Lamond

14-May-1991	3.5 h	Biological	A. Wormington
27-May-1991	0.5 h	Butterflies	B. Lamond
7-June-1991	1.3 h	Birds	B. Lamond
13-June-1991	0.5 h	Butterflies	B. Lamond
21-June-1991	3.5 h	Biological	A. Wormington
28-June-1991	3.3 h	Biological	A. Wormington
18-July-1991	2.0 h	Butterflies	A. Wormington, B. Lamond
19-July-1991	4.0 h	Flora	D. Bradley, C. Salole
20-July-1991	2.0 h	Butterflies	A. Wormington
06-Aug-1991	2.0 h	Flora	B. Lamond
12-Aug-1991	1.0 h	Butterflies	B. Lamond
11-Sept-1991	4.0 h	Butterflies	B. Lamond
July-1991	Small mammal trapping; 2 lines, 225 trap-nights.		
26-June-2000	5.0 h	Fauna	B. Curry
23-April-2001	0.5 h	Fauna	B. Curry
05-May-2001		Flora	A. Goodban
06-June-2001		Flora	A. Goodban
05-July-2001	0.5 h	Fauna	A. Wormington
05-Sept-2001		Flora	A. Goodban
23-July-2002	2.0 h	Fauna	B. Curry
Aug-2002	5 days/ nights	Sm. Mammal Trapping	S. Hall, S. Irazuzta
22-July-2004	1.75 h	ELC	KM, AW, SP, GW
23-July-2004	3.5 h	ELC	GW, SP
26-July-2004	1 h	ELC	GW, SP, AW
27-July-2004	1.5 h	ELC	KM, SP
29-July-2004	4 h	ELC	KM, AW, SP, GW
30-July-2004	1 h	ELC	KM, SP, GW
03-Aug-2004	0.5 h	ELC	KM, SP, AW, GW
04-Aug-2004	0.5 h	E:C	KM, SP, GW
5-Aug-2004	1.25 h	ELC	KM, GW, SP, GW
16-Aug-2004	5 h	ELC	KM, GW, AG
17-Aug-2004	1 h	ELC	GW, AW, KM, SP

Hydy-Rockton-Beverly Complex (FLAM-85) Overview Map.



eBird Field Checklist

Westover--Safari Road--Marsh

Hamilton, Ontario, CA

ebird.org/hotspot/L1517826

137 species (+18 other taxa) - Year-round, All years

Date: _____
Start time: _____
Duration: _____
Distance: _____
Party size: _____
Notes:

This checklist is generated with data from eBird (ebird.org), a global database of bird sightings from birders like you. If you enjoy this checklist, please consider contributing your sightings to eBird. It is 100% free to take part, and your observations will help support birders, researchers, and conservationists worldwide.

Go to ebird.org to learn more!

Waterfowl

___Canada Goose *Branta canadensis*
___Mute Swan *Cygnus olor*
___Trumpeter Swan *Cygnus buccinator*
___swan sp. *Cygnus sp.*
___Wood Duck *Aix sponsa*
___Blue-winged Teal *Spatula discors*
___Gadwall *Mareca strepera*
___Mallard *Anas platyrhynchos*
___Green-winged Teal *Anas crecca*
___Long-tailed Duck *Clangula hyemalis*
___Hooded Merganser *Lophodytes cucullatus*
___duck sp. *Anatidae (duck sp.)*

Grouse, Quail, and Allies

___Wild Turkey *Meleagris gallopavo*
___Ruffed Grouse *Bonasa umbellus*

Grebes

___Pied-billed Grebe *Podilymbus podiceps*

Pigeons and Doves

___Rock Pigeon *Columba livia*
___Mourning Dove *Zenaida macroura*

Cuckoos

___Yellow-billed Cuckoo *Coccyzus americanus*
___Black-billed Cuckoo *Coccyzus erythropthalmus*
___Yellow-billed/Black-billed Cuckoo *Coccyzus americanus/erythropthalmus*

Nightjars

___Common Nighthawk *Chordeiles minor*

Swifts

___Chimney Swift *Chaetura pelagica*

Hummingbirds

___Ruby-throated Hummingbird *Archilochus colubris*

Rails, Gallinules, and Allies

___Virginia Rail *Rallus limicola*
___Sora *Porzana carolina*
___Common Gallinule *Gallinula galeata*
___American Coot *Fulica americana*
___rail/crake sp. *Rallidae sp. (rail/crake sp.)*

Cranes

___Sandhill Crane *Antigone canadensis*

Shorebirds

___Killdeer *Charadrius vociferus*
___American Woodcock *Scolopax minor*
___Wilson's Snipe *Gallinago delicata*
___Spotted Sandpiper *Actitis macularius*
___Solitary Sandpiper *Tringa solitaria*
___Greater Yellowlegs *Tringa melanoleuca*
___Lesser Yellowlegs *Tringa flavipes*
___shorebird sp. *Charadriiformes sp.*

Gulls, Terns, and Skimmers

___Ring-billed Gull *Larus delawarensis*
___Herring Gull *Larus argentatus*
___gull sp. *Larinae sp.*
___Caspian Tern *Hydroprogne caspia*

Cormorants and Anhingas

___Double-crested Cormorant *Nannopterum auritum*

Herons, Ibis, and Allies

___American Bittern *Botaurus lentiginosus*
___Least Bittern *Ixobrychus exilis*
___Great Blue Heron *Ardea herodias*

___Great Egret *Ardea alba*
___Green Heron *Butorides virescens*

Vultures, Hawks, and Allies

___Turkey Vulture *Cathartes aura*
___Osprey *Pandion haliaetus*
___Northern Harrier *Circus hudsonius*
___Sharp-shinned Hawk *Accipiter striatus*
___Cooper's Hawk *Accipiter cooperii*
___Bald Eagle *Haliaeetus leucocephalus*
___Broad-winged Hawk *Buteo platypterus*
___Red-tailed Hawk *Buteo jamaicensis*
___Buteo sp. *Buteo sp.*

Owls

___Great Horned Owl *Bubo virginianus*

Kingfishers

___Belted Kingfisher *Megaceryle alcyon*

Woodpeckers

___Red-headed Woodpecker *Melanerpes erythrocephalus*
___Red-bellied Woodpecker *Melanerpes carolinus*
___Downy Woodpecker *Dryobates pubescens*
___Hairy Woodpecker *Dryobates villosus*
___Downy/Hairy Woodpecker *Dryobates pubescens/villosus*
___Pileated Woodpecker *Dryocopus pileatus*
___Northern Flicker *Colaptes auratus*
___woodpecker sp. *Picidae sp.*

Falcons and Caracaras

___American Kestrel *Falco sparverius*

Tyrant Flycatchers: Pewees, Kingbirds, and Allies

___Eastern Wood-Pewee *Contopus virens*
___Alder Flycatcher *Empidonax alnorum*
___Willow Flycatcher *Empidonax traillii*
___Alder/Willow Flycatcher (Traill's Flycatcher) *Empidonax alnorum/traillii*
___Least Flycatcher *Empidonax minimus*
___Empidonax sp. *Empidonax sp.*
___Eastern Phoebe *Sayornis phoebe*
___Great Crested Flycatcher *Myiarchus crinitus*
___Eastern Kingbird *Tyrannus tyrannus*
___new world flycatcher sp. *Tyrannidae sp.*

Vireos

___Yellow-throated Vireo *Vireo flavifrons*
___Warbling Vireo *Vireo gilvus*
___Red-eyed Vireo *Vireo olivaceus*

Shrikes

___Northern Shrike *Lanius borealis*

Jays, Magpies, Crows, and Ravens

___Blue Jay *Cyanocitta cristata*
___American Crow *Corvus brachyrhynchos*
___Common Raven *Corvus corax*

Tits, Chickadees, and Titmice

___Black-capped Chickadee *Poecile atricapillus*

Martins and Swallows

___Northern Rough-winged Swallow *Stelgidopteryx serripennis*
___Purple Martin *Progne subis*
___Tree Swallow *Tachycineta bicolor*
___Bank Swallow *Riparia riparia*
___Barn Swallow *Hirundo rustica*
___swallow sp. *Hirundinidae sp.*

Kinglets

___Ruby-crowned Kinglet *Corthylio calendula*
___Golden-crowned Kinglet *Regulus satrapa*

Nuthatches

___Red-breasted Nuthatch *Sitta canadensis*
___White-breasted Nuthatch *Sitta carolinensis*
___nuthatch sp. *Sitta sp.*

Treecreepers

___Brown Creeper *Certhia americana*

Gnatcatchers

___Blue-gray Gnatcatcher *Polioptila caerulea*

Wrens

___House Wren *Troglodytes aedon*
___Marsh Wren *Cistothorus palustris*
___Carolina Wren *Thryothorus ludovicianus*

Starlings and Mynas

___European Starling *Sturnus vulgaris*

Catbirds, Mockingbirds, and Thrashers

___Gray Catbird *Dumetella carolinensis*
___Brown Thrasher *Toxostoma rufum*

Thrushes

___Eastern Bluebird *Sialia sialis*
___Veery *Catharus fuscescens*
___Swainson's Thrush *Catharus ustulatus*
___Wood Thrush *Hylocichla mustelina*
___American Robin *Turdus migratorius*

Waxwings

___Cedar Waxwing *Bombycilla cedrorum*

Old World Sparrows

___House Sparrow *Passer domesticus*

Finches, Euphonias, and Allies

___House Finch *Haemorhous mexicanus*
___Purple Finch *Haemorhous purpureus*

This field checklist was generated using eBird (ebird.org)

___Pine Siskin *Spinus pinus*
___American Goldfinch *Spinus tristis*
___finch sp. *Fringillidae sp.*

New World Sparrows

___Grasshopper Sparrow *Ammodramus savannarum*
___Chipping Sparrow *Spizella passerina*
___Field Sparrow *Spizella pusilla*
___American Tree Sparrow *Spizelloides arborea*
___Dark-eyed Junco *Junco hyemalis*
___White-throated Sparrow *Zonotrichia albicollis*
___Vesper Sparrow *Pooecetes gramineus*
___Savannah Sparrow *Passerculus sandwichensis*
___Song Sparrow *Melospiza melodia*
___Swamp Sparrow *Melospiza georgiana*
___Eastern Towhee *Pipilo erythrophthalmus*

Blackbirds

___Bobolink *Dolichonyx oryzivorus*
___Eastern Meadowlark *Sturnella magna*
___Baltimore Oriole *Icterus galbula*
___Red-winged Blackbird *Agelaius phoeniceus*
___Brown-headed Cowbird *Molothrus ater*
___Rusty Blackbird *Euphagus carolinus*
___Common Grackle *Quiscalus quiscula*
___blackbird sp. *Icteridae sp.*

Wood-Warblers

___Ovenbird *Seiurus aurocapilla*
___Blue-winged Warbler *Vermivora cyanoptera*
___Black-and-white Warbler *Mniotilta varia*
___Tennessee Warbler *Leiothlypis peregrina*
___Common Yellowthroat *Geothlypis trichas*
___American Redstart *Setophaga ruticilla*
___Northern Parula *Setophaga americana*
___Yellow Warbler *Setophaga petechia*
___Chestnut-sided Warbler *Setophaga pensylvanica*
___Blackpoll Warbler *Setophaga striata*
___Palm Warbler *Setophaga palmarum*
___Pine Warbler *Setophaga pinus*
___Yellow-rumped Warbler *Setophaga coronata*
___Black-throated Green Warbler *Setophaga virens*

Cardinals, Grosbeaks, and Allies

___Scarlet Tanager *Piranga olivacea*
___Northern Cardinal *Cardinalis cardinalis*
___Rose-breasted Grosbeak *Pheucticus ludovicianus*
___Indigo Bunting *Passerina cyanea*

Others

___passerine sp. *Passeriformes sp.*
___bird sp. *Aves sp.*

This field checklist was generated using eBird (ebird.org)

Appendix C

Costing Analysis

- Solution 3a

PRELIMINARY COST ESTIMATE
SOLUTION 3A
SAFARI ROAD MUNICIPAL DRAIN
(PRELIMINARY ENGINEER'S REPORT)

Robinson Consultants

Project No: B22048
Date: 23-Jun-23

Type	Item No.	Item	Unit	Cost/Unit	Quantity	Total
Construction						
Construction	**Site Preparation Activities**					
		Mobilization (maximum 2% of total consturction cost)	LS	$ 1,200.00	1.00	$ 1,200.00
		Erosion and Sediment Control Plan	LS	$ 1,500.00	1.00	$ 1,500.00
		- Straw BaleDam c/w Sediment Trap	each	$ 300.00	4.00	$ 1,200.00
		- Silt Fence	m	$ 7.50	600.00	$ 4,500.00
		Vegitation Management Coridor (5m wide)	m	$ 15.50	2048.00	$ 31,744.00
		Beaver Dam Removal	each	$ 1,500.00	3.00	$ 4,500.00
		Fence removal and reinstatement	m	$ 30.00	100.00	$ 3,000.00
	Excavation Activities					
		Earth Ex. - Ditch (full construction) - Incl. Spreading (at culverts only)	m^3	$ 22.50	200.00	$ 4,500.00
		Rock Excvation (hydraulic ram)	m^3	$ 150.00	0.00	$ -
	Reinstatement Activities					
		Tile Outlet Restoration/Protection	each	$ 500.00	0.00	$ -
		Hand Seeding	m^2	$ 1.50	400.00	$ 600.00
		1000mm dia CSP Culvert (incl. bedding, backfill and surface treatment)	m	$ 700.00	30.00	$ 21,000.00
		Existing Culverts -- Remove and Dispose	each	$ 500.00	2.00	$ 1,000.00
		Rock Protection - Erosion Control	m^2	$ 27.50	0.00	$ -
		Rock Protection - Culvert End Treatments	each	$ 825.00	10.00	$ 8,250.00
		Sub-Total - Construction Costs				**$ 74,744.00**
		Contingency Allowance - Construction				**$ 6,000.00**
		Total - Construction Costs				**$ 80,744.00**
Engineering/Administration						
Engineering & Administration		Preliminary Engineer's Report	LS	$ 37,230.00	1.00	$ 37,230.00
		Engineer's Report (apportioned by Section)	LS	$ 53,860.00	1.00	$ 53,860.00
		Contract Administration/Inspection	LS	$ 22,000.00	1.00	$ 22,000.00
		Sub-Total - Routine Engineering				**$ 113,090.00**
Total - Engineering/Administration						**$ 113,090.00**
Other						
		Allowances	LS	Not Anticipated		$ -
		Net HST (1.76% of All Above Noted Costs)	%	$ 193,834.00	1.76%	$ 3,411.48
Total - Other Costs						**$ 3,411.48**
Sub-Total - Net Costs						**$ 197,245.48**