



AGENDA
SPECIAL MEETING OF MUNICIPAL COUNCIL

Monday, May 8, 2023, 6:00 PM
South Edwardsburgh Community Centre
24 Sutton Dr.
Johnstown Ontario

- 1. Call to Order**
- 2. Approval of Agenda**
- 3. Disclosure of Pecuniary Interest & the General Nature Thereof**
- 4. Action and Information Items from Committees**
 - a. Johnstown Tennis Court Resurfacing Tender Award - EC-REC-23-03
 - b. Declare Significant Event - Eastern Ontario Firefighters Association Convention
- 5. By-laws**
 - a. Site Plan Control Agreement - HB Holdings Inc - 3209 County Rd 2
- 6. Question Period**
- 7. Confirmation By-law**
- 8. Adjournment**



TOWNSHIP OF EDWARDSBURGH CARDINAL ACTION ITEM

Committee: Special Council Meeting

Date: May 8, 2023

Department: Recreation & Facilities

Topic: Johnstown Tennis Court Resurfacing – Tender EC-REC-23-03

Purpose: To award Tender EC-REC-23-03 to Provincial Paving

Background: A request for tender to supply the Township with prepping the existing surface, crack sealing, leveling and bonding coat and placing a final 50mm lift of HL2 asphalt was issued on April 12, 2023 for the Johnstown tennis court. The tender closed on May 2nd with one submission.

Policy Implications: By-law 2015-57 establishes policies with respect to the procurement of goods and services. It states that all expenditures shall be within the current approved budget or within approved estimates, prior approval of Council is required. In addition, expenditures above \$ 50,000 require approval of Council.

Financial Considerations: The 2023 Recreation Capital Budget included an upset limit of \$226,000.00 for the rehabilitation of the Johnstown tennis courts. The court resurfacing is a component of the overall project and is within estimates. Replacement of fencing, court surface painting and layout are additional components of the overall project.

Recommendation: That Municipal Council award the Johnstown Tennis Court Resurfacing tender EC-REC-23-03, to Provincial Paving in the amount of \$ 71,500 dollars plus non rebated HST and authorize staff to execute any necessary contract documents.

A stylized, handwritten signature in black ink.

Facilities Manager

A stylized, handwritten signature in black ink.

CAO



TOWNSHIP OF EDWARDSBURGH CARDINAL ACTION ITEM

Committee: Special Council Meeting

Date: May 8, 2023

Department: Fire

Topic: Eastern Ontario Firefighters Association (EOFA) Convention

Purpose: To have Council designate the 111th annual Eastern Ontario Firefighters Association Convention an event of municipal significance.

Background: On June 16 & 17, 2023 Edwardsburgh Cardinal is hosting the 111th annual EOFA convention in Cardinal. As part of the event, a licensed community dance with live music is planned to take place on Saturday June 17 at the Ingredion Centre. In order to receive a special occasion permit (SOP) for a public event, it must be designated by municipal council as being an event of municipal significance.

Policy Implications:

By-Law 2013-43, A bylaw to adopt a municipal alcohol policy states the following:

In order to receive an SOP, Public Events which are not conducted by registered charity or non-profit organizations must be designated as an event of "municipal significance" by Council.

An SOP for a public event can be issued to:

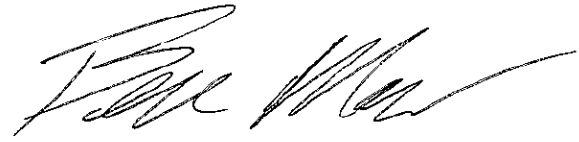
- A charity organization under the Income Tax Act (Canada)
- A non-profit organization or association organized to promote educational, charitable or community events. The entity is not required to be incorporated.

An individual or business may also apply for a public SOP if:

- The event has provincial, national or international significance
- The event has municipal significance (must have resolution from Council or letter)

Financial Considerations: None

Recommendation: That Municipal Council designate the 111th annual Eastern Ontario Firefighters Association convention, hosted by the Edwardsburgh Cardinal Fire Department, as an event of municipal significance.

A handwritten signature in black ink, appearing to read "Bob Man", written over a horizontal line.

Fire Chief

**CORPORATION OF THE
TOWNSHIP OF EDWARDSBURGH CARDINAL**

BY-LAW NO. 2023-

**“BEING A BY-LAW TO AUTHORIZE THE EXECUTION OF A SITE PLAN
CONTROL AGREEMENT WITH HB HOLDINGS INC.”**

WHEREAS the Council of the Corporation of the Township of Edwardsburgh Cardinal deems it advisable to enter into a Site Plan Control Agreement with HB Holdings Inc. respecting development of a property described as:

PT BLK C PL 63 PORT OF PRESCOTT PT 1, 2, 4 & 6, 15R8988, S/T & T/W
PR141625; S/T EG13527;
TOWNSHIP OF EDWARDSBURGH/CARDINAL
PIN: 68155-0648

WHEREAS Authority is granted under Section 41 of the Planning Act, RSO 1990, c.P. 13, as amended to the Council of the Corporation of the Township of Edwardsburgh Cardinal to enter into and amend such agreements; and

NOW THEREFORE BE IT RESOLVED THAT the Council of the Corporation of the Township of Edwardsburgh Cardinal enacts as follows:

1. That the Mayor and Clerk are hereby authorized to execute an agreement with HB Holdings Inc. and that a signed copy of said agreement is attached hereto as Schedule “A”.
2. That this by-law shall come into force and effect upon passing.

Read a first and second time in open Council this 8 day of May, 2023.

Read a third and final time, passed, signed and sealed in open Council this 8 day of May, 2023.

Mayor

Clerk

**THE CORPORATION OF THE
TOWNSHIP OF EDWARDSBURGH/CARDINAL
SITE PLAN CONTROL AGREEMENT**

THIS AGREEMENT made in triplicate this ____ day of _____, 2023

BETWEEN: HB Holdings Inc.

Hereinafter called the "Owner" of the first part

AND: THE CORPORATION OF THE TOWNSHIP OF EDWARDSBURGH/CARDINAL

Hereinafter called the "Township" of the second part

WHEREAS the Owner has applied to the Township in accordance with the Site Plan Control provisions of Bylaw No. 2002-31, to permit the development of the lands described in Schedule "A" attached hereto;

AND WHEREAS the Owner has agreed with the Township to undertake, furnish and perform the works, material, matter and things required to be done, furnished and performed in the manner hereafter described in connection with the proposed use of the land and in conformity with the Zoning Bylaw;

NOW THEREFORE THIS AGREEMENT WITNESSETH THAT in consideration of other good and valuable consideration and the sum of two dollars (\$2.00) of lawful money of Canada now paid by the Owner to the Municipality, the receipt of which is hereby acknowledged, the Parties hereby agree as follows:

1. Land to Which this Agreement Applies

This is an agreement made pursuant to the provisions of Section 41 of the Planning Act, RSO 1990. as amended, and applies to the lands described in Schedule "A" to this agreement.

2. Statutes, Bylaws, Licenses, Permits and Regulations

The Owner undertakes and agrees that prior to the commencement of any development, redevelopment, site alteration, construction or other works, the Owner shall obtain all necessary permits and approvals required by the Government of Canada, the Province of Ontario or any agency thereof, the Township and any other affected agency. The Owner undertakes and agrees to

comply with the requirements of all relevant municipal bylaws, provincial and federal statutes and regulations, permits, approvals or licenses in addition to the terms of this agreement.

3. Schedules

The Owner hereby agrees that prior written approval by the Township and/or an amendment to a Schedule shall be required for any departure, change or modification from the Schedules.

The following list of schedules attached hereto are deemed to be and form part of this Agreement:

3.1 Schedule "A" -Legal Description of the Land to which this Agreement applies.

3.2 Schedule "B" -Site Plans and Reports

3.3 Schedule "C" -Special Conditions

4. Registration of Agreement and Commencement of Work

The Owner covenants that he/she/they shall not commence any development or site alteration whatsoever until this Agreement is registered on title against the land at the expense of the Owner.

5. Completion Date

The owner agrees to complete the work required under this Agreement within one (1) year of the date of the commencement of works. Notwithstanding, if exceptional circumstances prevent the owner from complying with the requirements, the Township may extend the completion date.

6. Default

In the event the Owner defaults in the performance of an obligation under this agreement or for reasons of public safety as determined by the Chief Building Official under the Building Code Act of Ontario or the Fire Marshall under the Fire Protection & Prevention Act of Ontario, the Township may, at the expense of the Owner, enter upon the lands and do all such matters and things as may be required to comply with any Order of the Chief Building Official or Assistant to the Fire Marshall (local Fire Chief). Such actual costs incurred by the Township plus

**SITE PLAN CONTROL AGREEMENT
BETWEEN HB HOLDINGS INC. AND
THE TOWNSHIP OF EDWARDSBURGH CARDINAL**

an overhead charge of 15%, shall be deemed to be recoverable from the Owner by invoice and may be recovered in like manner as municipal taxes pursuant to the Municipal Act.

7. Facilities and Work to be Provided and Maintained

The Owner covenants and agrees to provide and maintain, at his/her/their sole expense each and every facility, work or other matter illustrated on the Schedules to the satisfaction of the Township, acting in a commercially reasonable manner, and to engage qualified professionals, where required, to design and carry forth any of the work undertaken under this Agreement. This shall include the restoration of any faulty workmanship or materials.

8. Certificate of Compliance

Upon the satisfactory completion of all matters and things to be provided and maintained by the Owner pursuant to this Agreement, the Owner shall be entitled to obtain a Certificate of Compliance from the Township confirming that all provisions of this Agreement have been complied with in full to the date of such Certificate.

9. Notice to Parties

Any Notice by any party to this agreement to another shall be given in writing and mailed or delivered to the Party:

9.1 In the case of the Municipality:

To the Clerk of the Township of Edwardsburgh/Cardinal
18 Centre Street
P.O. Box 129
Spencerville, ON KOE 1X0

9.2 In the case of the Owner(s):

HB Holdings Inc.
c/o Ibrahim Baydoun
28 Brady Rue
Gatineau QC J8Y 5L2

10. Severability

**SITE PLAN CONTROL AGREEMENT
BETWEEN HB HOLDINGS INC. AND
THE TOWNSHIP OF EDWARDSBURGH CARDINAL**

The terms of this agreement are severable, and the unenforceability of any part hereof shall not render the whole unenforceable. No forbearance or failure by the Township to strictly enforce any term or covenant herein shall prevent the Township from insisting upon strict compliance by the Owner subsequent to such forbearance or failure to strictly enforce its terms. The terms of this agreement may not be altered except by a subsequent agreement in writing between the parties.

11. Successors and Assigns

This Agreement shall ensure to the benefit of and be binding upon the respective heirs, personal representatives, successors and assigns of each of the parties hereto.

12. Force and Effect

This Agreement comes into force after it has been executed by all parties hereto and registered against the title to the lands described in Schedule "A".

IN WITNESS WHEREOF the Parties have hereunto set their hands and seals, corporate parties over the hand(s) of their duly authorized signing officers in that regard.

OWNER/AUTHORIZED AGENT

Owner

I have the authority to bind the corporation.

CORPORATION OF THE TOWNSHIP OF
EDWARDSBURGH/CARDINAL

Mayor

Clerk

We have the authority to bind the corporation.

**SITE PLAN CONTROL AGREEMENT
BETWEEN HB HOLDINGS INC. AND
THE TOWNSHIP OF EDWARDSBURGH CARDINAL**

SCHEDULE "A"

Site Plan Control Agreement

DESCRIPTION OF THE PROPERTY

PT BLK C PL 63 PORT OF PRESCOTT PT 1, 2, 4 & 6, 15R8988, S/T & T/W
PR141625; S/T EG13527; TOWNSHIP OF EDWARDSBURGH/CARDINAL

PIN: 68155-0648

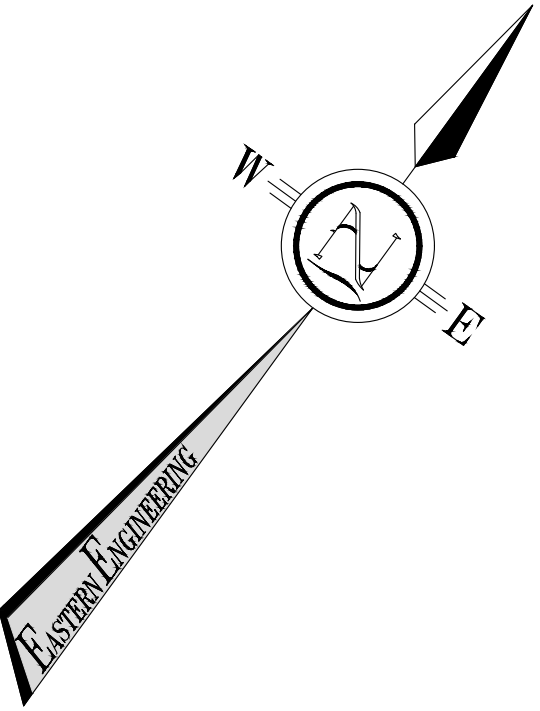
SCHEDULE “B”

Site Plan Control Agreement

SITE PLANS AND REPORTS

EXHIBITS: The following Exhibits attached hereto shall form part of this Schedule:

- | | |
|-----------|--|
| Exhibit 1 | C1 – Existing Conditions and Removals Plan
C2 – Septic and Grading Plan
C3 – Site Plan
C4 – Erosion and Sediment Control Plan |
| Exhibit 2 | Stormwater Management Report
by Eastern Engineering Group Inc., July 2021 |
| Exhibit 3 | Hydrogeological and Terrain Study
By Kollaard Associates Inc., March 17, 2023 |



BENCHMARK
FINISHED FLOOR AT NORTH ENTRANCE
TO BUILDING.100.18
ELEV. 100.18m (ASSUMED)

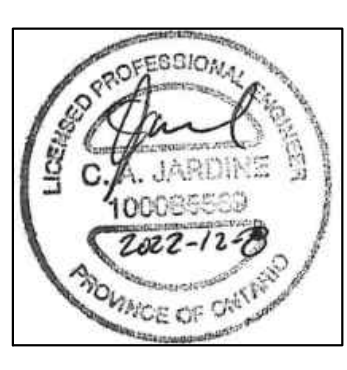
NOTE:
CONTRACTOR TO CONTACT UTILITY
COMPANIES TO DETERMINE TYPE,
LOCATION, AND CONFIGURATION OF
EXISTING PLANT.

5	CAJ	12/08/2022	TOWNSHIP COMMENTS
4	CAJ	9/20/2022	SNCA COMMENTS
3	CAJ	7/29/2022	TOWNSHIP COMMENTS
2	CAJ	5/16/2022	TOWNSHIP COMMENTS
1	CAJ	7/15/2021	TOWNSHIP COMMENTS
0	AJP	12/21/2020	FOR SITE PLAN REVIEW
No.	By	Date	Revisions

All drawings, specifications and related documents are the copyright property of the Engineer and must be returned upon request. Reproduction of drawings, specifications, and related documents in part or whole is forbidden without the Engineers' written permission.

The contractor must check and verify all dimensions on the job prior to start of construction.

Drawings are not to be scaled.



EASTERN
ENGINEERING GROUP INC.
CONSULTING ENGINEERS
Apex Building
207 - 100 Stouffer Blvd.
Brockville, Ont. K6V 5J9
Telephone: (613) 345-0400
Facsimile: (613) 345-0008
www.EastEng.com

Project Title:
**TERPENE
CONTRACTING
3209 COUNTY ROAD 2
JOHNSTOWN, ON**

Drawing Title:
**EXISTING CONDITIONS AND
REMOVALS PLAN**

Design:	CAJ	Checked:	.	Approved:	CAJ	Project No.:	9428
Drawn:	AJP	Checked:	.	Date:	2020/12/21	Contract No.:	.

Scale:
Horizontal: 200

Drawing No.: **C1**

File No.: 9428 C16 12-08-2022.dwg

GENERAL NOTES

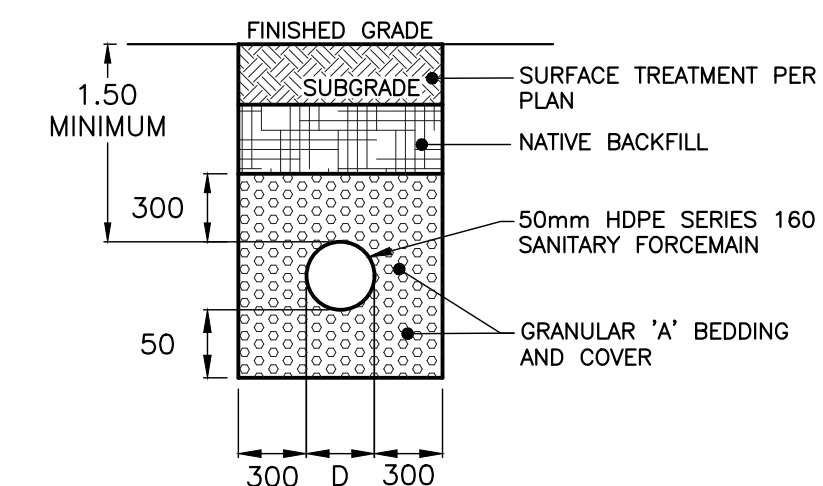
- CONTRACTOR TO VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.
- CONTRACTOR TO OBTAIN ALL NECESSARY PERMITS PRIOR TO START OF CONSTRUCTION.
- WELL TO BE MINIMUM 15m FROM SEPTIC BED.

SEPTIC DESIGN NOTES:

- ALL WORK SHALL CONFORM TO THE ONTARIO BUILDING CODE, LATEST EDITION.
- CONTRACTOR TO SUPPLY ALL MATERIAL, EQUIPMENT AND LABOR TO INSTALL.
- CONSTRUCT SWALES AROUND BED TO DIRECT RUNOFF FLOW AROUND BED.
- CONTRACTOR TO ARRANGE FOR UTILITY LOCATES PRIOR TO EXCAVATION.
- CONTRACTOR TO REINSTATE AND GRADE GRASS AREAS WITH 75mm SANDY LOAM, FERTILIZER AND SEED.
- GRADE SIDE SLOPES TO MAXIMUM SLOPE OF 4:1.
- ALL TANK OPENINGS TO HAVE PRE-MANUFACTURED RISERS TO GRADE. PROVIDE 300mm COVER OVER TANKS AND CHAMBERS.

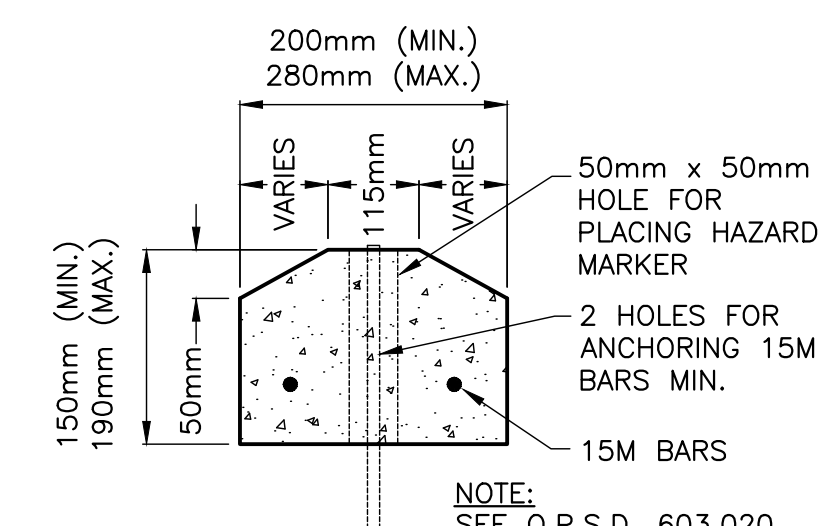
ELJEN DESIGN NOTES:

- ENVIRO-STEP TECHNOLOGIES STRONGLY RECOMMENDS THAT THE FOLLOWING NOTES APPEARS ON ELJEN GSF SYSTEM DESIGN PLANS:
- THIS SYSTEM (S/IS NOT) DESIGNED FOR THE USE OF A GARBAGE DISPOSAL.
 - THIS SYSTEM IS NOT DESIGNED TO RECEIVE BACKWASH FROM A DOMESTIC WATER TREATMENT DEVICE.
 - ORGANIC LOAM LAYER MUST BE REMOVED FROM BED AND SLOPE EXTENSION AREAS PRIOR TO FILL PLACEMENT. SCARIFY SUBSOIL PRIOR TO FILL PLACEMENT.
 - ALL FILL MATERIAL SHALL BE CLEAN AND PERMEABLE AND MEET ELJEN DESIGN MANUAL REQUIREMENTS. THE 150 MM OF SPECIFIED SAND UNDERNEATH AND SURROUNDING THE GSF MODULES SHALL COMPLY WITH ASTM C33 SAND.
 - BACKFILL MATERIAL CAN BE NATIVE SOIL WITH NO STONES LARGER THAN 50 MM IN ANY DIMENSION TO A MAXIMUM DEPTH OF 30 CM OVER THE GSF MODULES AND COVERED WITH A MINIMUM 150 MM OF CLEAN LOAM.
 - ANY ELJEN GSF SYSTEM THAT IS MORE THAN 450 MM BELOW FINISH GRADE AS MEASURED FROM THE TOP OF THE MODULE SHALL BE VENTED.
 - THIS DESIGN COMPLIES WITH AND MUST BE INSTALLED IN ACCORDANCE WITH THE DECEMBER 2014 ELJEN GSF SYSTEM DESIGN AND INSTALLATION MANUAL FOR ONTARIO.
 - INSTALLATION SHALL BE PERFORMED BY AN AUTHORIZED ELJEN INSTALLER DETAINING A VALID BCIN.
 - ELJEN GSF PRODUCT SHALL BE SUPPLIED BY AN ONTARIO AUTHORIZED ELJEN GSF DISTRIBUTOR.
 - MINIMUM TILE SAND TO BE INSTALLED 0.45m DEPTH.
 - MINIMUM WASHED CONCRETE SAND TO BE INSTALLED TO A DEPTH OF 0.3m BELOW MODULE AND TO TOP OF MODULE. ASTM C33



FORCEMAIN TRENCH

N.T.S.



LEGEND

- PROPOSED GRADE
- PROPOSED SWALE GRADE
- EXISTING GROUND GRADE
- DIRECTION OF DRAINAGE
- PROPOSED SWALE
- TOP OF SLOPE

SEPTIC SYSTEM DESIGN (AS PER OBC)

FACTORY W/O SHOWERS (75/DAY/EMPLOYEE)
EMPLOYEES (75/DAY X 12) 900 L/DAY

TERTIARY TREATMENT SYSTEM

ELJEN GSF SYSTEM DESIGN
HYDRAULIC LOADING RATE 95 L/MODULE
REQUIRED = (9.47) 10
EXISTING SAND LAYER T=20min/cm
A= Q*T/400 = 1600 * 20 / 400 = 80 m2

SEPTIC TANK

3600 L TANK

SYSTEM LAYOUT

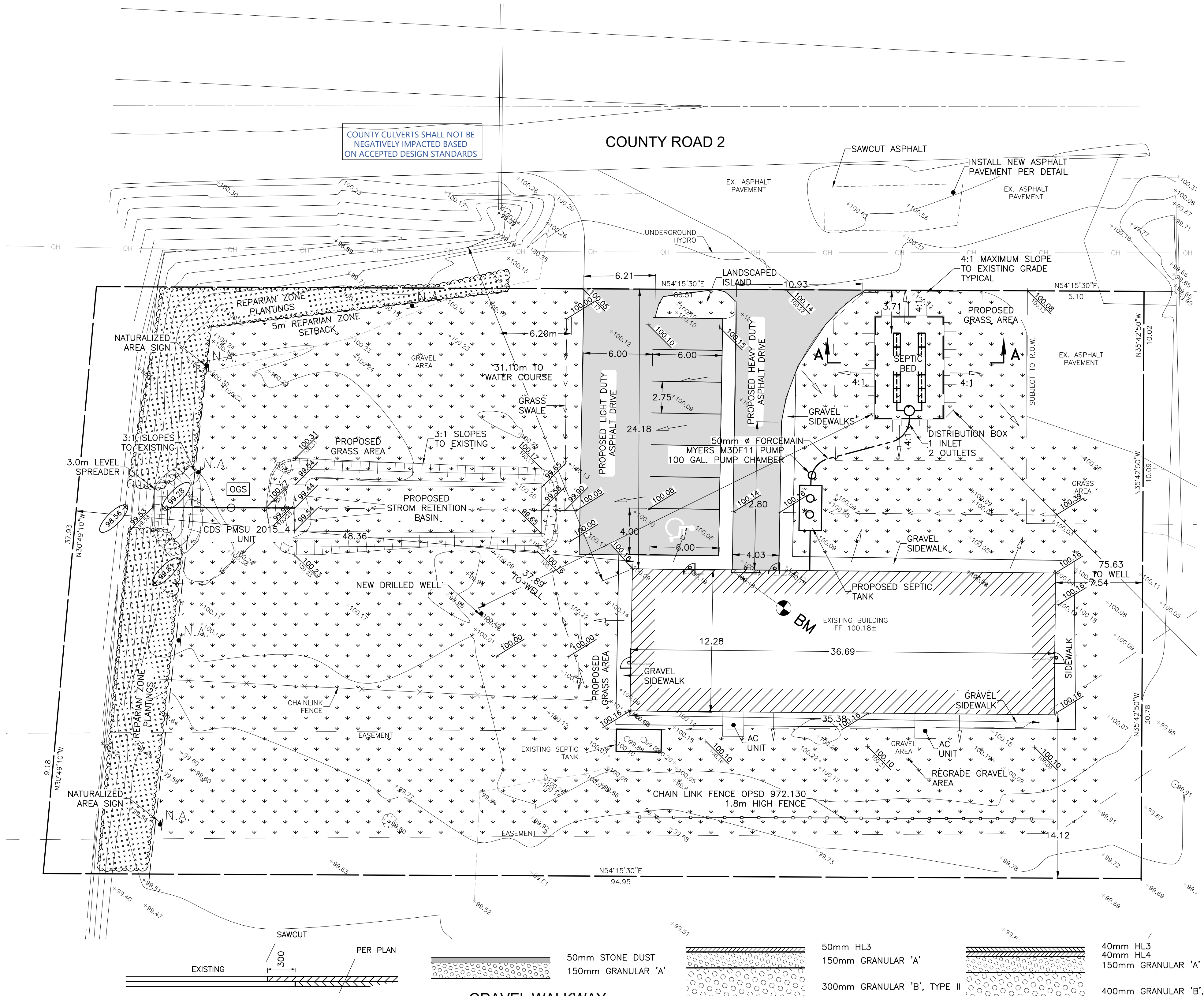
2 ROWS, x 5 MODULES

PUMP

MYERS ME3F11

PUMP CHAMBER

100 GALLON



PAVEMENT STEP JOINT AT EXISTING STREETS

N.T.S.

GRAVEL WALKWAY

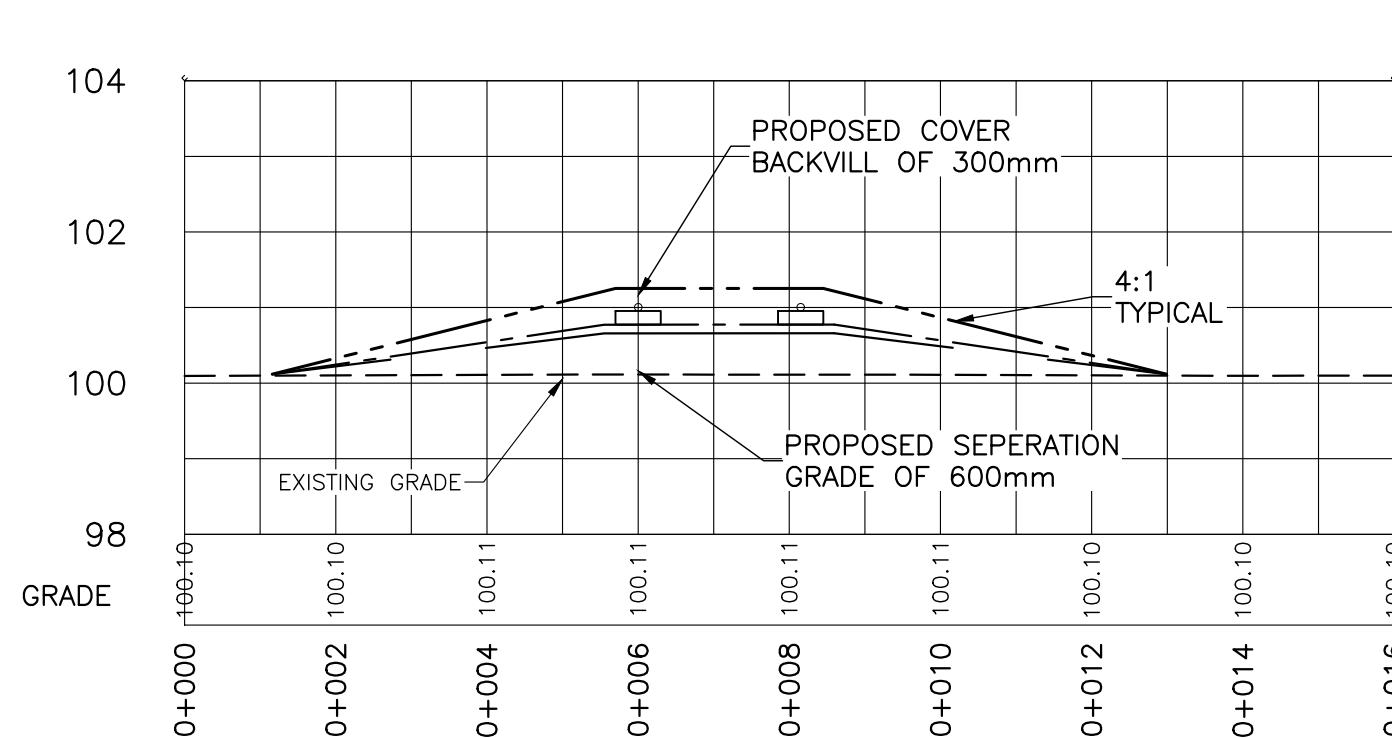
N.T.S.

LIGHT DUTY ASPHALT

N.T.S.

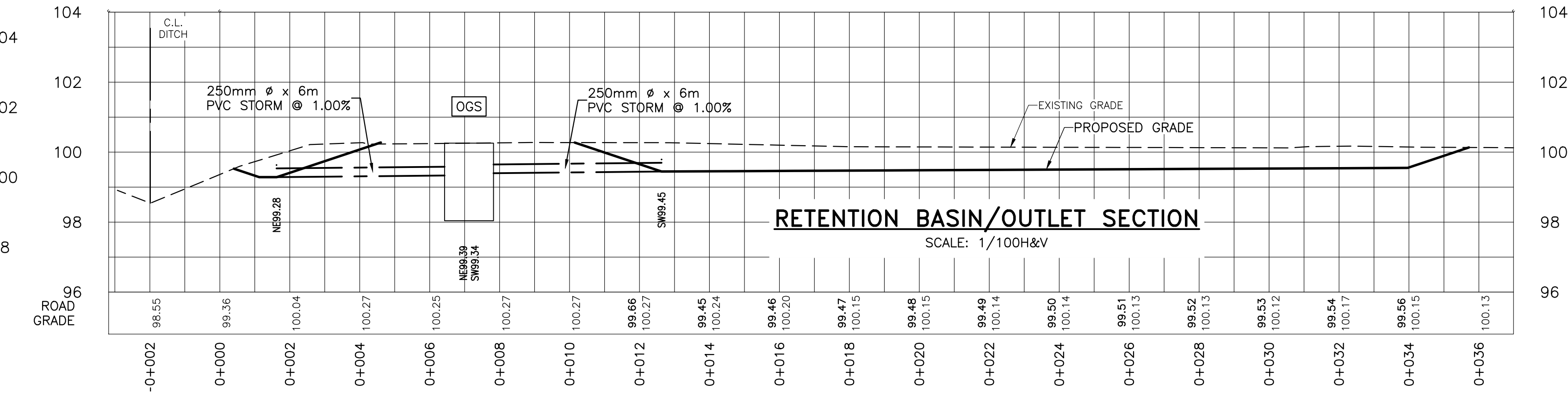
HEAVY DUTY ASPHALT

N.T.S.



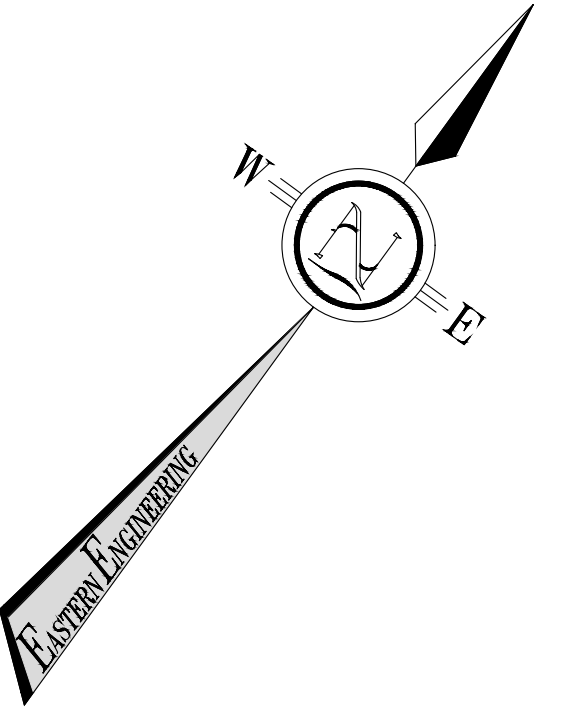
SECTION A-A

SCALE: 1/100H&V



RETENTION BASIN/OUTLET SECTION

SCALE: 1/100H&V



BENCHMARK
FINISHED FLOOR AT NORTH ENTRANCE TO BUILDING. 100.18
ELEV. 100.18m (ASSUMED)

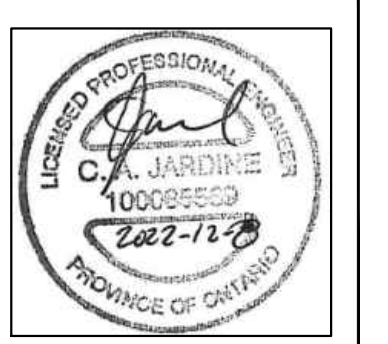
NOTE:
CONTRACTOR TO CONTACT UTILITY COMPANIES TO DETERMINE TYPE, LOCATION, AND CONFIGURATION OF EXISTING PLANT.

No.	By	Date	Revisions
6	CAJ	12/08/2022	TOWNSHIP COMMENTS
5	CAJ	9/20/2022	SNCA COMMENTS
4	CAJ	7/29/2022	TOWNSHIP COMMENTS
3	CAJ	5/16/2022	TOWNSHIP COMMENTS
2	CAJ	7/15/2021	TOWNSHIP COMMENTS
1	CAJ	4/27/2021	ADDED WELL DISTANCE
0	AJP	12/24/2020	FOR SITE PLAN/SEPTIC

All drawings, specifications and related documents are the copyright property of the Engineer and must be returned upon request. Reproduction of drawings, specifications, and related documents in part or whole is forbidden without the Engineer's written permission.

The contractor must check and verify all dimensions on the job prior to start of construction.

Drawings are not to be scaled.



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TERPENE
CONTRACTING
3209 COUNTY ROAD 2
JOHNSTOWN, ON

SEPTIC AND GRADING PLAN

Design:	CAJ	Checked:		Approved:	CAJ	Project No.:	9428
Drawn:	AJP	Checked:		Date:	2020/12/21	Contract No.:	

Scale: 0 4 8
Horizontal: 200

C2

File No.: 9428 C-6 12-08-2022.dwg

PROPOSED GRADE
PROPOSED SWALE GRADE
EXISTING GROUND GRADE
DIRECTION OF DRAINAGE
PROPOSED SWALE
TOP OF SLOPE

NAME

BIG BLUESTEM (ANDROPOGON GERARDII)
INDIAN GRASS (SORGHASTRUM NUTANS)
LITTLE BLUESTEM (SCHIZACHYRIUM SCOPARIUM),
SWITCH GRASS (PANICUM VIRGATUM)
CANADA WILD RYE (ELYMUS CANADENSIS)

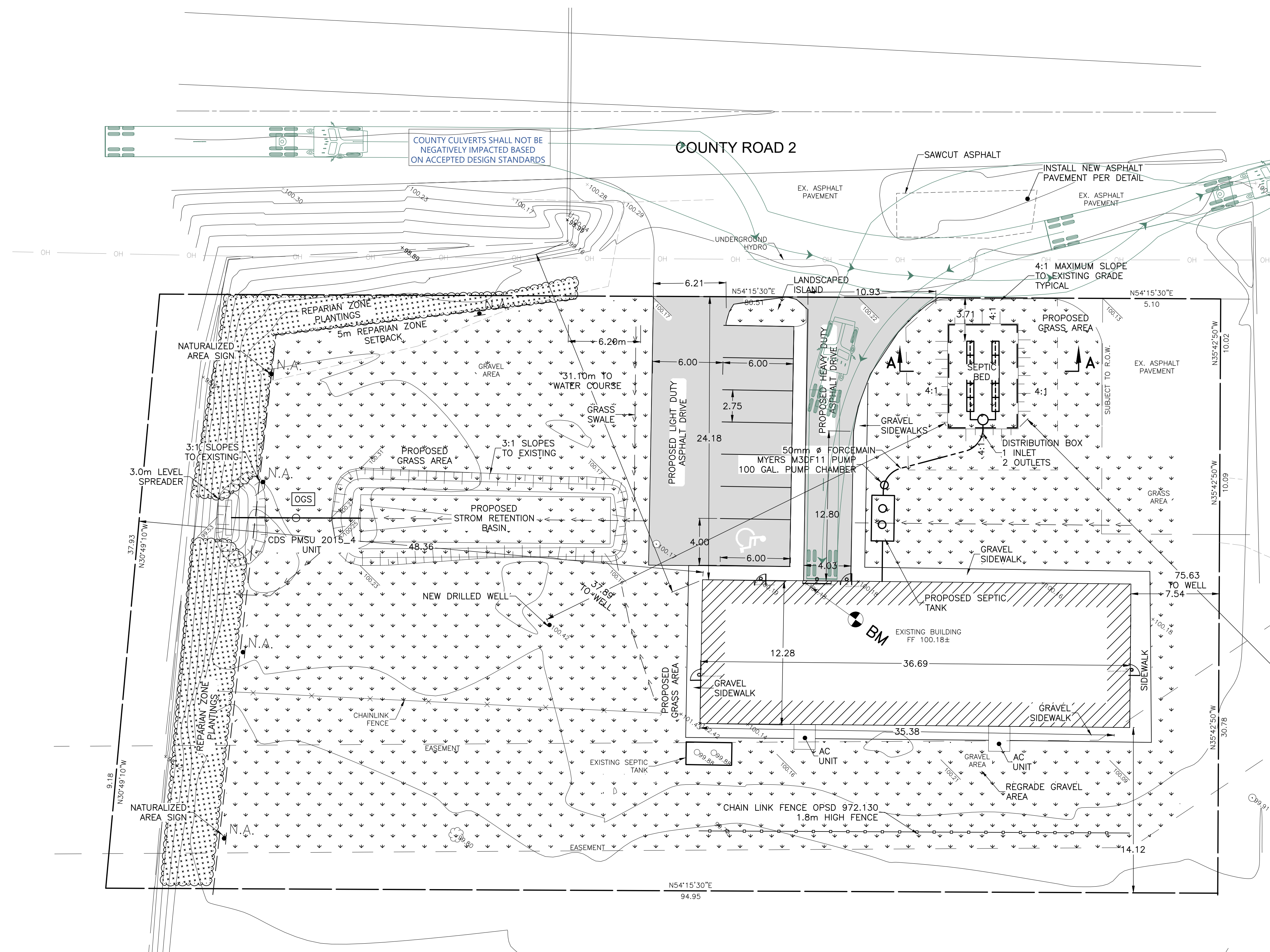
NOTES:
REPAIRIAN ZONE TO BE SEEDED
WITH THREE OR MORE NATIVE
ONTARIO GRASSES. PLANTINGS
WILL FOLLOW BEST PRACTICES AS
ESTABLISHED BY THE ONTARIO
MINISTRY OF AGRICULTURE.

1. ALL EXISTING PLANT OR UNDERGROUND INFRASTRUCTURE SHALL BE PROTECTED.
2. THE LOCATION OF EXISTING UNDERGROUND INFRASTRUCTURE WITHIN THE SITE IS UNKNOWN.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION OF ALL UNDERGROUND INFRASTRUCTURE WITHIN THE LIMITS OF THIS CONTRACT.
4. IF UNDERGROUND INFRASTRUCTURE IS ENCOUNTERED THAT HAS NOT BEEN SHOWN ON THE CONTRACT DRAWINGS THE CONTRACTOR WILL RECORD IT'S LOCATION, NOTIFY THE CONTRACT ADMINISTRATOR AND FURNISH A COPY OF THE LOCATION OF SAID INFRASTRUCTURE.
5. IF AN UNDERGROUND INFRASTRUCTURE IS FOUND TO BE IN CONFLICT WITH ANY OF THE WORK OF THIS CONTRACT THE CONTRACTOR WILL IMMEDIATELY NOTIFY THE CONTRACT ADMINISTRATOR AND STOP WORKING UNTIL THE ISSUE IS RESOLVED WITH OTHER WORK THAT IS NOT AFFECTED BY THE CONFLICT.
6. IT WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO PRESERVE AND PROTECT ALL EXISTING INFRASTRUCTURE WITHIN THE CONTRACT LIMITS FROM DAMAGE TO THE INFRASTRUCTURE RESULTING FROM THE ACTIONS OF THE CONTRACTORS.
7. OPERATIONS SHALL BE REPAIRED TO A SAME OR BETTER CONDITION AT NO ADDITIONAL COST TO THE OWNER.
8. IF ANY EXISTING INFRASTRUCTURE IS IN THE CONSTRUCTION AREA, CONTRACTOR TO LOCATE AND POTENTIALLY RELOCATE TO SATISFACTION OF THE TOWN AND TOWN'S ENGINEERS.

THE MUNICIPAL-ORIENTED ONTARIO PROVINCIAL STANDARDS IN AFFECT WHEN THE CALL FOR TENDERS FOR THIS CONTRACT WAS ADVERTISED SHALL APPLY FOR THE DURATION OF THE CONTRACT. ALL REFERENCES WITHIN THIS SPECIFICATION TO AN OPSS SHALL BE DEEMED TO MEAN OPSS.MUNI, UNLESS USE OF A PROVINCIAL-ORIENTED SPECIFICATION IS SPECIFIED IN THESE CONTRACT DOCUMENTS. WHEN THERE IS NOT A CORRESPONDING MUNICIPAL-ORIENTED SPECIFICATION, THE SPECIFICATION BELOW SHALL BE CONSIDERED TO BE THE OPSS LISTED. UNLESS USE OF A PROVINCIAL-ORIENTED SPECIFICATION IS SPECIFIED IN THESE CONTRACT DOCUMENTS, THE FOLLOWING ONTARIO PROVINCIAL STANDARD SPECIFICATIONS APPLY TO AND FORM PART OF THIS CONTRACT:

SAND TOWN PART OF C. TRACT.		SAND TOWN PART OF C. TRACT.	
102	MUNI 120	127	
128	MUNI 180	201	
MUNI 206	MUNI 212	310	
MUNI 314	351	MUNI 353	
MUNI 355	MUNI 401	MUNI 402	
MUNI 403	405	407	
408	MUNI 410	MUNI 441	
MUNI 442	490	MUNI 501	
506	MUNI 510	MUNI 517	
MUNI 518	MUNI 539	MUNI 706	
802	803	MUNI 804	
1001	MUNI 1002	MUNI 1003	
MUNI 1004	MUNI 1010	MUNI 1101	
MUNI 1102	1150	1301	
1302	MUNI 1303	1305	
1306	1308	1312	
MUNI 1315	MUNI 1820	1841	
1850	2501		

THE OPSD'S ARE CONTAINED IN THE MANUAL OF ONTARIO
PROVINCIAL STANDARD DRAWINGS.



		REQ'D	PROVIDED	
MINIMUM LOT AREA	1000	m ²	4700	m ²
MINIMUM LOT FRONTAGE	45	m	90.6	m
MINIMUM LOT DEPTH			50.9	m
MINIMUM FRONT YARD	7.5	m	24.18	m
MINIMUM REAR YARD	15	m	14.12	m
EXTERIOR SIDE YARD	7.5	m	7.54	m
INTERIOR SIDE YARD	10	m	7.54	m
MAXIMUM BUILDING HEIGHT	15	m	5.0	m
MAXIMUM LOT COVERAGE	35	%	21.1	%

LOT AREA	4700	m ³
ASPHALT AREA	542	m ³
BUILDING AREA	449	m ³
LANDSCAPED AREA	3709	m ³

BENCHMARK
FINISHED FLOOR AT NORTH ENTRANCE
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ELEV. 100.18m (ASSUMED)

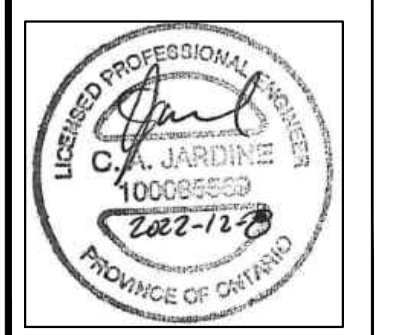
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0	CAJ	2022/05/16	TOWNSHIP COMMENTS
No.	By	Date	Revisions

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**EASTERN
ENGINEERING GROUP INC.**
CONSULTING ENGINEERS

Apex Building
207 - 100 Strouger Blvd.
Brockville, Ont. K6V 5J9

Telephone: (613) 345-0400
Facsimile: (613) 345-0008
www.EastEng.com

Project Title:

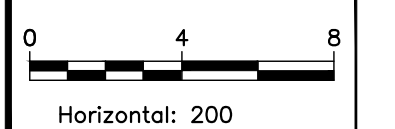
**TERPENE
CONTRACTING
3209 COUNTY ROAD 2
JOHNSTOWN, ON**

Drawing Title:

SITE PLAN

Design:	Checked:	Approved:	Project No.:
CAJ	.	CAJ	9428
Drawn:	Checked:	Date:	Contract No.:
AIP		2022/05/16	

Scale:	Drawing No.:
--------	--------------



C3

No.: 9428 Cr6 12-08-2022.dwg

LEGEND

- 99.90 PROPOSED GRADE
- 108.30 PROPOSED SWALE GRADE
- +104.41 EXISTING GROUND GRADE
- DIRECTION OF DRAINAGE
- PROPOSED SWALE
- TOP OF SLOPE

SEDIMENT AND EROSION CONTROL

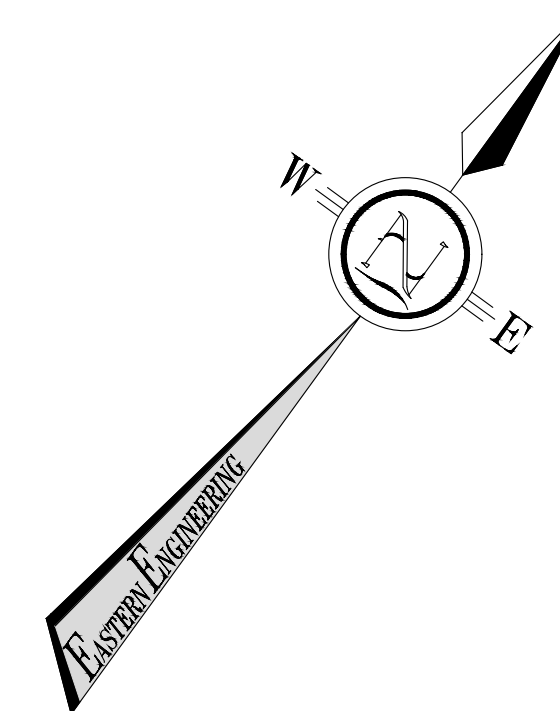
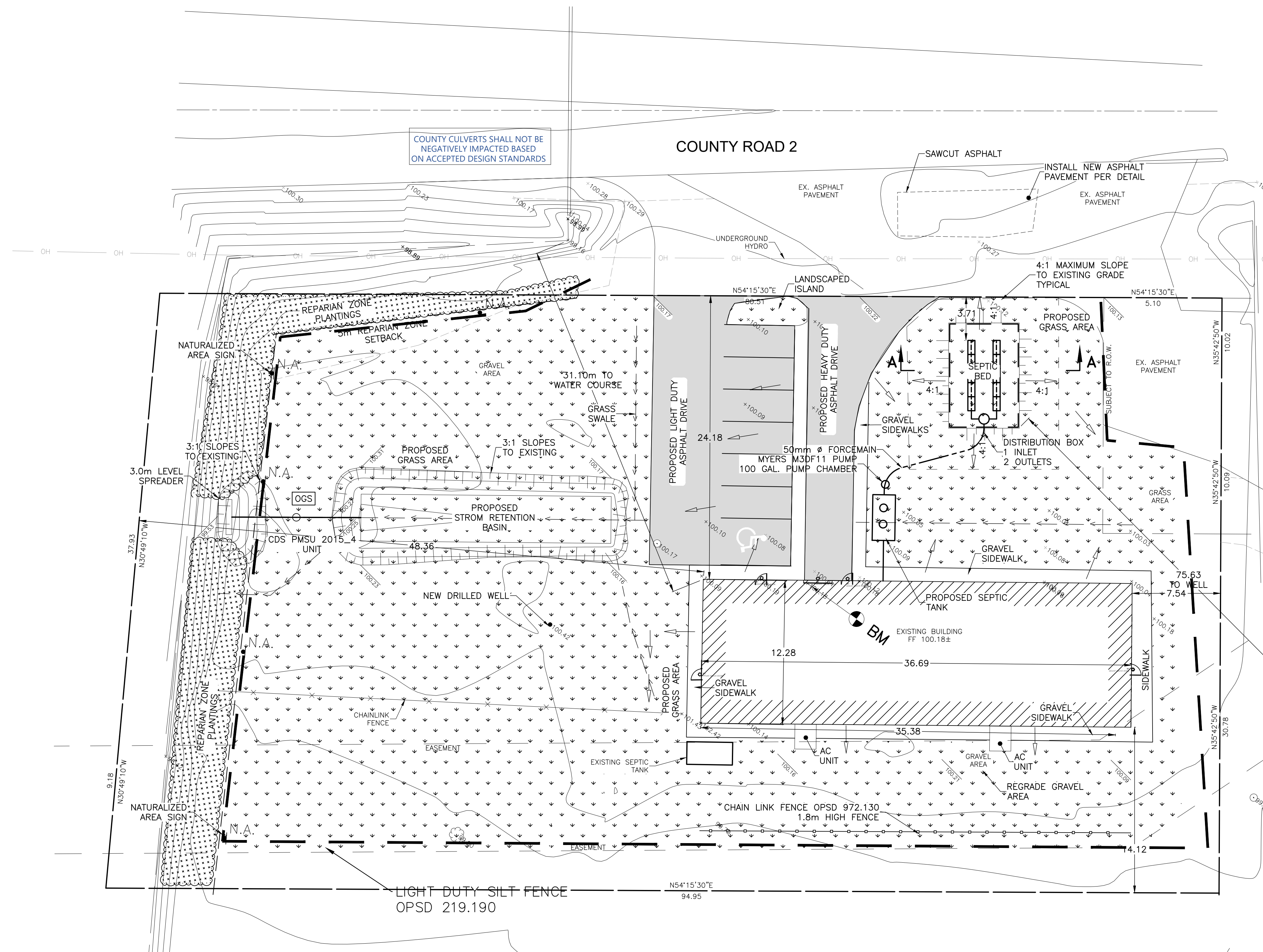
- IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES FOR EROSION & SEDIMENT CONTROL:
 - GEOTEXTILE CATCHES SHALL BE INSTALLED UNDER THE LIDS OF ALL SITE STRUCTURES AND ADJACENT MUNICIPAL STRUCTURES.
 - LIGHT DUTY SILT FENCE (OPSD 219.190) SHALL BE INSTALLED WHERE SHOWN.

- ALL SEDIMENT AND EROSION CONTROL MEASURE SHALL BE INSPECTED DAILY AND AFTER EVERY RAIN EVENT BY THE CONTRACTOR. ALL SEDIMENT AND EROSION MEASURES SHALL BE MAINTAINED, REPAIRED OR REPLACED AS REQUIRED UNTIL CONSTRUCTION IS COMPLETE AND GROUND COVER HAS STABILIZED. IMMEDIATELY CONTAIN AND REMOVE ANY SEDIMENTS THAT BREACH SILT BARRIERS. ANY SEDIMENT OR DEBRIS ENTERING SEWERS DURING CONSTRUCTION SHALL BE REMOVED IMMEDIATELY.
- THE CONTRACTOR SHALL PROTECT ALL TREES NOT DESIGNATED FOR REMOVAL. TREES SHALL BE PROTECTED FROM: CONSTRUCTION EQUIPMENT MOVEMENT, STOCKPILING OF ANY MATERIALS WITHIN DRIP LINES AND FROM UNNECESSARY ENCROACHING WITHIN DRIP LINES. THE CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN TREE PROTECTION BARRIERS AS PER OPSD 220.01 INSPECT, MAINTAIN, REPAIR AND REPLACE AS NECESSARY UNTIL ALL CONSTRUCTION IS COMPLETE.
- CONSTRUCTION TRUCKS SHALL NOT BE CLEANED OR WASHED OFF ON THIS SITE EXCEPT AT AN APPROVED WASH OFF STATION. ANY FUEL SPILLS SHALL BE CONTAINED & CLEANED UP IMMEDIATELY. THE MINISTRY OF THE ENVIRONMENT MUST BE NOTIFIED IMMEDIATELY IF A SPILL OCCURS.
- IN THE EVENT THAT THE EROSION AND SEDIMENT CONTROL ("ESC") MEASURE INDICATED ON THIS PLAN ARE NOT SUFFICIENT, THE CONTRACTOR SHALL PROVIDE ADDITIONAL "ESC" MEASURE TO MINIMIZE THE RELEASE OF SOILS AND SEDIMENT INTO BODIES OF WATER AND SEWERS.
- ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL REMAIN IN PLACE AND MAINTAINED UNTIL CONSTRUCTION IS COMPLETE AND VEGETATION IS REESTABLISHED. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF SEDIMENT AND EROSION CONTROL MEASURES AND DISPOSAL THERE OF.

NATURALIZED AREA
DO NOT TOUCH
BEYOND SIGN

- NOTES
- SIGN SIZE TO BE 18" X 10" OR APPROVED EQUIVALENT
- SIGN TO BE MADE OF MATERIALS THAT WILL NOT FADE
- SIGNS TO BE INSTALLED 1m ABOVE GROUND

NATURALIZED AREA
SIGN
N.T.S.



BENCHMARK
FINISHED FLOOR AT NORTH ENTRANCE
TO BUILDING 100.18
ELEV. 100.18m (ASSUMED)

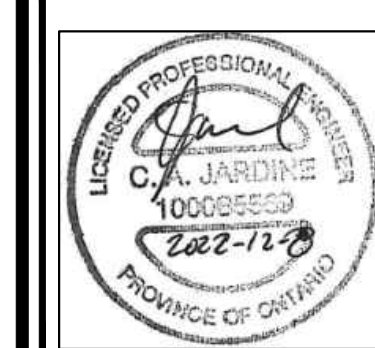
NOTE:
CONTRACTOR TO CONTACT UTILITY
COMPANIES TO DETERMINE TYPE,
LOCATION, AND CONFIGURATION OF
EXISTING PLANT.

No.	By	Date	Revisions
3	CAJ	12/08/2022	TOWNSHIP COMMENTS
2	CAJ	9/20/2022	SNCA COMMENTS
1	CAJ	2022/07/29	TOWNSHIP COMMENTS
0	CAJ	2022/05/16	TOWNSHIP COMMENTS

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The contractor must check and verify all dimensions on the job prior to start of construction.

Drawings are not to be scaled.



EASTERN
ENGINEERING GROUP INC.
CONSULTING ENGINEERS
Apex Building
207 - 100 Sturwiger Blvd.
Brockville, Ont. K6V 5J9
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Facsimile: (613) 345-0008
www.EastEng.com

Project Title:
**TERPENE
CONTRACTING
3209 COUNTY ROAD 2
JOHNSTOWN, ON**

Drawing Title:
**EROSION AND SEDIMENT
CONTROL PLAN**

Design:	CAJ	Checked:		Approved:	CAJ	Project No.:	9428
Drawn:	AJP	Checked:		Date:	2022/05/16	Contract No.:	

Scale:
0 4 8
Horizontal: 200

C4

File No.: 9428 C4 12-08-2022.dwg

**SITE PLAN CONTROL AGREEMENT
BETWEEN HB HOLDINGS INC. AND
THE TOWNSHIP OF EDWARDSBUGH CARDINAL**

SCHEDULE “B”

Site Plan Control Agreement

SITE PLANS AND REPORTS

Exhibit 2 Stormwater Management Report
by Eastern Engineering Group Inc., July 2021

TERPENE CONTRACTING
3209 COUNTY ROAD 2
EDWARDSBURGH-CARDINAL, ON

STORMWATER MANAGEMENT REPORT

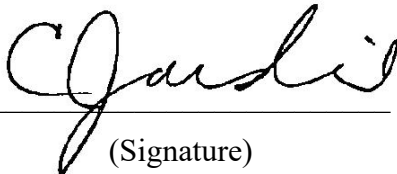


EASTERN ENGINEERING GROUP INC.
APEX BUILDING
100 STROWGER BLVD, SUITE 207
BROCKVILLE, ON
K6V 5J9

JULY 2021

REVISION RECORD					
REV	DESCRIPTION	PREPARED BY		REVIEWED BY	
0	ISSUED FOR SITE PLAN APPLICATION	CJ		CJ	
1	TOWNSHIP COMMENTS	CJ	2022-05-16	CJ	2022-05-16
2	SNCA COMMENTS	CJ	2022-09-20		

This document entitled Stormwater Management Report was prepared by Eastern Engineering Group Inc. for the account of the Terpene Contracting (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in the report reflects Eastern Engineering Group’s professional judgement in light of the scope, schedule and other limitations stated in the document and in the contract between Eastern Engineering Group and the Client. The opinions in the document are based on conditions and information existing at the time the document was prepared and published and do not take into account any subsequent changes. In preparing the document, Eastern Engineering Group did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Eastern Engineering Group shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions take based on this document.

Prepared by 
(Signature)

Colin A. Jardine, P. Eng

President, Eastern Engineering Group

Director of Civil Engineering

**TERPENE CONTRACTING PROJECT
EDWARDSBURGH-CARDINAL, ONTARIO**

STORMWATER MANAGEMENT REPORT

**PREPARED BY:
EASTERN ENGINEERING GROUP INC.
JULY 2021
REVISED MAY 2022**

PROJECT

Eastern Engineering Group Inc. was retained by Mr. Baydoun Hussein of Terpene Contracting to prepare a stormwater management report for the proposed industrial project at 3209 County Road 2, Johnstown, in the Township of Edwardsburgh Cardinal. The project consists of renovating an empty building into a Cannabis Cultivation facility including future processing activities. The building would be renovated on both the interior and exterior to aid in the functionality of the facility.



**FIGURE 1: LOCATION
3209 COUNTY ROAD 2,
JOHNSTOWN, ON**

EXISTING CONDITIONS

The existing site is approximately 4707 m² and has a vacant commercial building on the site. The site has gravel and old asphalt mixed parking/driving areas on the north and west side of the building. The east side of the property has an access easement for the adjacent property through the entrance from County Road 2. This easement will remain in place. The existing property has a shared well with the neighbouring property and a septic that will be replaced as part of the project.

PROPOSED LOT SERVICING

The redeveloped lot has a new septic system installed with approval by the Leeds and Grenville Health Unit. The water service will be from a newly installed well on the west side of the building. The well was installed in spring 2022.

All connections would be designed to meet the Ontario Building Code and Township regulations for water and sanitary services.

STORM SERVICING AND STORMWATER MANAGEMENT

The existing site consists of existing building, damaged asphalt and compacted gravel/asphalt (unknown origin) and green space. The pre-development runoff coefficient for the site is 0.617 based on 2287.7 m² of hard surface and 2421.3 m² of soft surface. The post development runoff coefficient is less at 0.52 due to increased grass surfaces on the site. The post hard surface is 1144.5 m² and soft surface is 3562.5 m².

The storm design will allow for surface water to flow westerly to a new above ground storage area for stormwater. The basin is designed to store the 100 year storm event while releasing at the pre-development allowable flow. Quality control will be via an OGS unit placed on the west side of the storm basin. TSS removal will be aimed for the enhanced level of TSS removal of 80%.

There will be a small amount of water from the building draining to the stormwater basin. This water usage and disposal is from the tanks that are filled to water the plants. There is approximately 500 liters of water used in the course of a week to water plants in four growing rooms which will be runoff and leave the building. These are done on separate days for each room and over the course of an hour. The flow from each room over an hour period would be approximately 125 litres per hour for one hour a day. This would constitute 0.035 L/s which is negligible for stormwater management. This would be consistent weekly and not associated with storm flows. This water would be treated through the OGS unit prior to reaching the creek on west side of the property.

PRE-DEVELOPMENT FLOWS

The total allowable flow from the site is determined using the following criteria:

$C_{pre} = 0.617$ (2287.7 m² @ 0.9, 2421.3 m² @ 0.35)

Area – 0.4707 ha

Using MTO IDF Curve lookup website, it was determined for this site, the following:

I_{5year} is 71.2 mm/hr

$I_{100year}$ is 118.6 mm/hr

The document is attached in the appendix.

T_c is assumed to be 15 mins as the area of flow and flow path are being modified from north to south to flow east to west. The existing drainage flow is to the rear of the property whereas the proposed flow is to the west. Local Municipalities (Prescott, Brockville) have accepted an assumed T_c of 15 mins for small localized projects similar in size to this.

$$\begin{aligned} Q_{5pre} &= 2.78 * A * i * C \\ &= 2.78 * 0.4707 * 71.2 * 0.617 \\ &= \mathbf{57.48 \text{ L/s}} \end{aligned}$$

The total allowable from the site is **57.48 L/s** total.

The post development runoff coefficient is 0.48. This was calculated with 1144.5 m² @ 0.90 and 3562.5 @ 0.35.

I_{5year} is 71.2 mm/hr

I_{100year} is 118.6 mm/hr

The target runoff is from the site is 57.48 L/s.

POST DEVELOPMENT FLOWS

The post development flows are calculated using Modified Rationale method for various times and rainfall intensities, to determine how much storage is required for each drainage area.

The post development runoff coefficient is 0.48 for 5 year event. The allowable release rate is controlled to 57.48 L/s.

5 Year Storage – A=0.4707 ha, c=0.48, Q allowable 57.48 L/s

Tc (min.)	I (mm/hr.)	Q (L/s)	Qallow (L/s)	Net Runoff (L/s)	Storage (m³)
5	153.4	96.35	57.48	38.87	11.66
10	94.5	59.35	57.48	1.88	1.13
15	71.2	44.72	57.48	0	0

100 Year Storage – A=0.4707 ha, c=0.48*1.25 = 0.6, Q allowable 57.48 L/s

Tc (mn.)	I (mm/hr.)	Q (L/s)	Qallow (L/s)	Net Runoff (L/s)	Storage (m³)
5	255.6	200.61	57.48	143.20	42.96
10	157.4	123.58	57.48	66.10	39.66
15	118.6	93.12	57.48	35.64	32.07

Therefore, based on Modified Rationale Method, the storage requirement for the site for 5 year is 11.66 m³ and for 100 year 42.96 m³.

STORAGE PROVIDED

The storage will be provided on the west side of the building in an above ground storage basin. The basin will hold 45 m³ of stormwater which is above the required amount of 42.96 m³.

QUALITY CONTROL

Quality control for the site will be provided with an OGS unit on the west side of the infiltration trench. The unit will provide 80% TSS removal before outlet into the creek to the west of the site. The specified unit is a CDS PMSU 2015_4 unit. Details are attached in appendix.

Outlet from the storm area will be with the use of a level spreader outlet which will allow sheet flow over the bank to the creek.

MAINTENANCE

The owner will have maintenance staff review the site periodically during routine maintenance. Catch basins will need to be cleaned out as required in the sumps.

The maintenance plans and forms must address the following:

- inspection frequency
- maintenance frequency
- data collection/ storage requirements (i.e. during inspections)
- detailed cleanout procedures (main element of the plans) including:
 - equipment needs
 - maintenance techniques
 - occupational health and safety
 - public safety
 - environmental management considerations
 - disposal requirements (of material removed)
 - access issues

From: Low Impact Development Stormwater Management Planning and Design Guide, 2010 by CVC and TRCA.

Routine Maintenance and Operation

Routine inspection and maintenance activities as shown in Table 4.5.6 are necessary for the continued operation of infiltration areas.

Table 4.5.6 Suggested routine inspection and maintenance activities

Activity	Schedule
Inspect for vegetation density (at least 80% coverage), damage by foot or vehicular traffic, channelization, accumulation of debris, trash and sediment, and structural damage to pretreatment devices.	After every major storm event (>25 mm), quarterly for the first two years, and twice annually thereafter.
Regular watering may be required during the first two years until vegetation is established;	As needed for first two years of operation.
Remove trash and debris from pretreatment devices, the infiltration area surface and inlet and outlets.	At least twice annually. More frequently if desired for aesthetic reasons.
<ul style="list-style-type: none">• Remove accumulated sediment from pretreatment devices, inlets and outlets;• Trim trees and shrubs;• Replace dead vegetation, remove invasive growth;• Repair eroded or sparsely vegetated areas;• Remove accumulated sediment on the bioretention area surface when dry and exceeds 25 mm depth (PDEP, 2006);• If gullies are observed along the surface, regrading and revegetating may be required.	Annually or as needed

Annual Inspection and Maintenance

The annual spring cleaning should consist of an inspection and corrective maintenance tasks described in Table 4.5.7

Table 4.5.7 Suggested inspection items and corrective actions

Inspection Item	Corrective Actions
Vegetation health, diversity and density	<ul style="list-style-type: none"> • Remove dead and diseased plants. • Add reinforcement planting to maintain desired vegetation density. • Prune woody matter. • Check soil pH for specific vegetation. • Add mulch to maintain 75 mm layer.
Sediment build up and clogging at inlets	<ul style="list-style-type: none"> • Remove sand that may accumulate at the inlets or on the filter bed surface following snow melt. • Examine drainage area for bare soil and stabilize. Apply erosion control such as silt fence until the area is stabilized. • Check that pretreatment is properly functioning. For example, inspect grass filter strips for erosion or gullies. Reseed as necessary.
Ponding for more than 48 hours	<ul style="list-style-type: none"> • Check underdrain for clogging and flush out. • Apply core aeration or deep tilling • Mix amendments into the soil • Remove the top 75 mm of bioretention soil • Replace bioretention soil

The owner will have maintenance staff review the site periodically during routine maintenance.

Prepared by:

Eastern Engineering Group Inc.

Colin A. Jardine, P. Eng



APPENDIX
OGS UNIT
CDS PMSU 2015_4



**CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON A FINE PARTICLE SIZE DISTRIBUTION**



Project Name: 3209 COUNTY ROAD 2
Location: JOHNSTOWN, ONTARIO
OGS #: 1

Engineer: Eastern Engineering
Contact: Colin Jardine, P.Eng
Report Date: 2022-08-02

Area 0.4707 ha
Weighted C 0.48
CDS Model 2015-4

Rainfall Station # 215
Particle Size Distribution FINE
CDS Treatment Capacity 20 l/s

<u>Rainfall Intensity¹</u> <u>(mm/hr)</u>	<u>Percent Rainfall Volume¹</u>	<u>Cumulative Rainfall Volume</u>	<u>Total Flowrate (l/s)</u>	<u>Treated Flowrate (l/s)</u>	<u>Operating Rate (%)</u>	<u>Removal Efficiency (%)</u>	<u>Incremental Removal (%)</u>
1.0	10.6%	19.8%	2.6	2.6	13.0	95.1	10.1
1.5	9.9%	29.7%	3.9	3.9	19.5	93.3	9.2
2.0	8.4%	38.1%	5.2	5.2	26.0	91.4	7.7
2.5	7.7%	45.8%	6.5	6.5	32.5	89.5	6.9
3.0	5.9%	51.7%	7.7	7.7	39.0	87.7	5.2
3.5	4.4%	56.1%	9.0	9.0	45.6	85.8	3.7
4.0	4.7%	60.7%	10.3	10.3	52.1	83.9	3.9
4.5	3.3%	64.0%	11.6	11.6	58.6	82.1	2.7
5.0	3.0%	67.1%	12.9	12.9	65.1	80.2	2.4
6.0	5.4%	72.4%	15.5	15.5	78.1	76.5	4.1
7.0	4.4%	76.8%	18.1	18.1	91.1	72.7	3.2
8.0	3.5%	80.3%	20.6	19.8	100.0	67.4	2.4
9.0	2.8%	83.2%	23.2	19.8	100.0	59.9	1.7
10.0	2.2%	85.3%	25.8	19.8	100.0	53.9	1.2
15.0	7.0%	92.3%	38.7	19.8	100.0	36.0	2.5
20.0	4.5%	96.9%	51.6	19.8	100.0	27.0	1.2
25.0	1.4%	98.3%	64.5	19.8	100.0	21.6	0.3
30.0	0.7%	99.0%	77.4	19.8	100.0	18.0	0.1
35.0	0.5%	99.5%	90.3	19.8	100.0	15.4	0.1
40.0	0.5%	100.0%	103.2	19.8	100.0	13.5	0.1
45.0	0.0%	100.0%	116.1	19.8	100.0	12.0	0.0
50.0	0.0%	100.0%	129.0	19.8	100.0	10.8	0.0

77.6

Removal Efficiency Adjustment² = 6.5%
Predicted Net Annual Load Removal Efficiency = 71.1%
Predicted Annual Rainfall Treated = 90.2%

1 - Based on 42 years of hourly rainfall data from Canadian Station 6105976, Ottawa ON

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

3 - CDS Efficiency based on testing conducted at the University of Central Florida

4 - CDS design flowrate and scaling based on standard manufacturer model & product specifications

CDS Stormwater Treatment Unit Performance

Table 1. Fine Particle Size Distribution (PSD)

Particle Size (µm)	% of Particle Mass
< 20	20
20 – 40	10
40 – 60	10
60 – 130	20
130 – 400	20
400 – 2000	20

Removal Efficiencies – CDS Unit Testing Under Various Flow Rates

The following performance curves are based on controlled tests using a full scale CDS Model PMSU20_20 (2400 micron screen), 1.1-cfs (494-gpm) capacity treatment unit.

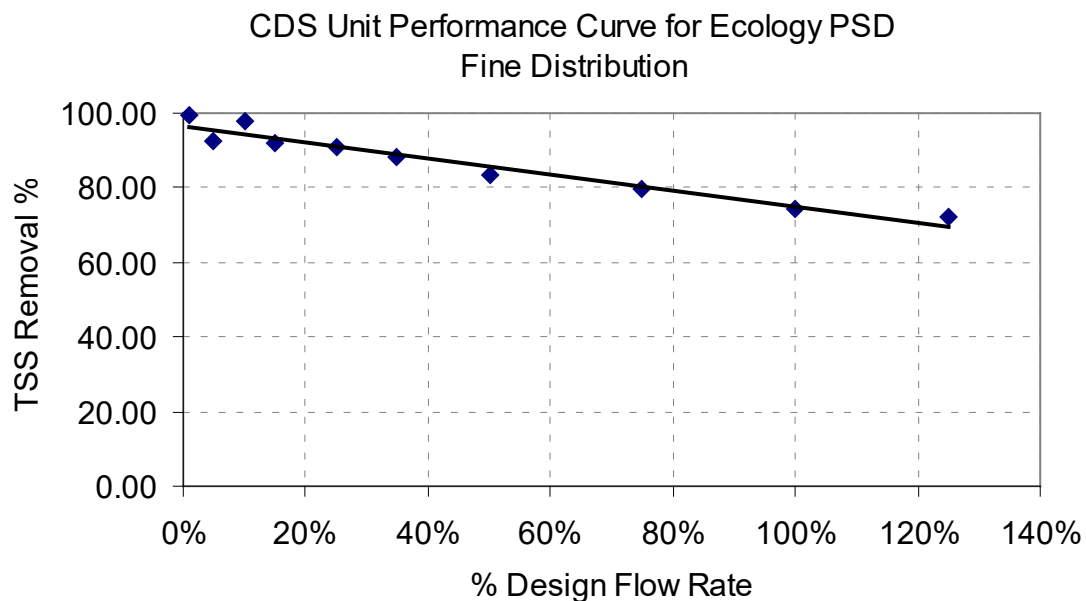


Figure 1. CDS Unit Performance for Fine PSD

CDS Unit Performance Testing Protocol

Tests were conducted using two types of sand – U.S. Silica OK-110 and UF sediment (a mixture of U.S. Silica sands). Particle size gradations for the two types of sand are illustrated in Figure 2.

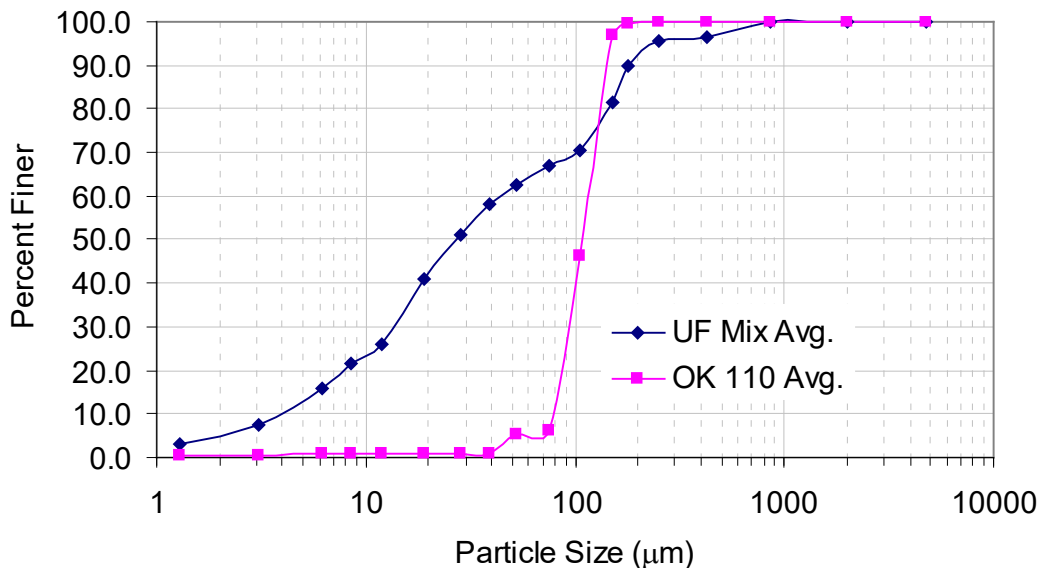
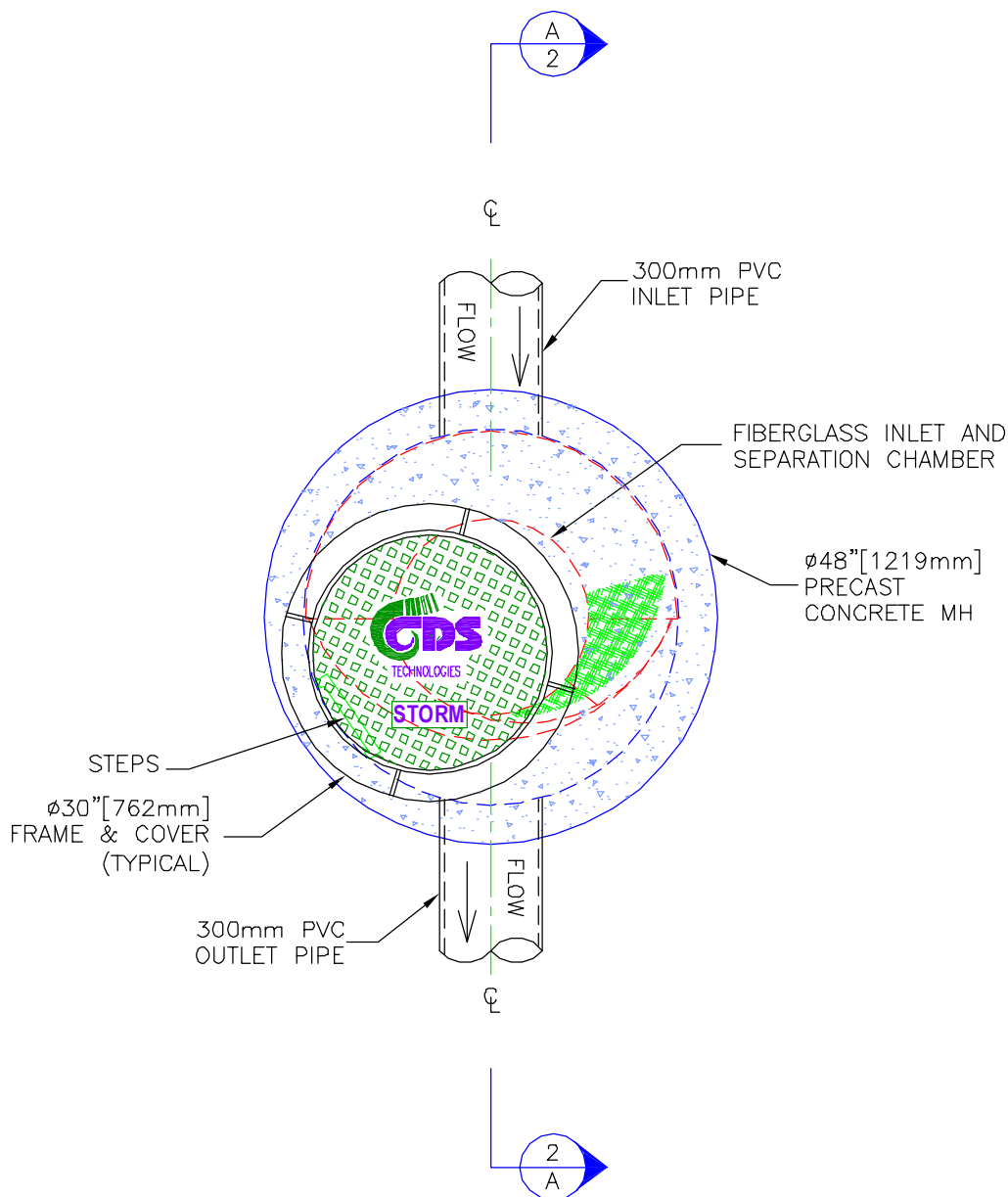


Figure 2. Test material particle size gradations - CDS Model PMSU20_20 test
(Analytical results provided by MACTEC Engineering and Consulting Inc. FL
ASTM D-422 with Hydrometer method)

The influent concentration (mg/L) for the test was set at 200-mg/L and verified from slurry feeding. Effluent samples were taken at fixed time intervals during each test run at various flow rates. The composite effluent samples were sent to Test American Analytical Testing Lab, OR for TSS analysis (ASTM D3977-97).

TSS removal rates for the specified PSD (d_{50} of 90 μm) under various flow rates were calculated from Figure 2 shows the removal efficiency as a function of operating flow rate. This removal efficiency curve as a function of percent flow rate can be applied to all CDS unit models.

PLAN VIEW



CDS MODEL PMSU20_15_4m STORMWATER TREATMENT UNIT



PROJECT NAME
CITY, STATE

JOB# XX-##-###

DATE ##/##/##

DRAWN INITIALS

APPROV.

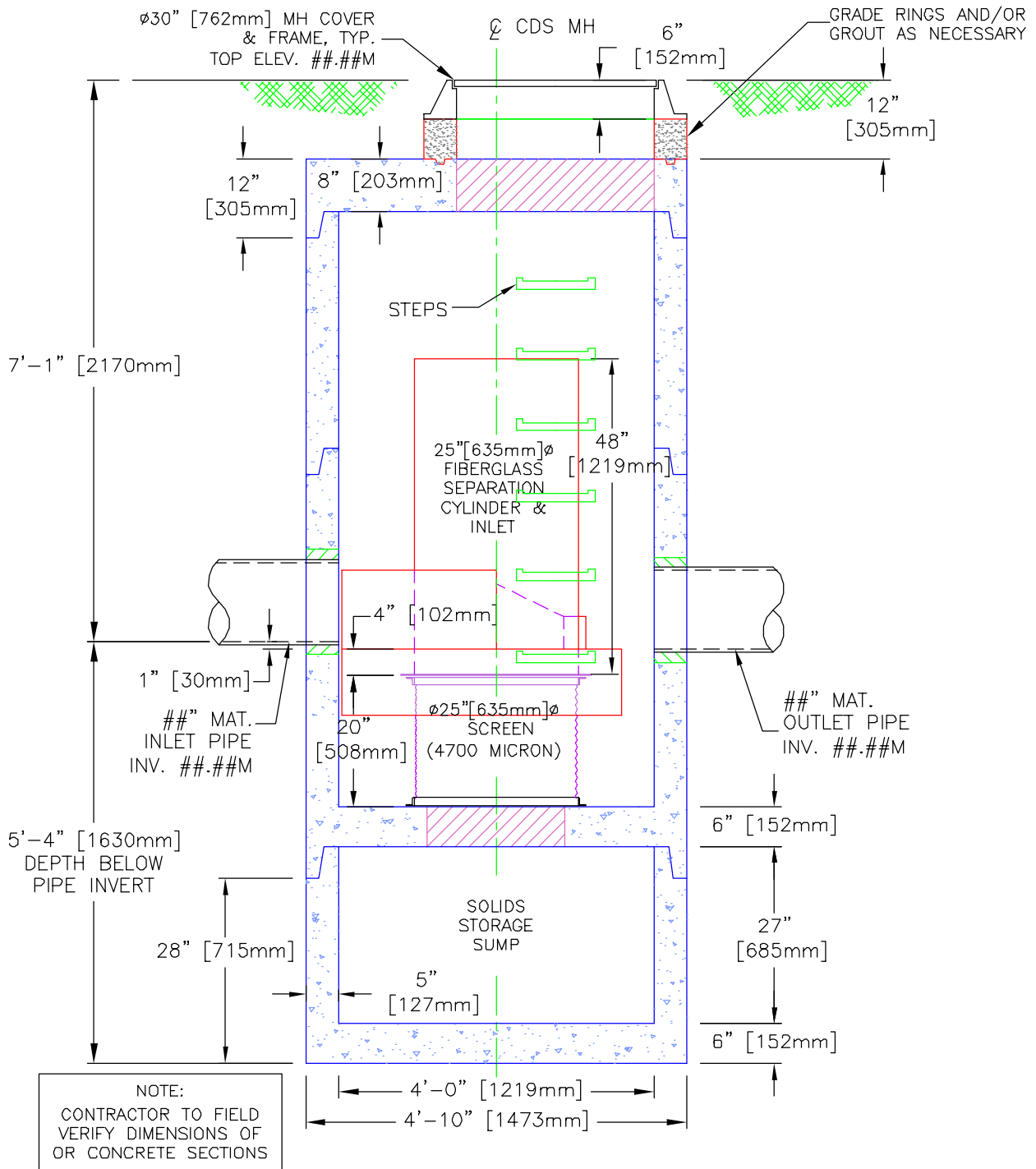
SCALE
1" = 2'

SHEET

1



SECTION A-A ELEVATION VIEW



CDS MODEL PMSU20_15_4m
STORMWATER TREATMENT UNIT



PROJECT NAME
CITY, STATE

JOB# XX-##-###

DATE ##/##/##

DRAWN INITIALS

APPROV.

SCALE
1" = 2'

SHEET

2

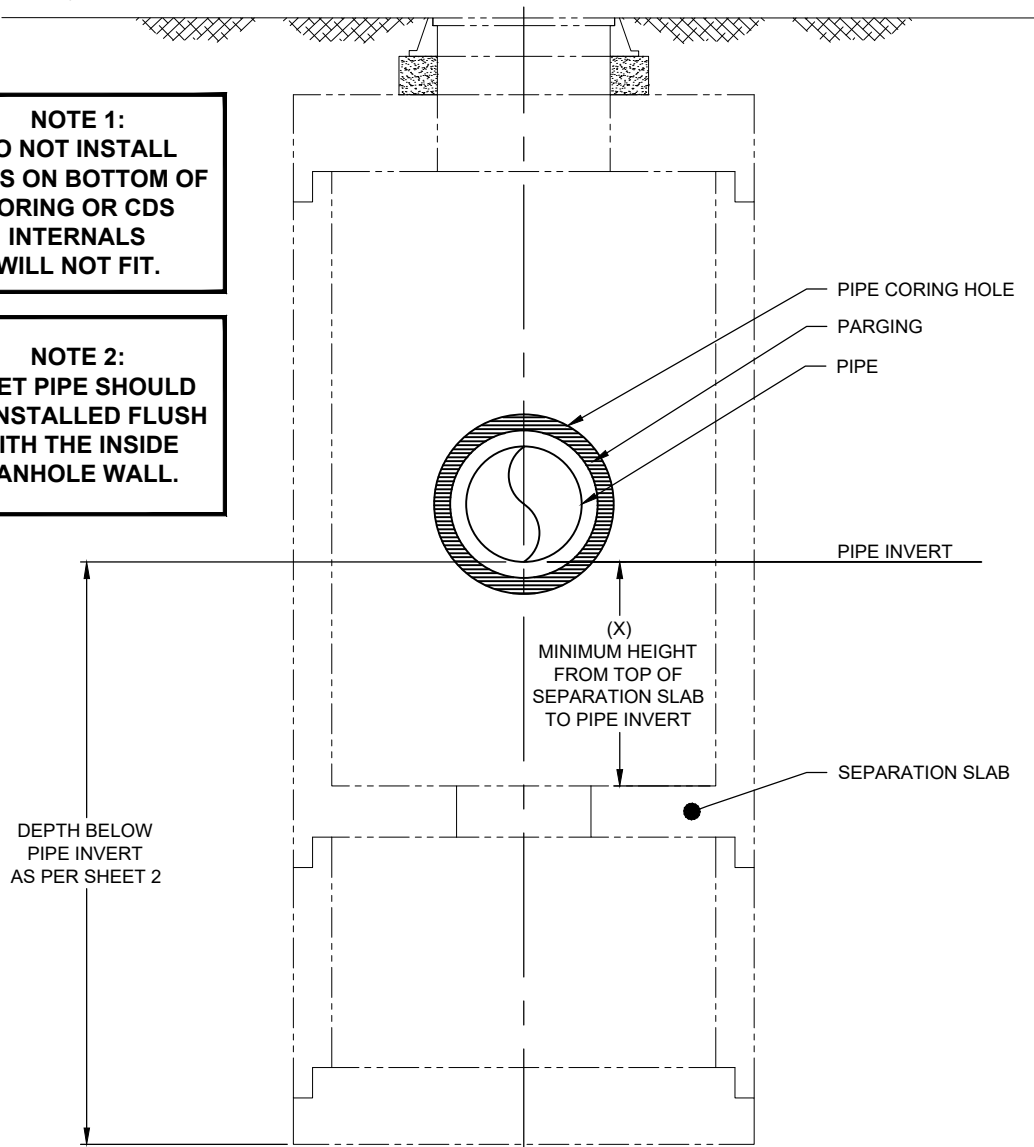


THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS INTERNALS HEIGHT

NOTE 1:
DO NOT INSTALL
PIPES ON BOTTOM OF
CORING OR CDS
INTERNALS
WILL NOT FIT.

NOTE 2:
INLET PIPE SHOULD
BE INSTALLED FLUSH
WITH THE INSIDE
MANHOLE WALL.



HEIGHT OF CDS INTERNALS

CDS MODEL	DIMENSION X (m)	CDS MODEL	DIMENSION X (m)
20_15	0.610	40_30	1.080
20_20	0.787	40_40	1.397
20_25	0.889	40_45	1.524
30_20	0.838	56_40	1.397
30_25	0.940	56_53	1.804
30_30	1.080	56_68	2.311
30_35	1.250	56_78	2.616

CONTECH
ENGINEERED SOLUTIONS LLC
www.contechES.com

200 Enterprise Drive, Scarborough, ME 04074
877-907-8676 207-885-9830 207-885-9825 FAX

PROJECT NAME
CITY, ON
SITE DESIGNATION: CDS
Page 31 of 111

JOB No. : XXXX-XXX

SCALE : NTS

DATE : XX/XX/XXXX

SHEET :

DRAWN : XX

APPROV. :

5

SECTION [____]
STORM WATER TREATMENT DEVICE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope

The Contractor shall furnish all labor, equipment and materials necessary to install the storm water treatment device(s) (SWTD) and appurtenances specified in the Drawings and these specifications.

B. Related Sections – **if applicable**

Section ****: Dewatering
Section ****: Excavation Support and Protection
Section ****: Excavation and Fill
Section ****: Soil Stabilization

1.2 QUALITY ASSURANCES

A. Inspection

All components shall be subject to inspection by the engineer at the place of manufacture and/or installation. Any components that do not comply with the requirements of this specification may be subject to replacement or repair at the **Consultant's** discretion.

B. Warranty

The manufacturer shall guarantee the SWTD components against all manufacturer originated defects in materials or workmanship for a period of twelve (12) months from the date the components are delivered to the owner for installation. The manufacturer shall upon its determination repair, correct or replace any manufacturer originated defects advised in writing to the manufacturer within the referenced warranty period.

C. Manufacturer's Installation Certificate

The SWTD manufacturer shall submit a "Manufacturer's Installation Certificate" certifying that each SWTD has been installed in accordance with manufacturer's installation instructions.

1.3 SUBMITTALS

A. Shop Drawings

The contractor shall prepare and submit shop drawings in accordance with Section [____] of the contract documents.

B. SWTD Sizing

The SWTD manufacturer shall submit a Sizing Report in accordance with the criteria set out in section 2.2.

C. Hydraulic Performance

The SWTD manufacturer shall submit a hydraulic report, stamped by a Professional Engineer licensed in the Province of Ontario, which verifies the system weir is sized correctly for the treatment flowrate and in addition, indicates the effect the SWTD has on the hydraulic grade line.

PART 2.0 – PRODUCTS

2.1 MATERIALS AND DESIGN

A. Precast concrete components shall conform to applicable sections of CSA standards, CAN/CSA A257.1, A257.2, A257.3, A257.4, ASTM C507M and OPSS 1351 and the following:

1. Concrete shall achieve a minimum 28-day compressive strength of 28 MPa;
2. Unless otherwise noted, the precast concrete sections shall be designed to CHBDC loadings;
3. Cement shall be Type (HE) Portland Cement conforming to (OPSS 1301);
4. Aggregates shall conform to OPSS 1001 & OPSS 1002;
5. Reinforcing steel shall be deformed billet-steel bars, welded steel wire or deformed welded steel wire conforming to CSA A23.4-94 and ASTM A 185 respectively; and,
6. Joints shall be sealed with fuel resistant joint sealing compound or gaskets.

B. Internal Components and appurtenances shall conform to the following:

1. Stainless Steel components shall be manufactured of Type 316 and 316L stainless steel conforming to ASTM F 1267-01;
2. Hardware shall be manufactured of Type 316 stainless steel conforming to ASTM A 320;
3. Fiberglass components shall be manufactured to ASTM D-4097;
4. Concrete components shall be designed to withstand CHBDC loadings.

2.2 PERFORMANCE

A. REMOVAL EFFICIENCIES

1. The SWTD shall be approved under the NJDEP testing and certification program.
2. The SWTD shall be designed to meet Ministry of Environment Enhanced performance criteria based on the particle size distribution defined in Section 2.2 A.2.

3. The SWTD must be able to meet the total suspended solids removal requirements stated in this section based on the following particle size distribution at a minimum. Sizing with a particle size distribution that is finer through the full particle range is also acceptable.

Particle Size (μm)	% Finer
< 20	20
20-40	10
40-60	10
60-130	20
130-400	20
400-2000	20

SWTD performance must be based on laboratory or field testing data. Sizing of the SWTD based solely on theoretical modeling is not acceptable.

4. The SWTD shall be capable of capturing and retaining 100 percent of pollutants greater than or equal to 2.4 mm regardless of the pollutant's specific gravity (i.e.: floatable and neutrally buoyant materials) for flows up to 20 l/s. The SWTD shall be designed to retain all previously captured pollutants addressed by this subsection under all flow conditions.
4. The SWTD shall be capable of capturing and retaining total petroleum hydrocarbons. The SWTD shall be greater than 95 percent effective in controlling dry-weather accidental oil spills.

The SWTD shall be capable of utilizing sorbent media to enhance removal and retention of petroleum based pollutants.

B. HYDRAULIC CAPACITY

1. The SWTD shall provide a rated-treatment capacity of 20 l/s. At its rated-treatment capacity, the device shall be capable of achieving greater than 65 percent removal efficiency of the particle size distribution provided in section 2.2.A.2.
2. The SWTD shall be equipped with an internal high flow bypass that is capable of conveying the maximum design flowrate from the treated drainage area with no flow going through the treatment portion of the unit.

C. STORAGE CAPACITY

1. The SWTD shall be designed with a sump chamber for the storage of captured sediments and other negatively buoyant pollutants in between maintenance cycles. The minimum storage capacity provided by the sump chamber shall be 0.838 m³. The sump chamber shall be physically separated from the treatment section of the SWTD such that accumulated grit does not reduce the treatment volume of the unit. SWTD that use the same chamber for treatment and grit storage are not acceptable. The minimum dimension providing access from grade to the sump chamber shall be 533mm in diameter.
2. The SWTD shall be designed to capture and retain Total Petroleum Hydrocarbons generated by wet-weather flow and dry-weather gross spills.

2.3 MANUFACTURER

The manufacturer of the SWTD shall be one that is regularly engaged in the engineering design and production of systems deployed for the treatment of storm water runoff for at least five (5) years and which have a history of successful production, acceptable to the Engineer. In accordance with the Drawings, the SWTD(s) shall be a Contech CDS[®] device as supplied by:

Echelon Environmental
505 Hood Road
Markham, ON
L3R 5B6
Tel: 905-948-0000

PART 3 – EXECUTION

3.1 INSTALLATION

1. The SWTD shall be installed in accordance with the manufacturer's recommendations and related sections of the contract documents. The manufacturer shall provide the contractor installation instructions and offer on-site guidance during the important stages of the installation as identified by the manufacturer at no additional expense.
2. The contractor shall fill all voids associated with lifting provisions provided by the manufacturer. These voids shall be filled with non-shrinking grout providing a finished surface consistent with adjacent surfaces.

END OF SECTION

**SITE PLAN CONTROL AGREEMENT
BETWEEN HB HOLDINGS INC. AND
THE TOWNSHIP OF EDWARDSBUGH CARDINAL**

SCHEDULE “B”

Site Plan Control Agreement

SITE PLANS AND REPORTS

Exhibit 3 Hydrogeological and Terrain Study
By Kollaard Associates Inc., March 17, 2023



Kollaard Associates

Engineers

210 Prescott Street

P.O. Box 189

Kemptville, Ontario K0G 1J0

Civil • Geotechnical •
Structural • Environmental •
Hydrogeology •

(613) 860-0923

FAX: (613) 258-0475

REPORT ON

HYDROGEOLOGICAL AND TERRAIN STUDY PROPOSED LIGHT INDUSTRIAL BUILDING 3209 COUNTY ROAD 2, JOHNSTOWN TOWNSHIP OF EDWARDSBURGH-CARDINAL, ONTARIO

Submitted to:

Terpene Farms Inc.
3209 County Road 2
Johnstown, Ontario
K0E 1T1

DATE March 17, 2023

DISTRIBUTION

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1 copy Kollaard Associates Inc.

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March 17, 2023

230124

Terpene Farms Inc.
3209 County Road 2
Johnstown, Ontario
K0E 1T1

RE: HYDROGEOLOGICAL AND TERRAIN STUDY
EXISTING SUPPLY WELL
PROPOSED FACTORY
3209 COUNTY ROAD 2, JOHNSTOWN
TOWNSHIP OF EDWARDSBURGH-CARDINAL, ONTARIO

Dear Sir:

This letter presents the results of an evaluation of the water quality and quantity for the well that will supply water for the above noted proposed agricultural use conversion of an existing building located at 3209 County Road 2 in Johnstown, Ontario (see Key Plan, Figure 1). It is understood that the proposed development is to consist of an indoor cannabis growing operation with office space.

The well in question was constructed by 1382845 Ontario Ltd. of Augusta, Ontario on or about June 28, 2022. A Ministry of the Environment, Conservation and Parks (MECP) Well Record for the subject well (TW1) is provided as Attachment A.

A pumping test was carried out at the well, TW1, by a member of our engineering staff on March 7, 2023. The testing consisted of a 6 hour duration constant discharge rate pumping test. During the pumping test, water level measurements were made both manually and using a pressure transducer to monitor the drawdown of the water level in the well in response to pumping. Groundwater samples were collected from TW1 at about hour 3 and at hour 6 of the pumping test to characterize groundwater quality. After the pumping period, the pump was shut off and the recovery of the water level in the well was monitored for a period of time until at least 95 percent of the drawdown created during pumping had been recovered or for at least 24 hours, whichever was less.

Groundwater Supply Evaluation

Water Demand

The water demand is calculated using the information from the sewage system daily design flow and the City of Ottawa Water Distribution Guidelines, 2010. The sewage design flows are provided below, based on the sewage design information (provided by client in a document from Eastern Engineering Group Inc. Septic and Grading Plan, revision 6). The calculations from that document indicate the sewage demand for the building is 900 Litres per day. The client also supplied information for the expected water demand for the cannabis growth (provided as Attachment E).



Professional Engineers
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Using this information, an average water demand is calculated as follows.

- Factory, Per employee per 8 hour shift = 75 Litres/employee x 12 employees = 900 L/day
- Greenhouse, estimated water use = 2517 L/day
- Total average daily water demand = 3417 L/day

Since sewage system design is based on the maximum expected daily use, it is equivalent to the Maximum Daily Demand (MDD). The MDD is based on an eight hour operation schedule (i.e. full day occurs over an eight hour period and not over 24 hours).

City of Ottawa calculates the Maximum Hour Demand (MHD) for a commercial or industrial demand to be $1.8 \times \text{MDD}$

$$\begin{aligned}\text{MDD} &= 3417 \text{ litres / day} \times 1 \text{ day} / 8 \text{ hours} \times 1 \text{ hour} / 60 \text{ minutes} \\ &= 7.1 \text{ litres / minute}\end{aligned}$$

$$\begin{aligned}\text{MHD} &= 1.8 \times \text{MDD} \\ &= 1.8 \times 7.1 \text{ litres / minute} \\ &= 12.8 \text{ litres / minute}\end{aligned}$$

Alternatively, the City of Ottawa Water Distribution Guideline Section 4.2.8 indicates the average water demand for light industrial usage is 35,000 L/gross ha/day. The gross area of the site is 0.47 hectares.

$$\begin{aligned}\text{ADD} &= 0.47 \text{ ha} \times 35,000 \text{ L/gross ha/day} \\ &= 11.4 \text{ L/min} \\ \text{MDD} &= 1.5 \times \text{ADD} \\ &= 1.5 \times 11.4 \text{ L/min} \\ &= 17.1 \text{ L/min} \\ \text{MHD} &= 17.1 \text{ L/min} \times 1.8 = 30.8 \text{ L/min}\end{aligned}$$

Using the more conservative figure for groundwater usage, the City of Ottawa predicated water usage for ADD, MDD and MHD of 11.4 L/min, 17.1 L/min and 30.8 L/min, respectively, are used.

The conservative estimate for Maximum Hourly Demand (MHD) for the site based on its proposed use is expected to be about 30.8 litres/minute, compared to the pumping test rate which was 36 litres/minute. As such, it is considered that the pumping rate used is sufficient to meet a peak water demand that may occur.

Water Quantity

The well was pumped for six hours at a pumping rate of about 36 litres per minute. Over the course of the pumping test, the water level in the well dropped some 5.29 metres. At the end of the pumping test, the well had recovered 90% within about 76 minutes and 92% after 130 minutes. The pressure transducer that is installed to carry out continuous monitoring of groundwater levels was removed from the well at that point as the owner had to reinstall the pump. A Kollaard Associates Inc. technician visited the site the subsequent day and measured the water level manually. The water level 22.5 hours after the end of the test was 98 percent recovered. As such, it is considered that the well can sustain a daily water demand of at least 36 litres per minute and meet the expected daily water demand for the site over the long term.



The pumping test drawdown and recovery data and plots for TW1 are provided as Attachment B. The drawdown and recovery data provided were measured with reference to the top of the well casing at the test well location.

The pumping test data for the test well was analyzed using the method of Cooper and Jacob (1946). Although the assumptions on which these equations are based are not strictly met, this method provides a reasonable estimate of the aquifer transmissivity. Transmissivity was calculated using the following relationship:

$$T = \frac{2.3Q}{4\pi ds}$$

where Q is the pump rate, m³/day
ds is the change in drawdown over one time log cycle, m
T is the transmissivity, m²/day

$$\begin{aligned}\text{Specific Capacity} &= Q / \text{TD} \\ &= 51.8 \text{ m}^3/\text{day} / 5.29 \text{ m} \\ &= 9.79 \text{ m}^3/\text{day/m}\end{aligned}$$

where Q = test pumping rate (m³/day)
TD = total drawdown (m)

Based on the pumping test drawdown data the transmissivity of the aquifer is estimated to be about 6.3 m²/day. Based on the recovery data the aquifer transmissivity is estimated to be about 10.5 m²/day. Over the course of the six hour test, some ~13,000 litres of water were pumped from the well. The available drawdown at the well is about 45.7 metres (based on recommended pump depth and static water level at the time of the test). As the expected maximum daily water demand is about 4,000 litres per day, the expected drawdown at the well should be well within the available drawdown for the well.

Well Interference

During the pumping test, the drawdown at the well was 5.29 metres. The closest offsite well is at least 50 metres or more from the subject well. The effects of drawdown in a well dissipate quickly outside of the immediate area. So, the interference effects on other wells are expected to be much less than 5 metres.

A review of several additional well records was carried out and indicated that area wells are typically 25 metres in depth or deeper. These wells are all sufficiently deep such that well interference is not an issue, with available drawdown of greater than 10 metres or more. There is one well located near the site that is of older construction and are indicated to be a shallower well of a depth of some 17 metres. The available drawdown in this well based on the pump depths and the static water level indicated on the well record is about 6.1 metres. There is sufficient available drawdown at these wells such that the use of the well will not interfere with the well performance in other offsite wells.



Water Quality

To determine the water quality of the groundwater supply, groundwater samples were obtained from the well during the pumping test and prepared/preserved in the field using appropriate techniques and submitted to Eurofins Environmental Testing in Ottawa, Ontario for the chemical, physical and bacteriological analyses listed in the MECP guideline entitled Procedure D-5-5, Technical Guideline for Private Wells: Water Supply Assessment, August 1996. Other water samples were submitted to ALS Canada for common contaminants including VOCs, petroleum hydrocarbons and PAHs.

The temperature, conductivity, pH, total dissolved solids, turbidity and residual chlorine levels of the groundwater were measured at periodic intervals during the pumping test. The results of the chemical, physical and bacteriological analyses of the water samples obtained from the test well and the field water quality are provided as Attachment C and in Table I, respectively.

The water quality as determined from the results of the analyses is acceptable. The water meets all the Ontario Drinking Water Standards (ODWS) health and aesthetic parameters tested for at the test well except for hardness, iron, manganese, TDS and turbidity. Sodium level is above the 20 mg/l medical advisory limit but well within the aesthetic objective. When sodium levels exceed 20 mg/l, the local Medical Officer of Health should be informed so that the information can be relayed to local physicians.

Hardness

The water is considered to be hard by water treatment standards. Water with hardness above 80 to 100 milligrams per litre as CaCO_3 is often softened for domestic use. The hardness at the well is 387 to 394 milligrams per litre. Treatment consisting of water softening by conventional sodium ion exchange is effective to reduce scale formation associated with hardness. Ion exchange water softening may introduce relatively high concentrations of sodium into the drinking water. Treatment by water softening can also contribute a significant percentage to the daily sodium intake for a consumer on a sodium restricted diet. Where ion exchange water softeners are used, a separate unsoftened water supply could be used for drinking and culinary purposes. The untreated water had sodium levels that were above the medical advisory level of 20 mg/l.

Iron

Iron was measured at a level of 1.38 to 1.43 mg/l, compared to the aesthetic objective of 0.3 mg/l. Excessive iron levels may cause brown or black discolouration of laundry and fixtures, affect the taste and colour of water, and iron precipitation in pipes and hot water tank can also promote the growth of iron bacteria. Iron can be effectively removed using conventional ion exchange water softeners or manganese greensand filter at levels of up to 5.0 mg/L. However, depending on the form that iron is in (reduced or oxidized) as well as the concentration and other factors, a proprietary filter iron filters may be more effective in removing iron from the water supply.

Manganese

The level of manganese ranged from 0.43 to 0.46 mg/L. The aesthetic objective for manganese is 0.05 mg/l. Water softeners or manganese greensand filter can be effective for treating manganese levels of up to 1.0 mg/L. Manganese can stain laundry and fixtures black. Manganese can be effectively treated using a manganese greensand filter or some other proprietary filter for manganese removal.



Turbidity

Turbidity was also elevated in the three hour sample and six hour sample (16.6 and 14.2 NTU). The elevated turbidity was considered to be due to the elevated iron and manganese. The field readings for turbidity ranged from 6.3 to 1.7 NTU.

Colour

The colour level was elevated in both water samples from 11 to 23 TCU in the samples obtained after three and six hours, respectively. This level of colour is often associated with certain forms of iron and manganese compounds. It is considered

Sodium

Sodium is above the medical advisory level of 20 milligrams per litre for those who require a sodium reduced diet. The sodium level is about 55 to 58 milligrams per litre. When sodium levels exceed 20 mg/l, the local Medical Officer of Health should be informed so that the information can be relayed to local physicians.

Total Dissolved Solids

Total dissolved solids (TDS) were slightly elevated above the aesthetic objective of 500 mg/l, about 648 to 663 mg/l. The Ryznar Stability Index (RSI) and Langelier Saturation Index (LSI) were calculated for both water samples. The RSI values for the water samples were 6.55 and 6.37 for the three and six hour samples, respectively. The LSI values for the water samples were 0.69 and 0.85 for the three and six hour samples, respectively. RSI values less than 6 indicate that the scale potential increases and values greater than 7 indicate that a calcium carbonate formation does not lead to a protective corrosion inhibiting film. In this case, the water is mildly scale forming and not corrosive. Positive values for LSI indicate that scale can form and calcium carbonate precipitation may occur, while values close to zero indicate borderline scale potential. In this case, the LSI values are positive, indicating borderline scale potential. Combined with the RSI values, it is likely that the water is slightly scale forming and not corrosive potential. According to the Support Document for the Ontario Drinking Water Standards, Objectives and Guidelines (ODWSOG), the palatability of drinking water with a TDS level less than 500 mg/l is generally considered to be good. The effect of elevated TDS levels on drinking water depends on the individual components, which are principally chlorides, sulphates, calcium, magnesium and bicarbonates. Depending on which parameters are elevated, TDS exceedances can include hardness, taste, mineral deposition or corrosion. In this case, the water samples had high hardness and sodium and magnesium are also elevated. Sodium and magnesium are both within the aesthetic objectives and are unlikely to significantly affect the taste of the water. Hardness generally increases the mineral deposition. However, in this case, the water is not indicated to be scale forming. Based on the above noted information, it is considered that treatment to reduce hardness will reduce the potential for scale forming as it affects TDS.

Trace Heavy Metals

Trace metals were tested and no exceedances of any metals were encountered.

VOCs, PAHs, Hydrocarbons

There was no presence of VOCs or hydrocarbons above the method detection limits. PAHs were generally also below method detection limits, with the exception of low levels of naphthalene compounds which were well within allowable limits (by 2 orders of magnitude).



GROUNDWATER IMPACT ASSESSMENT

The Ministry of the Environment, Conservation and Parks (MECP) in the MOE Procedure D-5-4 provides guidelines for evaluating "the ability of the lands identified by and restricted to the development to treat sewage effluent to meet acceptable limits". The guideline requires that the representative background nitrate levels in the receiving groundwater be determined. Where background levels are greater than 10 milligrams per litre the ministry indicates development of the site should not be supported unless it can be demonstrated that existing levels of nitrates are the results of historical agricultural practices on the site. In addition, the guideline requires demonstration that the site is not obviously hydrogeologically sensitive such as karstic areas, areas of fractured bedrock exposed at the surface, areas of thin soil cover or areas of highly permeable soils.

The guideline indicates that the assessment involves a three step process.

Step 1 regards lot size considerations. Where the lot size for each private residence within the development is an average of one hectare or larger and no lot is smaller than 0.8 hectares, and provided the site is not hydrogeologically sensitive, the risk that impact limits may be exceeded by individual systems is considered acceptable.

Step 2 is in regards to septic system isolation considerations. Developments are considered low risk when it can be demonstrated that sewage effluent is hydrogeologically isolated from existing or potential supply aquifers. For this case the most probable groundwater receiver for sewage is to be defined through information obtained through a test pit or test hole program, and the most probable lower hydraulic or physical boundary of the groundwater receiving sewage effluent is to be defined. The guideline indicates hydrogeologic information concerning lands up to 500 metres beyond the actual development boundary may be required. When it can be demonstrated that the sewage will not enter supply aquifers the lot density of the proposed development is determined based on the space required to install a suitable septic system at each lot in accordance with the Ontario Building Code.

Step 3 is in regards to contaminant attenuation considerations. For this case, it is required to assess the risk that the on-site sewage systems within the proposed development will cause a concentration of nitrate in groundwater above 10 milligrams per litre at the down gradient boundary of the site.

The proposed development is on an existing parcel of land that is some 4700 square metres (~1.2 acres). As the lot size is less than 0.8 hectares, sewage concentrations down gradient of the site are considered.

Surficial geology maps, combined with information from the well record indicate soil type is likely glacial till of a soil thickness is about 6.0 metres in thickness. Generally, this amount of soil cover and the type of soil being medium permeability would not be considered hydrogeologically sensitive.

To obtain a general indication as to the potential impact of septic effluent on the properties adjoining the proposed development, a nitrate dilution model was used. A daily effluent loading of 900 litres per day was assumed using the sewage design information and the total expected impact of septic system at this site was determined by considering the attenuation of nitrate in the effluent from an assumed 40 milligrams per litre (mg/l) (NO_3 as N) after the septic system treatment to the property



boundary by dilution as a result of the infiltration of meteoric water only. The following provides the basis whereby the infiltration reduction factors for the site were chosen for the dilution calculations.

Topographic, soil and land cover infiltration factors were selected from *Table 2* of the MOE *Hydrological Technical Information Requirements for Land Development Applications*. The following is a discussion of each of the infiltration reduction factors chosen for the site.

The lot area is 4700 square metres. The hard surfaced areas that are present at the site include the roof of the building and asphalt areas of 991 square metres. However, the stormwater design is expected to infiltrate most of the runoff. As such, the stormwater infiltration is estimated to be 50% (i.e. at least 50% of the total expected runoff will infiltrate on site through stormwater management). This reduces the hard surfaced area by about 50%. The Net Surface Area of the site is 4204 m².

A soil infiltration factor of 0.20 was chosen as the site is expected to consist of glacial till (IRF of 0.20, described as medium combinations of clay and loam) for the septic effluent dilution calculations, based on the expected permeability of the soils expected across the site.

The site is characterized by flat terrain with a slope infiltration factor of 0.30.

The type of land cover observed at the site at the time of site visits and by use of satellite imagery consists of cultivated lands with up to 20% woodland, given the presence of a drainage boundary on the west side of the site. The land cover infiltration factor of 0.12 was selected, which corresponds to cultivated lands with some woodland.

In order to determine water surplus estimates for the site area, a water surplus model was obtained using published information from Environment Canada (EC) for the City of Brockville. The water balance model output the average yearly moisture surplus value, based on monthly moisture surplus averages for the period from 1966 to 2022. The expected moisture surplus or net potential infiltration value for glacial till is 402 millimetres.

The results of the sewage dilution calculations indicate that the expected concentration of nitrate at the site boundary due to the proposed sewage system is about 9.5 milligrams per litre (Attachment D). This is within the Ministry of the Environment acceptable nitrate impact limit of 10 milligrams per litre.

Based on the predictive impact assessment, the private sewage disposal system is not expected to have an adverse impact on groundwater resources in the site area and the lot size is appropriate for the proposed domestic water use for the office space.

WELLHEAD PROTECTION AND RECOMMENDATIONS

A review of the Site Plan (Rev. 3) prepared by Eastern Engineering Group indicates that the well is located within a landscaped area and is greater than 15 metres and 37 metres from the sewage tank and sewage system, respectively.

Should any grading be carried out, the grading around the wellhead shall be carried out as follows to comply with well siting requirements and be in accordance with the Ontario Regulation 903:

- The well casing must extend to greater than 400 millimetres above final finished grades around the well; and



- The ground surface shall be graded such that the well is the highest point on the ground surface within 3 metres radially from the exterior of the well casing and shall ensure that water does not collect or pond near the well head.

The supply well is located within the south portion of the site, while the location of the proposed septic system is within the north portion of the site. The down gradient flow direction is expected to be to the southeast (generally towards the St. Lawrence River). As such, the well location is not down gradient of the septic system.

The well has been grouted and cased to a depth of about 9.1 metres below the existing ground surface, according to information provided on the well record (Attachment A). The well is physically separated from any driving surfaces. With these measures in place, it is considered that an adequate amount of wellhead protection is going to be in place to protect the water supply for the proposed use of the property. The well location is also accessible in case of repairs and well maintenance.

Recommendations for wellhead protection include ensuring that potential contaminant sources are at least 15 metres or more from the well. Possible contaminant sources include; chemical storage, garage and related chemicals, such as antifreeze, gasoline, oils, vehicle/boat/equipment storage, sewer lines, septic systems, animal enclosures, manure or compost piles. If liquid chemicals, such as antifreeze, oil and gasoline/diesel, and their waste products, are to be stored at the site, they should be stored in containers approved for that purpose. The container(s) should be labelled with their contents. Secondary containment should be installed around all bulk liquid chemical or waste storage containers, to collect and contain leaks and spills from the tank and all connections.

Recommendations for well maintenance include; inspect wellhead annually to ensure that the casing is structurally sound, verify well cap is sealed and that surface water is not pooling around wellhead. The well is located such that it is easily accessible for maintenance/repairs. A lock on the well cap is useful to prevent vandalism.

Based on the results of this evaluation it is considered that the well in question should supply water of adequate quantity and quality for the proposed development with suitable treatment and wellhead protection as indicated above.

We trust this letter provides sufficient information for your purposes. If you have any questions concerning this letter, please do not hesitate to contact our office.

Yours truly,
Kollaard Associates Inc.



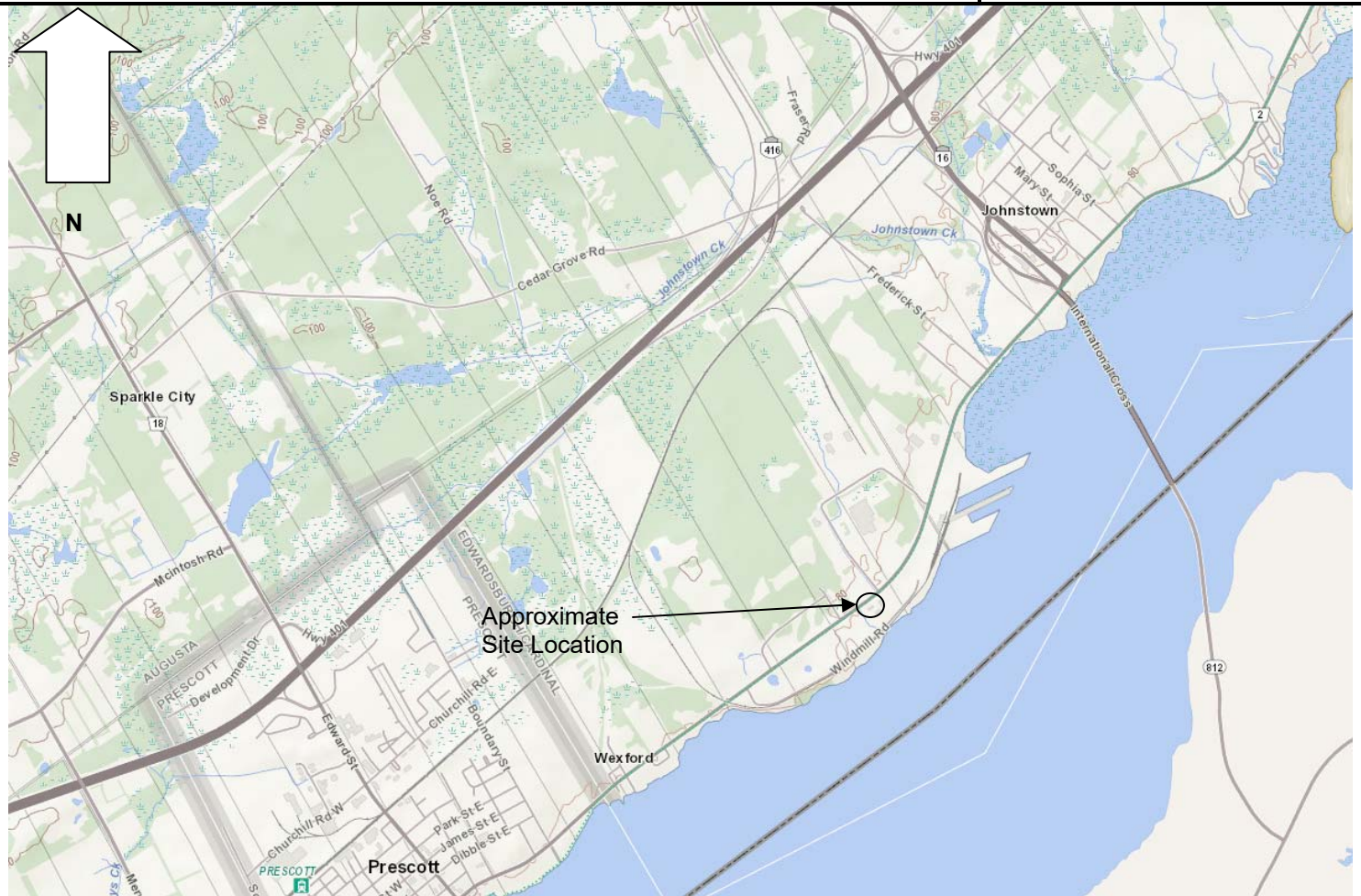
Colleen Vermeersch, P. Eng.



Attachments:	Figure 1	- Key Plan
	Table I	- Field Water Quality
	Attachment A	- Well Record
	Attachment B	- Pumping Test Data
	Attachment C	- Well Water Laboratory Test Results
	Attachment D	- Nitrate Dilution Calculations and EC Climate Data
	Attachment E	- Water Demand Estimate provided by client

KEY PLAN

FIGURE 1



NOT TO SCALE



Kollaard Associates
Engineers

Project No. **230124**

Date **April 2023**

TABLE I
FIELD WATER QUALITY MEASUREMENTS
FOR TEST WELL 1

Time Since Pumping Test Started (min)	Temperature (°C)	pH	Turbidity (NTU)	Total Dissolved Solids (ppm)	Conductivity (µS)	Free Chlorine (ppm)
60	9.0	8.33	6.27	511	1027	0.00
120	8.9	7.87	1.81	493	987	-
180	9.0	7.67	1.68	484	968	0.00
240	11.5	7.47	2.76	455	910	-
300	9.7	7.77	-	469	939	-
360	-	-	-	-	-	-



ATTACHMENT A
MOE WELL RECORD FOR TW1
PROVIDED BY CLIENT

Measurements recorded in: ☐ Metric ☐ Imperial

Page _____ of _____

Well Owner's Information

First Name Hussein	Last Name/Organization Baydoun INC.	E-mail Address	<input type="checkbox"/> Well Constructed by Well Owner
Mailing Address (Street Number/Name) 3209 County Rd 2 Johnstown	Municipality	Province Ont	Postal Code
Telephone No. (inc. area code)			

Well Location

Address of Well Location (Street Number/Name) 3209 County Rd 2 Johnstown	Township	Lot	Concession
County/District/Municipality Leeds	City/Town/Village Johnstown	Province Ontario	Postal Code
UTM Coordinates Zone Easting Northing NAD 83 18	Municipal Plan and Sublot Number	Other	

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From To
	Gray Gravel Hard Pan			0 20
	Gray Limestone			20 30
	Gray Limestone			30 120
	Gray Brown Sandstone			120 188
CHLORZEN Residuals Collected				
And Recorded At 125 Milligrams Per Liter's				

Annular Space		
Depth Set at (m/ft) From To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0 30	Quick Grout	6 Bags

Method of Construction	Well Use
<input type="checkbox"/> Cable Tool <input type="checkbox"/> Rotary (Conventional) <input type="checkbox"/> Rotary (Reverse) <input type="checkbox"/> Boring <input checked="" type="checkbox"/> Air percussion <input type="checkbox"/> Other, specify	<input type="checkbox"/> Diamond <input type="checkbox"/> Jetting <input type="checkbox"/> Driving <input type="checkbox"/> Digging <input type="checkbox"/> Public <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Livestock <input type="checkbox"/> Irrigation <input type="checkbox"/> Industrial <input type="checkbox"/> Other, specify
<input type="checkbox"/> Commercial <input type="checkbox"/> Municipal <input type="checkbox"/> Test Hole <input type="checkbox"/> Cooling & Air Conditioning <input type="checkbox"/> Not used <input type="checkbox"/> Dewatering <input type="checkbox"/> Monitoring	

Construction Record - Casing				Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From To	<input checked="" type="checkbox"/> Water Supply	
6 1/2"	Steel	188	0 30	<input type="checkbox"/> Replacement Well	
				<input type="checkbox"/> Test Hole	
				<input type="checkbox"/> Recharge Well	
				<input type="checkbox"/> Dewatering Well	
				<input type="checkbox"/> Observation and/or Monitoring Hole	
				<input type="checkbox"/> Alteration (Construction)	
				<input type="checkbox"/> Abandoned, Insufficient Supply	
				<input type="checkbox"/> Abandoned, Poor Water Quality	
				<input type="checkbox"/> Abandoned, other, specify	
				<input type="checkbox"/> Other, specify	

Construction Record - Screen			
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From To

Water Details		Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft) From To	Diameter (cm/in)
168	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	0 30	10 1/4"
		30 188	6 1/8"

Well Contractor and Well Technician Information			
Business Name of Well Contractor 1362645 Ont Limited		Well Contractor's Licence No. 6151615	
Business Address (Street Number/Name) 8350 County Rd 15 N Aurora		Municipality Aurora	
Province Ont	Postal Code H0G 2R0	Business E-mail Address	
Bus. Telephone No. (inc. area code) 613 1802-8251		Name of Well Technician (Last Name, First Name) Dave + r.s.h	
Well Technician's Licence No. 10-11414		Signature of Technician and/or Contractor Pam	
Date Submitted 2022/06/28			

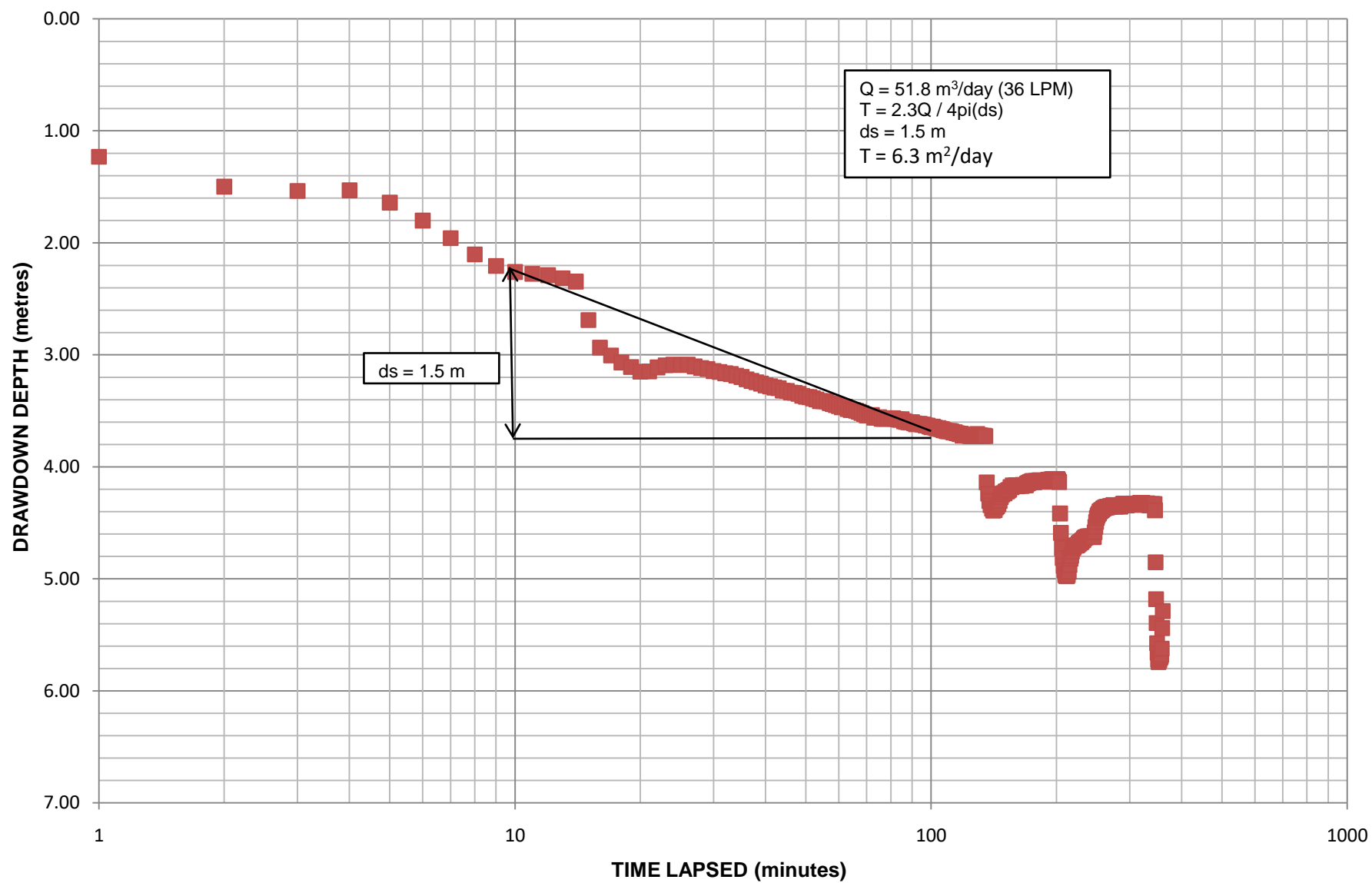
Results of Well Yield Testing				
After test of well yield, water was: <input checked="" type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify	Draw Down		Recovery	
	Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason: 0	Static Level	19		20
	1	20	1	19
Pump intake set at (m/ft) 150 Ft	2	20	2	19
	3	20	3	19
Pumping rate (l/min / GPM) 306 GPM	4	20	4	19
	5	20	5	19
Duration of pumping 1 hrs + min	10	20	10	19
	15	20	15	19
Final water level end of pumping (m/ft) 20 Ft	20	20	20	19
	25	20	25	19
If flowing give rate (l/min/GPM) 0	30	20	30	19
	40	20	40	19
Recommended pump depth (m/ft) 150 Ft	50	20	50	19
	60	20	60	19
Recommended pump rate (l/min/GPM) 256 GPM				
Well production (l/min/GPM) 306 GPM				
Disinfected? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	125 MPL			

Map of Well Location	
Please provide a map below following instructions on the back.	
Buildings 44' W 76' pine way	
Comments:	
Well owner's information package delivered <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Date Package Delivered 2022/06/28 Date Work Completed 2022/06/28
Ministry Use Only Audit No. Z387231 Received	



ATTACHMENT B
PUMPING TEST DATA FOR TW1

TW1-WELL DRAWDOWN VS. TIME-KOLLAARD FILE 230124



DRAWDOWN DATA TW1

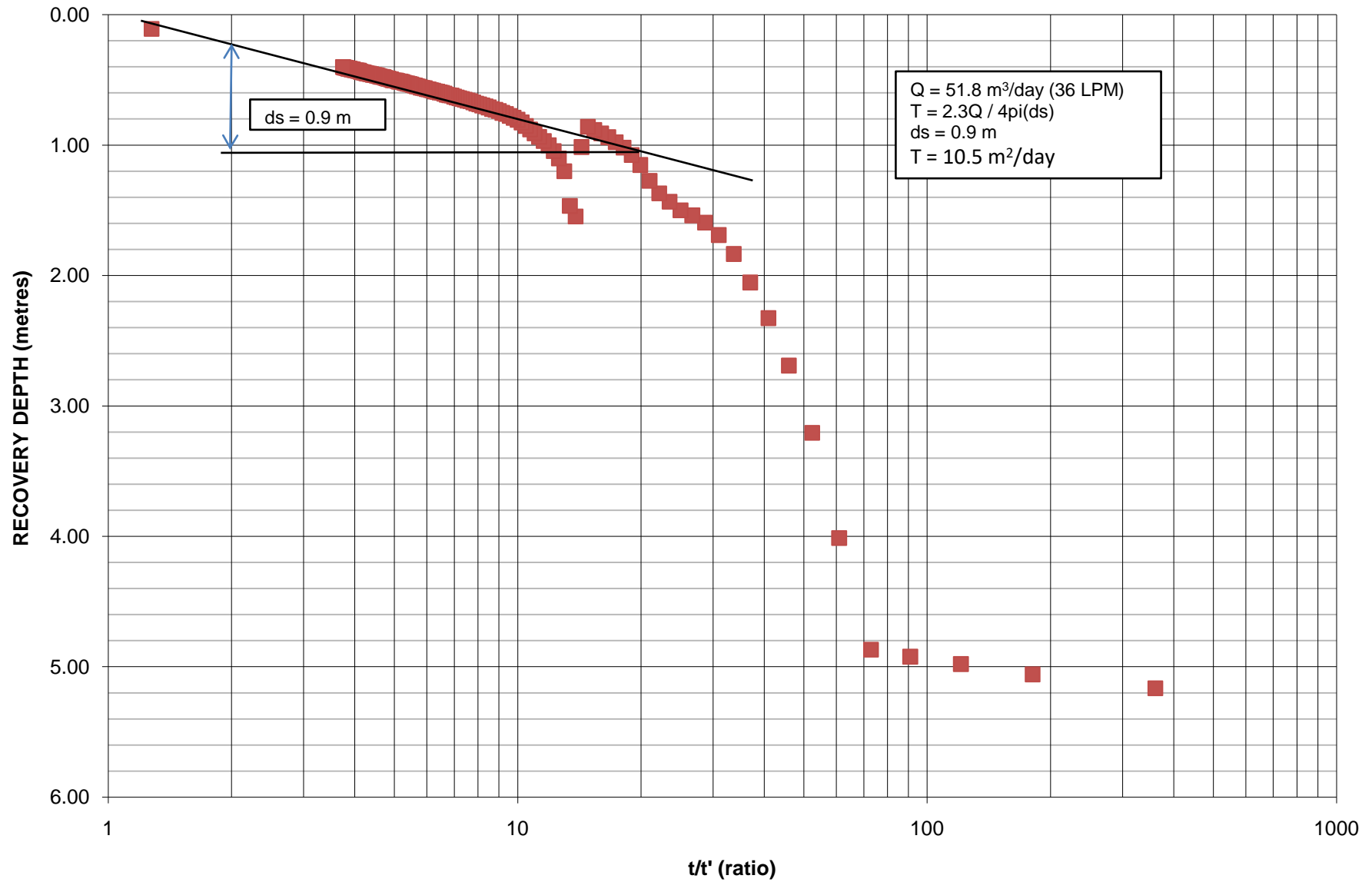
Time Lapsed (minutes)	Abs Pres (kPa)	Temp (°C)	Water Level (m)	Drawdown (m)
0	362.877	9.472	-2.08	0.00
1	350.8	9.472	-3.312	1.23
2	348.184	9.472	-3.578	1.50
3	347.806	9.472	-3.617	1.54
4	347.864	9.472	-3.611	1.53
5	346.789	9.472	-3.721	1.64
6	345.22	9.472	-3.881	1.80
7	343.68	9.472	-4.038	1.96
8	342.256	9.472	-4.183	2.10
9	341.24	9.472	-4.286	2.21
10	340.717	9.472	-4.34	2.26
11	340.543	9.472	-4.357	2.28
12	340.427	9.472	-4.369	2.29
13	340.165	9.472	-4.396	2.32
14	339.875	9.472	-4.426	2.35
15	336.508	9.472	-4.769	2.69
16	334.099	9.472	-5.015	2.94
17	333.403	9.472	-5.086	3.01
18	332.793	9.472	-5.148	3.07
19	332.387	9.472	-5.189	3.11
20	331.981	9.472	-5.231	3.15
21	332.01	9.472	-5.228	3.15
22	332.358	9.472	-5.192	3.11
23	332.532	9.472	-5.174	3.09
24	332.59	9.472	-5.168	3.09
25	332.561	9.472	-5.171	3.09
26	332.59	9.472	-5.168	3.09
27	332.445	9.472	-5.183	3.10
28	332.3	9.472	-5.198	3.12
29	332.213	9.472	-5.207	3.13
30	332.039	9.472	-5.225	3.15
31	331.952	9.472	-5.233	3.15
32	331.836	9.472	-5.245	3.17
33	331.778	9.472	-5.251	3.17
34	331.633	9.472	-5.266	3.19
35	331.517	9.472	-5.278	3.20
36	331.314	9.472	-5.299	3.22
37	331.169	9.472	-5.313	3.23
38	331.053	9.472	-5.325	3.25
39	330.937	9.472	-5.337	3.26
40	330.792	9.472	-5.352	3.27
41	330.705	9.472	-5.361	3.28
42	330.589	9.472	-5.372	3.29
43	330.531	9.472	-5.378	3.30
44	330.328	9.472	-5.399	3.32
45	330.299	9.472	-5.402	3.32
46	330.154	9.472	-5.417	3.34
47	330.131	9.571	-5.419	3.34
48	330.044	9.571	-5.428	3.35
49	329.87	9.571	-5.446	3.37
50	329.783	9.571	-5.455	3.38
51	329.754	9.571	-5.458	3.38
52	329.638	9.571	-5.469	3.39
53	329.551	9.571	-5.478	3.40
54	329.406	9.571	-5.493	3.41
55	329.406	9.571	-5.493	3.41
56	329.377	9.571	-5.496	3.42
57	329.232	9.571	-5.511	3.43
58	329.145	9.571	-5.52	3.44
59	329.058	9.571	-5.529	3.45
60	328.971	9.571	-5.537	3.46
61	328.855	9.571	-5.549	3.47
62	328.913	9.571	-5.543	3.46
63	328.711	9.571	-5.564	3.48
64	328.624	9.571	-5.573	3.49
65	328.624	9.571	-5.573	3.49
66	328.566	9.571	-5.579	3.50
67	328.479	9.571	-5.588	3.51
68	328.363	9.571	-5.599	3.52
69	328.247	9.571	-5.611	3.53
70	328.16	9.571	-5.62	3.54
71	328.16	9.571	-5.62	3.54
72	328.189	9.571	-5.617	3.54
73	327.963	9.669	-5.64	3.56
74	327.963	9.669	-5.64	3.56
75	327.992	9.669	-5.637	3.56
76	327.847	9.669	-5.652	3.57
77	327.847	9.669	-5.652	3.57
78	327.905	9.669	-5.646	3.57
79	327.876	9.669	-5.649	3.57
80	327.905	9.669	-5.646	3.57
81	327.905	9.669	-5.646	3.57
82	327.847	9.669	-5.652	3.57
83	327.818	9.669	-5.655	3.58
84	327.76	9.669	-5.661	3.58
85	327.818	9.669	-5.655	3.58
86	327.644	9.669	-5.673	3.59

87	327.586	9.669	-5.679	3.60
88	327.557	9.669	-5.682	3.60
89	327.528	9.669	-5.685	3.61
90	327.557	9.669	-5.682	3.60
91	327.47	9.669	-5.691	3.61
92	327.383	9.669	-5.699	3.62
93	327.412	9.669	-5.696	3.62
94	327.412	9.669	-5.696	3.62
95	327.354	9.669	-5.702	3.62
96	327.354	9.669	-5.702	3.62
97	327.267	9.669	-5.711	3.63
98	327.267	9.669	-5.711	3.63
99	327.18	9.669	-5.72	3.64
100	327.122	9.669	-5.726	3.65
101	327.18	9.669	-5.72	3.64
102	327.093	9.669	-5.729	3.65
103	327.035	9.669	-5.735	3.66
104	327.042	9.768	-5.734	3.65
105	326.977	9.669	-5.741	3.66
106	326.955	9.768	-5.743	3.66
107	326.868	9.768	-5.752	3.67
108	326.839	9.768	-5.755	3.68
109	326.781	9.768	-5.761	3.68
110	326.781	9.768	-5.761	3.68
111	326.781	9.768	-5.761	3.68
112	326.752	9.768	-5.764	3.68
113	326.665	9.768	-5.773	3.69
114	326.694	9.768	-5.77	3.69
115	326.607	9.768	-5.779	3.70
116	326.578	9.768	-5.781	3.70
117	326.52	9.768	-5.787	3.71
118	326.549	9.768	-5.784	3.70
119	326.375	9.768	-5.802	3.72
120	326.404	9.768	-5.799	3.72
121	326.433	9.768	-5.796	3.72
122	326.375	9.768	-5.802	3.72
123	326.375	9.768	-5.802	3.72
124	326.346	9.768	-5.805	3.73
125	326.346	9.768	-5.805	3.73
126	326.346	9.768	-5.805	3.73
127	326.462	9.768	-5.793	3.71
128	326.404	9.768	-5.799	3.72
129	326.52	9.768	-5.787	3.71
130	326.404	9.768	-5.799	3.72
131	326.404	9.768	-5.799	3.72
132	326.375	9.768	-5.802	3.72
133	326.346	9.768	-5.805	3.73
134	326.375	9.768	-5.802	3.72
135	326.346	9.768	-5.805	3.73
136	322.289	9.768	-6.219	4.14
137	321.304	9.768	-6.319	4.24
138	320.667	9.768	-6.384	4.30
139	320.29	9.768	-6.423	4.34
140	320	9.768	-6.452	4.37
141	319.827	9.768	-6.47	4.39
142	319.856	9.768	-6.467	4.39
143	320.087	9.768	-6.443	4.36
144	320.203	9.768	-6.432	4.35
145	320.377	9.768	-6.414	4.33
146	320.667	9.768	-6.384	4.30
147	321.014	9.768	-6.349	4.27
148	321.217	9.768	-6.328	4.25
149	321.333	9.768	-6.316	4.24
150	321.333	9.768	-6.316	4.24
151	321.507	9.768	-6.299	4.22
152	321.507	9.768	-6.299	4.22
153	321.593	9.768	-6.29	4.21
154	321.651	9.768	-6.284	4.20
155	321.883	9.768	-6.26	4.18
156	321.854	9.768	-6.263	4.18
157	322.028	9.768	-6.245	4.17
158	321.97	9.768	-6.251	4.17
159	321.97	9.768	-6.251	4.17
160	322.057	9.768	-6.242	4.16
161	321.941	9.768	-6.254	4.17
162	321.999	9.768	-6.248	4.17
163	322.028	9.768	-6.245	4.17
164	322.057	9.768	-6.242	4.16
165	321.97	9.768	-6.251	4.17
166	322.086	9.768	-6.24	4.16
167	322.034	9.866	-6.245	4.17
168	322.034	9.866	-6.245	4.17
169	322.034	9.866	-6.245	4.17
170	322.179	9.866	-6.23	4.15
171	322.237	9.866	-6.224	4.14
172	322.266	9.866	-6.221	4.14
173	322.324	9.866	-6.215	4.14
174	322.353	9.866	-6.212	4.13
175	322.411	9.866	-6.206	4.13
176	322.353	9.866	-6.212	4.13
177	322.295	9.866	-6.218	4.14
178	322.411	9.866	-6.206	4.13
179	322.411	9.866	-6.206	4.13

180	322.353	9.866	-6.212	4.13
181	322.44	9.866	-6.203	4.12
182	322.469	9.866	-6.2	4.12
183	322.44	9.866	-6.203	4.12
184	322.411	9.866	-6.206	4.13
185	322.411	9.866	-6.206	4.13
186	322.44	9.866	-6.203	4.12
187	322.353	9.866	-6.212	4.13
188	322.44	9.866	-6.203	4.12
189	322.382	9.866	-6.209	4.13
190	322.44	9.866	-6.203	4.12
191	322.527	9.866	-6.195	4.12
192	322.527	9.866	-6.195	4.12
193	322.469	9.866	-6.2	4.12
194	322.556	9.866	-6.192	4.11
195	322.556	9.866	-6.192	4.11
196	322.585	9.866	-6.189	4.11
197	322.556	9.866	-6.192	4.11
198	322.585	9.866	-6.189	4.11
199	322.556	9.866	-6.192	4.11
200	322.498	9.866	-6.198	4.12
201	322.585	9.866	-6.189	4.11
202	322.498	9.866	-6.198	4.12
203	322.324	9.866	-6.215	4.14
204	319.572	9.866	-6.496	4.42
205	317.863	9.866	-6.67	4.59
206	316.532	9.866	-6.806	4.73
207	315.663	9.866	-6.894	4.81
208	314.969	9.866	-6.965	4.89
209	314.592	9.866	-7.004	4.92
210	314.187	9.866	-7.045	4.97
211	314.1	9.866	-7.054	4.97
212	314.071	9.866	-7.057	4.98
213	314.187	9.866	-7.045	4.97
214	314.454	9.965	-7.018	4.94
215	315.055	9.866	-6.956	4.88
216	315.605	9.866	-6.9	4.82
217	315.866	9.866	-6.874	4.79
218	316.242	9.866	-6.835	4.76
219	316.532	9.866	-6.806	4.73
220	316.59	9.866	-6.8	4.72
221	316.734	9.866	-6.785	4.71
222	316.763	9.866	-6.782	4.70
223	316.763	9.866	-6.782	4.70
224	316.763	9.866	-6.782	4.70
225	316.821	9.866	-6.776	4.70
226	316.966	9.866	-6.762	4.68
227	316.937	9.866	-6.765	4.69
228	317.053	9.866	-6.753	4.67
229	317.053	9.866	-6.753	4.67
230	317.14	9.866	-6.744	4.66
231	317.227	9.866	-6.735	4.66
232	317.227	9.866	-6.735	4.66
233	317.371	9.866	-6.72	4.64
234	317.429	9.866	-6.714	4.63
235	317.487	9.866	-6.708	4.63
236	317.487	9.866	-6.708	4.63
237	317.522	9.965	-6.705	4.63
238	317.58	9.965	-6.699	4.62
239	317.522	9.965	-6.705	4.63
240	317.551	9.965	-6.702	4.62
241	317.58	9.965	-6.699	4.62
242	317.551	9.965	-6.702	4.62
243	317.522	9.965	-6.705	4.63
244	317.58	9.965	-6.699	4.62
245	317.493	9.965	-6.708	4.63
246	317.522	9.965	-6.705	4.63
247	317.927	9.965	-6.664	4.58
248	318.391	9.965	-6.616	4.54
249	318.825	9.965	-6.572	4.49
250	319.173	9.965	-6.537	4.46
251	319.375	9.965	-6.516	4.44
252	319.52	9.965	-6.501	4.42
253	319.578	9.965	-6.495	4.42
254	319.752	9.965	-6.478	4.40
255	319.781	9.965	-6.475	4.40
256	319.868	9.965	-6.466	4.39
257	319.868	9.965	-6.466	4.39
258	319.926	9.965	-6.46	4.38
259	320.013	9.965	-6.451	4.37
260	320.013	9.965	-6.451	4.37
261	320.071	9.965	-6.445	4.37
262	320.071	9.965	-6.445	4.37
263	320.128	9.965	-6.439	4.36
264	320.128	9.965	-6.439	4.36
265	320.099	9.965	-6.442	4.36
266	320.157	9.965	-6.436	4.36
267	320.157	9.965	-6.436	4.36
268	320.186	9.965	-6.433	4.35
269	320.215	9.965	-6.43	4.35
270	320.186	9.965	-6.433	4.35
271	320.186	9.965	-6.433	4.35
272	320.215	9.965	-6.43	4.35

273	320.244	9.965	-6.427	4.35
274	320.302	9.965	-6.421	4.34
275	320.273	9.965	-6.424	4.34
276	320.273	9.965	-6.424	4.34
277	320.244	9.965	-6.427	4.35
278	320.157	9.965	-6.436	4.36
279	320.244	9.965	-6.427	4.35
280	320.273	9.965	-6.424	4.34
281	320.273	9.965	-6.424	4.34
282	320.244	9.965	-6.427	4.35
283	320.273	9.965	-6.424	4.34
284	320.244	9.965	-6.427	4.35
285	320.157	9.965	-6.436	4.36
286	320.302	9.965	-6.421	4.34
287	320.302	9.965	-6.421	4.34
288	320.273	9.965	-6.424	4.34
289	320.389	9.965	-6.413	4.33
290	320.447	9.965	-6.407	4.33
291	320.331	9.965	-6.418	4.34
292	320.418	9.965	-6.41	4.33
293	320.36	9.965	-6.416	4.34
294	320.331	9.965	-6.418	4.34
295	320.273	9.965	-6.424	4.34
296	320.418	9.965	-6.41	4.33
297	320.418	9.965	-6.41	4.33
298	320.418	9.965	-6.41	4.33
299	320.418	9.965	-6.41	4.33
300	320.389	9.965	-6.413	4.33
301	320.418	9.965	-6.41	4.33
302	320.389	9.965	-6.413	4.33
303	320.447	9.965	-6.407	4.33
304	320.447	9.965	-6.407	4.33
305	320.389	9.965	-6.413	4.33
306	320.418	9.965	-6.41	4.33
307	320.395	10.063	-6.412	4.33
308	320.418	9.965	-6.41	4.33
309	320.418	9.965	-6.41	4.33
310	320.389	9.965	-6.413	4.33
311	320.395	10.063	-6.412	4.33
312	320.395	10.063	-6.412	4.33
313	320.395	10.063	-6.412	4.33
314	320.366	10.063	-6.415	4.34
315	320.366	10.063	-6.415	4.34
316	320.395	10.063	-6.412	4.33
317	320.476	9.965	-6.404	4.32
318	320.511	10.063	-6.4	4.32
319	320.389	9.965	-6.413	4.33
320	320.308	10.063	-6.421	4.34
321	320.511	10.063	-6.4	4.32
322	320.482	10.063	-6.403	4.32
323	320.366	10.063	-6.415	4.34
324	320.366	10.063	-6.415	4.34
325	320.424	10.063	-6.409	4.33
326	320.366	10.063	-6.415	4.34
327	320.366	10.063	-6.415	4.34
328	320.366	10.063	-6.415	4.34
329	320.366	10.063	-6.415	4.34
330	320.366	10.063	-6.415	4.34
331	320.453	10.063	-6.406	4.33
332	320.366	10.063	-6.415	4.34
333	320.308	10.063	-6.421	4.34
334	320.366	10.063	-6.415	4.34
335	320.279	10.063	-6.424	4.34
336	320.366	10.063	-6.415	4.34
337	320.308	10.063	-6.421	4.34
338	320.308	10.063	-6.421	4.34
339	320.395	10.063	-6.412	4.33
340	320.308	10.063	-6.421	4.34
341	320.395	10.063	-6.412	4.33
342	320.308	10.063	-6.421	4.34
343	320.337	10.063	-6.418	4.34
344	320.395	10.063	-6.412	4.33
345	319.845	10.063	-6.468	4.39
346	315.299	10.063	-6.932	4.85
347	312.058	10.063	-7.262	5.18
348	309.975	10.063	-7.475	5.40
349	308.21	10.063	-7.654	5.57
350	307.372	10.063	-7.74	5.66
351	306.765	10.063	-7.802	5.72
352	306.562	10.063	-7.823	5.74
353	306.707	10.063	-7.808	5.73
354	306.909	10.063	-7.787	5.71
355	306.938	10.063	-7.784	5.70
356	307.025	10.063	-7.775	5.70
357	307.198	10.063	-7.758	5.68
358	307.748	10.063	-7.702	5.62
359	309.541	10.063	-7.519	5.44
360	311.016	10.063	-7.368	5.29

TW1- WELL RECOVERY VS. TIME - KOLLAARD FILE 230124



RECOVERY DATA TW1

t'	t / t'	Abs Pres (kPa)	Temp (°C)	Water Level (m)	Drawdown (m)	Recovery (%)
1	361	312.231	10.063	-7.244	5.16	2%
2	181.0	313.273	10.063	-7.138	5.06	4%
3	121.0	314.054	10.063	-7.059	4.98	6%
4	91.0	314.604	10.063	-7.002	4.92	7%
5	73.0	315.125	10.063	-6.949	4.87	8%
6	61.0	323.524	10.063	-6.093	4.01	24%
7	52.4	331.439	10.063	-5.286	3.21	39%
8	46.0	336.488	10.063	-4.771	2.69	49%
9	41.0	340.059	10.063	-4.407	2.33	56%
10	37.0	342.731	10.063	-4.134	2.05	61%
11	33.7	344.881	10.063	-3.915	1.84	65%
12	31.0	346.305	10.063	-3.77	1.69	68%
13	28.7	347.236	10.063	-3.675	1.60	70%
14	26.7	347.788	10.063	-3.619	1.54	71%
15	25.0	348.166	10.063	-3.58	1.50	72%
16	23.5	348.805	10.063	-3.515	1.44	73%
17	22.2	349.445	10.063	-3.45	1.37	74%
18	21.0	350.375	10.063	-3.355	1.28	76%
19	19.9	351.568	10.063	-3.233	1.15	78%
20	19.0	352.324	10.063	-3.156	1.08	80%
21	18.1	352.87	9.965	-3.1	1.02	81%
22	17.4	353.277	9.965	-3.059	0.98	81%
23	16.7	353.655	9.965	-3.02	0.94	82%
24	16.0	353.946	9.965	-2.991	0.91	83%
25	15.4	354.208	9.965	-2.964	0.88	83%
26	14.8	354.441	9.965	-2.94	0.86	84%
27	14.3	352.928	9.965	-3.095	1.02	81%
28	13.9	347.694	9.965	-3.628	1.55	71%
29	13.4	348.486	10.063	-3.547	1.47	72%
30	13.0	351.102	10.063	-3.281	1.20	77%
31	12.6	352.062	10.063	-3.183	1.10	79%
32	12.3	352.615	10.063	-3.126	1.05	80%
33	11.9	353.051	10.063	-3.082	1.00	81%
34	11.6	353.371	10.063	-3.049	0.97	82%
35	11.3	353.691	10.063	-3.017	0.94	82%
36	11.0	353.953	10.063	-2.99	0.91	83%
37	10.7	354.244	10.063	-2.96	0.88	83%
38	10.5	354.506	10.063	-2.934	0.85	84%
39	10.2	354.768	10.063	-2.907	0.83	84%
40	10.0	354.971	10.063	-2.886	0.81	85%
41	9.8	355.117	10.063	-2.871	0.79	85%
42	9.6	355.256	9.965	-2.857	0.78	85%
43	9.4	355.401	9.965	-2.842	0.76	86%
44	9.2	355.488	9.965	-2.833	0.75	86%
45	9.0	355.634	9.965	-2.819	0.74	86%
46	8.8	355.721	9.965	-2.81	0.73	86%

47	8.7	355.779	9.965	-2.804	0.72	86%
48	8.5	355.896	9.965	-2.792	0.71	87%
49	8.3	355.983	9.965	-2.783	0.70	87%
50	8.2	356.041	9.965	-2.777	0.70	87%
51	8.1	356.128	9.965	-2.768	0.69	87%
52	7.9	356.187	9.965	-2.762	0.68	87%
53	7.8	356.274	9.965	-2.753	0.67	87%
54	7.7	356.361	9.965	-2.744	0.66	87%
55	7.5	356.419	9.965	-2.739	0.66	88%
56	7.4	356.478	9.965	-2.733	0.65	88%
57	7.3	356.529	9.866	-2.727	0.65	88%
58	7.2	356.587	9.866	-2.721	0.64	88%
59	7.1	356.645	9.866	-2.715	0.64	88%
60	7.0	356.704	9.866	-2.709	0.63	88%
61	6.9	356.791	9.866	-2.701	0.62	88%
62	6.8	356.82	9.866	-2.698	0.62	88%
63	6.7	356.849	9.866	-2.695	0.62	88%
64	6.6	356.936	9.866	-2.686	0.61	89%
65	6.5	356.995	9.866	-2.68	0.60	89%
66	6.5	357.024	9.866	-2.677	0.60	89%
67	6.4	357.082	9.866	-2.671	0.59	89%
68	6.3	357.104	9.768	-2.669	0.59	89%
69	6.2	357.162	9.768	-2.663	0.58	89%
70	6.1	357.198	9.866	-2.659	0.58	89%
71	6.1	357.257	9.866	-2.653	0.57	89%
72	6.0	357.279	9.768	-2.651	0.57	89%
73	5.9	357.337	9.768	-2.645	0.57	89%
74	5.9	357.366	9.768	-2.642	0.56	89%
75	5.8	357.395	9.768	-2.639	0.56	89%
76	5.7	357.454	9.768	-2.633	0.55	90%
77	5.7	357.483	9.768	-2.63	0.55	90%
78	5.6	357.541	9.768	-2.624	0.54	90%
79	5.6	357.57	9.768	-2.621	0.54	90%
80	5.5	357.628	9.768	-2.615	0.54	90%
81	5.4	357.657	9.768	-2.612	0.53	90%
82	5.4	357.686	9.768	-2.609	0.53	90%
83	5.3	357.715	9.768	-2.606	0.53	90%
84	5.3	357.745	9.768	-2.603	0.52	90%
85	5.2	357.803	9.768	-2.597	0.52	90%
86	5.2	357.832	9.768	-2.594	0.51	90%
87	5.1	357.832	9.768	-2.594	0.51	90%
88	5.1	357.89	9.768	-2.589	0.51	90%
89	5.0	357.919	9.768	-2.586	0.51	90%
90	5.0	357.919	9.768	-2.586	0.51	90%
91	5.0	357.948	9.768	-2.583	0.50	90%
92	4.9	358	9.669	-2.577	0.50	91%
93	4.9	358.029	9.669	-2.574	0.49	91%
94	4.8	358.058	9.669	-2.571	0.49	91%
95	4.8	358.087	9.669	-2.568	0.49	91%
96	4.8	358.116	9.669	-2.565	0.49	91%

97	4.7	358.181	9.768	-2.559	0.48	91%
98	4.7	358.203	9.669	-2.557	0.48	91%
99	4.6	358.203	9.669	-2.557	0.48	91%
100	4.6	358.233	9.669	-2.554	0.47	91%
101	4.6	358.268	9.768	-2.55	0.47	91%
102	4.5	358.298	9.768	-2.547	0.47	91%
103	4.5	358.327	9.768	-2.544	0.46	91%
104	4.5	358.349	9.669	-2.542	0.46	91%
105	4.4	358.349	9.669	-2.542	0.46	91%
106	4.4	358.407	9.669	-2.536	0.46	91%
107	4.4	358.407	9.669	-2.536	0.46	91%
108	4.3	358.436	9.669	-2.533	0.45	91%
109	4.3	358.436	9.669	-2.533	0.45	91%
110	4.3	358.465	9.669	-2.53	0.45	91%
111	4.2	358.494	9.669	-2.527	0.45	92%
112	4.2	358.524	9.669	-2.524	0.44	92%
113	4.2	358.553	9.669	-2.521	0.44	92%
114	4.2	358.553	9.669	-2.521	0.44	92%
115	4.1	358.582	9.669	-2.518	0.44	92%
116	4.1	358.647	9.768	-2.511	0.43	92%
117	4.1	358.647	9.768	-2.511	0.43	92%
118	4.1	358.676	9.768	-2.508	0.43	92%
119	4.0	358.698	9.669	-2.506	0.43	92%
120	4.0	358.698	9.669	-2.506	0.43	92%
121	4.0	358.727	9.669	-2.503	0.42	92%
122	4.0	358.756	9.669	-2.5	0.42	92%
123	3.9	358.756	9.669	-2.5	0.42	92%
124	3.9	358.786	9.669	-2.497	0.42	92%
125	3.9	358.815	9.669	-2.494	0.41	92%
126	3.9	358.815	9.669	-2.494	0.41	92%
127	3.8	358.844	9.669	-2.491	0.41	92%
128	3.8	358.873	9.669	-2.488	0.41	92%
129	3.8	358.873	9.669	-2.488	0.41	92%
130	3.8	358.902	9.669	-2.485	0.41	92%
131	3.7	358.931	9.669	-2.482	0.40	92%
1299	1.3	manual		-2.19	0.11	98%



ATTACHMENT C

RESULTS OF LABORATORY TESTING
OF WELL WATER SAMPLES

OFFICIAL CERTIFICATE OF ANALYSIS : 3521746
WORK REQUEST : 100205171
Report Date : 2023-03-16

Kollaard Associates Inc.
210 Prescott St., Box 189
Kemptville, ON
K0G 1J0
Attention : Colleen Vermeersch

Reception Date : 2023-03-08
Project : 230124
Sampler : Ben Kollaard
PO Number : Not Applicable
Temperature : 10 °C

Analysis	Quantity	External Method
Alkalinity (Water, Automated)	2	Modified from SM 2320 B
Ammonia, Total (Water, Colorimetry)	2	Modified from EPA 350.1
Chloride (Water, IC)	2	Modified from SM 4110 B and C
Colour, Apparent (Water, Spectrophotometry)	2	Modified from SM 2120 C
Conductivity (Water, Automated)	2	Modified from SM 2510 B
DOC (Water, IR)	2	Modified from SM 5310 B
Fluoride (Water, Auto/ISE)	2	Modified from SM 4500-F A and 4500-F C
Hardness (Water, Calculation)	2	SM 2340 B
Ion Balance (Water, Calculation)	2	Modified from SM1030 E
Metals Scan (Water, ICP/MS)	2	Modified from EPA 200.8
Metals Scan (Water, ICP/OES)	2	Modified from SM 3120 B
Nitrate (Water, IC)	2	Modified from SM 4110 B and C
Nitrite (Water, IC)	2	Modified from SM 4110 B and C
pH (25°C) (Water, Automated)	2	Modified from SM 4500-H+ B
Phenols (Water, Colorimetry)	2	Modified from EPA 420.2
Sulphate (Water, IC)	2	Modified from SM 4110 B and C
Sulphide (Water, Colorimetry)	2	Modified from SM 4500-S2 D
* Tannins and Lignins	2	
TDS (Estimated)	2	Modified from SM 2510 A
Total Kjeldahl Nitrogen (Water, Colorimetry)	2	Modified from EPA 351.2
Turbidity (Water, Turbidimeter)	2	Modified from SM 2130 B

Criteria :

A : Ontario Regulation 169/03 (Non-Regulated Drinking Water)

Sample status upon receipt :

6776732 6776733

Compliant
Certificate Comments :

6776732 6776733

Na spike failed due to high native analyte concentration.
Notes :

- All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise stated.
- Eurofins Environment Testing Canada Inc. is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at <https://directory.cala.ca/>
- Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline or regulatory limits listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official guideline or regulation as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Legend :

RL : Reporting limit

N/A : Not applicable

* : Analysis conducted by external subcontracting

QC : Reference material (QC)

1 : Results in annex

^ : Analysis not accredited

OFFICIAL CERTIFICATE OF ANALYSIS - EXCEEDENCE SUMMARY

Eurofins Sample No	Client Sample Identification	Analyte	Result	Units	Criteria
Colour, Apparent (Water, Spectrophotometry)					
6776732	TW1 - 3 hrs	Colour (Apparent)	11	TCU	A 5
6776733	TW1 - 6 hrs	Colour (Apparent)	23	TCU	A 5
Hardness (Water, Calculation)					
6776732	TW1 - 3 hrs	Hardness as CaCO3 (Calculation)	394	mg/L	A 100
6776733	TW1 - 6 hrs	Hardness as CaCO3 (Calculation)	387	mg/L	A 100
Metals Scan (Water, ICP/MS)					
6776732	TW1 - 3 hrs	Iron	1.43	mg/L	A 0.3
6776733	TW1 - 6 hrs	Iron	1.38	mg/L	A 0.3
6776733	TW1 - 6 hrs	Manganese	0.43	mg/L	A 0.05
6776732	TW1 - 3 hrs	Manganese	0.46	mg/L	A 0.05
TDS (Estimated)					
6776732	TW1 - 3 hrs	TDS (Estimated)^	663	mg/L	A 500
6776733	TW1 - 6 hrs	TDS (Estimated)^	648	mg/L	A 500
Turbidity (Water, Turbidimeter)					
6776733	TW1 - 6 hrs	Turbidity	14.2	NTU	A 5
6776732	TW1 - 3 hrs	Turbidity	16.6	NTU	A 5

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Kollaard Associates Inc.

Project : 230124

Reception Date: 2023-03-08

Eurofins Sample No :						6776732	6776733			
Matrix :						Drinking water	Drinking water			
Sampling Date :						2023-03-07	2023-03-07			
Client Sample Identification :						TW1 - 3 hrs	TW1 - 6 hrs			
Anions	RL	Unit	Criteria							
			A	B	C					
Chloride	1	mg/L	250	-	-	91	89			
Nitrate (as Nitrogen)	0.1	mg/L	10	-	-	<0.1	<0.1			
Nitrite (as Nitrogen)	0.1	mg/L	1	-	-	<0.1	<0.1			
Sulphate	1	mg/L	500	-	-	111	110			

Eurofins Sample No :						6776732	6776733			
Matrix :						Drinking water	Drinking water			
Sampling Date :						2023-03-07	2023-03-07			
Client Sample Identification :						TW1 - 3 hrs	TW1 - 6 hrs			
Calculations	RL	Unit	Criteria							
			A	B	C					
Hardness as CaCO ₃ (Calculation)	1	mg/L	100	-	-	394	387			
Ion Balance (Water, Calculation)										
Anion Sum (Calculation)^	0.01	meq/L	-	-	-	10.5	10.7			
Cation Sum (Calculation)^	0.01	meq/L	-	-	-	10.5	10.2			
Ion Balance (Calculation)^	0.1		-	-	-	1.00	0.96			

Eurofins Sample No :						6776732	6776733			
Matrix :						Drinking water	Drinking water			
Sampling Date :						2023-03-07	2023-03-07			
Client Sample Identification :						TW1 - 3 hrs	TW1 - 6 hrs			
General Chemistry	RL	Unit	Criteria							
			A	B	C					
Alkalinity (as CaCO ₃)	5	mg/L	500	-	-	282	294			
Colour (Apparent)	2	TCU	5	-	-	11	23			
Conductivity @ 25°C	5	µS/cm	-	-	-	1020	997			
Dissolved Organic Carbon	0.5	mg/L	5	-	-	1.5	1.4			
Fluoride	0.1	mg/L	1.5	-	-	0.31	0.34			
pH @ 25°C	1		8.5	-	-	7.93	8.06			
Sulphide (S ₂ -)	0.01	mg/L	0.05	-	-	<0.01	<0.01			
Tannins and Lignins*	0.5	mg/L	-	-	-	<0.5	<0.5			
Turbidity	0.1	NTU	5	-	-	16.6	14.2			

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Kollaard Associates Inc.
Project : 230124

Reception Date: 2023-03-08

Eurofins Sample No :						6776732	6776733			
Matrix :						Drinking water	Drinking water			
Sampling Date :						2023-03-07	2023-03-07			
Client Sample Identification :						TW1 - 3 hrs	TW1 - 6 hrs			
Metals	RL	Unit	Criteria							
			A	B	C					
Metals Scan (Water, ICP/MS)										
Aluminum	0.01	mg/L	0.1	-	-	<0.01	<0.01			
Antimony	0.0005	mg/L	0.01	-	-	<0.0005	<0.0005			
Arsenic	0.001	mg/L	0.01	-	-	<0.001	0.001			
Barium	0.01	mg/L	1	-	-	0.11	0.11			
Beryllium	0.0005	mg/L	-	-	-	<0.0005	<0.0005			
Cadmium	0.0001	mg/L	0.01	-	-	<0.0001	<0.0001			
Chromium	0.001	mg/L	0.05	-	-	<0.001	<0.001			
Cobalt	0.002	mg/L	-	-	-	<0.002	<0.002			
Copper	0.001	mg/L	1	-	-	<0.001	<0.001			
Iron	0.03	mg/L	0.3	-	-	1.43	1.38			
Lead	0.001	mg/L	0.01	-	-	<0.001	<0.001			
Manganese	0.01	mg/L	0.05	-	-	0.46	0.43			
Mercury	0.0001	mg/L	0	-	-	<0.0001	<0.0001			
Molybdenum	0.005	mg/L	-	-	-	<0.005	<0.005			
Nickel	0.005	mg/L	-	-	-	<0.005	<0.005			
Selenium	0.001	mg/L	0.05	-	-	<0.001	<0.001			
Silver	0.0001	mg/L	-	-	-	<0.0001	<0.0001			
Strontium	0.001	mg/L	-	-	-	0.616	0.649			
Thallium	0.0001	mg/L	-	-	-	<0.0001	<0.0001			
Uranium	0.001	mg/L	0.02	-	-	0.001	0.001			
Vanadium	0.001	mg/L	-	-	-	<0.001	<0.001			
Zinc	0.01	mg/L	5	-	-	0.03	<0.01			

Eurofins Sample No :						6776732	6776733			
Matrix :						Drinking water	Drinking water			
Sampling Date :						2023-03-07	2023-03-07			
Client Sample Identification :						TW1 - 3 hrs	TW1 - 6 hrs			
Metals, Water, ICP/OES			RL	Unit	Criteria					
					A	B	C			
Metals Scan (Water, ICP/OES)										
Calcium			1	mg/L	-	-	-	102	99	
Magnesium			1	mg/L	-	-	-	34	34	
Potassium			1	mg/L	-	-	-	2	2	
Sodium			1	mg/L	200	-	-	58	55	

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Kollaard Associates Inc.

Project : 230124

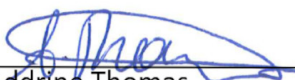
Reception Date: 2023-03-08

Eurofins Sample No :		6776732	6776733				
Matrix :		Drinking water	Drinking water				
Sampling Date :		2023-03-07	2023-03-07				
Client Sample Identification :		TW1 - 3 hrs	TW1 - 6 hrs				
Nutrients	RL	Unit					
Ammonia (Total, as Nitrogen)	0.02	mg/L	0.670	0.660			
Total Kjeldahl Nitrogen	0.1	mg/L	0.758	0.719			

Eurofins Sample No :		6776732	6776733				
Matrix :		Drinking water	Drinking water				
Sampling Date :		2023-03-07	2023-03-07				
Client Sample Identification :		TW1 - 3 hrs	TW1 - 6 hrs				
Phenols-4AAP	RL	Unit					
Phenols-4AAP	0.001	mg/L	<0.001	<0.001			

Eurofins Sample No :		6776732	6776733				
Matrix :		Drinking water	Drinking water				
Sampling Date :		2023-03-07	2023-03-07				
Client Sample Identification :		TW1 - 3 hrs	TW1 - 6 hrs				
Solids	RL	Unit	Criteria				
			A	B	C		
TDS (Estimated)^	5	mg/L	500	-	-	663	648

Approved by :


Addrine Thomas,

Inorganic supervisor, Ottawa

Environment Testing

146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Kollaard Associates Inc.

Project : 230124

Reception Date: 2023-03-08

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Alkalinity (Water, Automated)									
Method : Alkalinity (water, titration to pH 4.5, automated). Internal method: OTT-I-AT-WI45398.									
Alkalinity (as CaCO3)	mg/L	5	<5	97	95-105			1	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-09 Analysis Date: 2023-03-10	
Ammonia, Total (Water, Colorimetry)									
Method : Ammonia (Water, Colorimetry). Internal method: OTT-I-NUT-WI46201.									
Ammonia (Total, as Nitrogen)	mg/L	0.02	<0.020	115	80-120	105	80-120	-	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-09 Analysis Date: 2023-03-09	
Chloride (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Chloride	mg/L	1	<0.5	98	88-112	98	80-120	0	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-09 Analysis Date: 2023-03-10	
Colour, Apparent (Water, Spectrophotometry)									
Method : Colour (Water, Spectrophotometric). Internal method: OTT-I-SPEC-WI45980.									
Colour (Apparent)	TCU	2	<2	105	90-110			-	0-40
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-13 Analysis Date: 2023-03-14	
Conductivity (Water, Automated)									
Method : Conductivity (Water, Autotitrator). Internal Method: OTT-I-AT-WI45398.									
Conductivity @ 25°C	uS/cm	5	<5	100	80-120				
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-09 Analysis Date: 2023-03-10	
DOC (Water, IR)									
Method : Organic carbon (water, IR, combustion). Internal method: OTT-I-DEM-WI46148.									
Dissolved Organic Carbon	mg/L	0.5	<0.5	89	84-115	85	80-120	-	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-15 Analysis Date: 2023-03-15	
Fluoride (Water, Auto/ISE)									
Method : Fluoride by autotitrator, ion selective electrode. Internal method: OTT-I-AT-WI45398.									
Fluoride	mg/L	0.1	<0.10	99	80-120				
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-09 Analysis Date: 2023-03-10	

OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Kollaard Associates Inc.

Project : 230124

Reception Date: 2023-03-08

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Metals Scan (Water, ICP/MS)									
Method : Metals (Water, ICP/MS). Internal method: AMMTFQE1.									
Aluminum	mg/L	0.01	<0.01	100	80-120			-	0-20
Antimony	mg/L	0.0005	<0.0005	119	80-120	92	70-130	-	0-20
Arsenic	mg/L	0.001	<0.001	95	80-120	112	70-130	-	0-20
Barium	mg/L	0.01	<0.01	100	80-120	108	70-130	-	0-20
Beryllium	mg/L	0.0005	<0.0005	113	80-120	114	70-130	-	0-20
Cadmium	mg/L	0.0001	<0.0001	106	80-120	104	70-130	-	0-20
Chromium	mg/L	0.001	<0.001	110	80-120	105	70-130	-	0-20
Cobalt	mg/L	0.002	<0.002	110	80-120	102	70-130	-	0-20
Copper	mg/L	0.001	<0.001	110	80-120	91	70-130	-	0-20
Iron	mg/L	0.03	<0.03	100	80-120	115	70-130	3	0-20
Lead	mg/L	0.001	<0.001	100	80-120	89	70-130	-	0-20
Manganese	mg/L	0.01	<0.01	100	80-120	114	70-130	2	0-20
Mercury	mg/L	0.0001	<0.0001	85	80-120			-	0-20
Molybdenum	mg/L	0.005	<0.005	80	80-120	105	70-130	-	0-20
Nickel	mg/L	0.005	<0.005	110	80-120	-	70-130	-	0-20
Selenium	mg/L	0.001	<0.001	101	80-120	124	70-130	-	0-20
Silver	mg/L	0.0001	<0.0001	110	80-120			-	0-20
Strontium	mg/L	0.001	<0.001	100	80-120	107	70-130	0	0-20
Thallium	mg/L	0.0001	<0.0001	101	80-120	91	70-130	-	0-20
Uranium	mg/L	0.001	<0.001	90	80-120	92	70-130	-	0-20
Vanadium	mg/L	0.001	<0.001	100	80-120	107	70-130	-	0-20
Zinc	mg/L	0.01	<0.01	110	80-120	95	70-130	-	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-13 Analysis Date: 2023-03-13	
Metals Scan (Water, ICP/OES)									
Method : Metals (Water, ICP/OES). Internal method: OTT-I-MET-WI48491.									
Calcium	mg/L	1	<1	105	86-115	101	70-130	1	0-20
Magnesium	mg/L	1	<1	105	91-109	91	70-130	2	0-20
Potassium	mg/L	1	<1	104	87-113	107	70-130	1	0-20
Sodium	mg/L	1	<1	104	85-115			0	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-09 Analysis Date: 2023-03-09	
Nitrate (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Nitrate (as Nitrogen)	mg/L	0.1	<0.1	106	92-110	102	80-120	-	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-09 Analysis Date: 2023-03-10	
Nitrite (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Nitrite (as Nitrogen)	mg/L	0.1	<0.1	108	90-110	100	80-120	-	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-09 Analysis Date: 2023-03-10	
pH (25°C) (Water, Automated)									
Method : pH (Water, Automated Meter). Internal method: OTT-I-AT-WI45398.									
pH @ 25°C		1	6.62	100	97-103			0	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-09 Analysis Date: 2023-03-10	

Environment Testing

146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Kollaard Associates Inc.

Project : 230124

Reception Date: 2023-03-08

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Phenols (Water, Colorimetry)									
Method : Phenols (Water, Colorimetry). Internal method: OTT-I-4AAP-WI46150.									
Phenols-4AAP	mg/L	0.001	<0.001	105	77-125	116	70-130	-	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-14 Analysis Date: 2023-03-15	
Sulphate (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Sulphate	mg/L	1	<1	105	90-110	100	80-120	1	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-09 Analysis Date: 2023-03-10	
Sulphide (Water, Colorimetry)									
Method : Sulphide, S2- (Water, Colorimetry). Internal method: OTT-I-SPEC-WI45931.									
Sulphide (S2-)	mg/L	0.01	<0.01	87	80-120			-	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-13 Analysis Date: 2023-03-14	
Total Kjeldahl Nitrogen (Water, Colorimetry)									
Method : TKN (Water, colorimetry). Internal method: OTT-I-NUT-WI46201.									
Total Kjeldahl Nitrogen	mg/L	0.1	<0.100	110	75-121	104	70-130	0	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-09 Analysis Date: 2023-03-09	
Turbidity (Water, Turbidimeter)									
Method : Turbidity (Water, Turbidimeter). Internal method: OTT-I-TUR-WI46288.									
Turbidity	NTU	0.1	<0.1	98	80-120			-	0-20
Associated Samples : 6776732, 6776733								Prep Date: 2023-03-09 Analysis Date: 2023-03-09	

Where RPD % is reported as "-" the calculation is not available because one or both of the duplicates is within 5 times the RL.

OFFICIAL CERTIFICATE OF ANALYSIS : 3518436**WORK REQUEST : 100205152****Report Date : 2023-03-10**

Kollaard Associates Inc.
210 Prescott St., Box 189
Kemptville, ON
K0G 1J0
Attention : Colleen Vermeersch

Reception Date : 2023-03-08
Project : 230124
Sampler : Ben Kollaard
PO Number : Not Applicable
Temperature : 10 °C

Analysis	Quantity	External Method
E.Coli and Total Coliforms (DC Plate)	2	Modified from MECP E3407
Heterotrophic Plate Count (mHPC)	2	Modified from SM 9215 D

Criteria :

A : Ontario Regulation 169/03 (Non-Regulated Drinking Water)

Sample status upon receipt :

6776511 6776512

Compliant

Notes :

- All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise stated.
- Eurofins Environment Testing Canada Inc. is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at <https://directory.cala.ca/>
- Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline or regulatory limits listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official guideline or regulation as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Legend :

RL : Reporting limit

N/A : Not applicable

* : Analysis conducted by external subcontracting

QC : Reference material (QC)

1 : Results in annex

^ : Analysis not accredited

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Kollaard Associates Inc.
Project : 230124

Reception Date: 2023-03-08

Eurofins Sample No :				6776511	6776512			
Matrix :				Drinking water	Drinking water			
Sampling Date :				2023-03-07	2023-03-07			
Client Sample Identification :				TW1 - 3 hrs	TW1 - 6 hrs			
Microbiology (DC Plate)	RL	Unit	Criteria					
			A	B	C			
E.Coli and Total Coliforms (DC Plate)								
Escherichia coli (DC)	0	CFU/100mL	0	-	-	0	0	
Total Coliforms (DC)	0	CFU/100mL	0	-	-	0	0	

Eurofins Sample No :				6776511	6776512			
Matrix :				Drinking water	Drinking water			
Sampling Date :				2023-03-07	2023-03-07			
Client Sample Identification :				TW1 - 3 hrs	TW1 - 6 hrs			
Microbiology (mHPC Plate)	RL	Unit						
Heterotrophic Plate Count (mHPC)	0	CFU/1 mL	7	5				

Approved by :

R. Zafari

Raheleh Zafari,
Ottawa, Environmental Chemist, PhD

OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Kollaard Associates Inc.

Project : 230124

Reception Date: 2023-03-08

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
E.Coli and Total Coliforms (DC Plate)									
Method : Total Coliforms and E.Coli by MF (Water, DC plate). Internal method: OTT-M-BAC-WI45296.									
Escherichia coli (DC)	CFU/100mL	0	0					0	0-30
Total Coliforms (DC)	CFU/100mL	0	0					0	0-30
Associated Samples : 6776511, 6776512								Prep Date: 2023-03-08 Analysis Date: 2023-03-09	
Method : Heterotrophic Plate Count by MF (mHPC Media). Internal method: OTT-M-BAC-WI45296.									
Heterotrophic Plate Count (mHPC)	CFU/1 mL	0	0					2	0-30
Associated Samples : 6776511, 6776512								Prep Date: 2023-03-08 Analysis Date: 2023-03-10	

Where RPD % is reported as "-" the calculation is not available because one or both of the duplicates is within 5 times the RL.

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: WT2305666	Page	: 1 of 8
Client	: Kollaard Associates Inc.	Laboratory	: Waterloo - Environmental
Contact	: Colleen Vermeersch	Account Manager	: Costas Farassoglou
Address	: 210 Prescott Street Unit 1 Kemptville ON Canada K0G1J0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 613 860 0923	Telephone	: 613 225 8279
Project	: 230124	Date Samples Received	: 08-Mar-2023 12:05
PO	: ----	Date Analysis Commenced	: 10-Mar-2023
C-O-C number	: ----	Issue Date	: 16-Mar-2023 13:25
Sampler	: CLIENT		
Site	: ----		
Quote number	: SOA 2022		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Danielle Gravel	Supervisor - Semi-Volatile Instrumentation	Organics, Waterloo, Ontario
Sarah Birch	VOC Section Supervisor	Organics, Waterloo, Ontario



No Breaches Found

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	Description
-	no units
µg/L	micrograms per litre

>: greater than.

<: less than.

Red shading is applied where the result is greater than the Guideline Upper Limit or the result is lower than the Guideline Lower Limit.

For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.



Analytical Results Evaluation

Matrix: Water

			Client sample ID	TW1-6HRS	----	----	----	----	----	----
			Sampling date/time	07-Mar-2023 18:00	----	----	----	----	----	----
			Sub-Matrix	Water	----	----	----	----	----	----
Analyte	CAS Number	Unit	WT2305666-001	-----	-----	-----	-----	-----	-----	-----
Volatile Organic Compounds										
Acetone	67-64-1	µg/L	<20	----	----	----	----	----	----	----
Benzene	71-43-2	µg/L	<0.50	----	----	----	----	----	----	----
Bromodichloromethane	75-27-4	µg/L	<0.50	----	----	----	----	----	----	----
Bromoform	75-25-2	µg/L	<0.50	----	----	----	----	----	----	----
Bromomethane	74-83-9	µg/L	<0.50	----	----	----	----	----	----	----
Carbon tetrachloride	56-23-5	µg/L	<0.20	----	----	----	----	----	----	----
Chlorobenzene	108-90-7	µg/L	<0.50	----	----	----	----	----	----	----
Chloroform	67-66-3	µg/L	<0.50	----	----	----	----	----	----	----
Dibromochloromethane	124-48-1	µg/L	<0.50	----	----	----	----	----	----	----
Dibromoethane, 1,2-	106-93-4	µg/L	<0.20	----	----	----	----	----	----	----
Dichlorobenzene, 1,2-	95-50-1	µg/L	<0.50	----	----	----	----	----	----	----
Dichlorobenzene, 1,3-	541-73-1	µg/L	<0.50	----	----	----	----	----	----	----
Dichlorobenzene, 1,4-	106-46-7	µg/L	<0.50	----	----	----	----	----	----	----
Dichlorodifluoromethane	75-71-8	µg/L	<0.50	----	----	----	----	----	----	----
Dichloroethane, 1,1-	75-34-3	µg/L	<0.50	----	----	----	----	----	----	----
Dichloroethane, 1,2-	107-06-2	µg/L	<0.50	----	----	----	----	----	----	----
Dichloroethylene, 1,1-	75-35-4	µg/L	<0.50	----	----	----	----	----	----	----
Dichloroethylene, cis-1,2-	156-59-2	µg/L	<0.50	----	----	----	----	----	----	----
Dichloroethylene, trans-1,2-	156-60-5	µg/L	<0.50	----	----	----	----	----	----	----
Dichloromethane	75-09-2	µg/L	<1.0	----	----	----	----	----	----	----
Dichloropropane, 1,2-	78-87-5	µg/L	<0.50	----	----	----	----	----	----	----
Dichloropropylene, cis+trans-1,3-	542-75-6	µg/L	<0.50	----	----	----	----	----	----	----
Dichloropropylene, cis-1,3-	10061-01-5	µg/L	<0.30	----	----	----	----	----	----	----
Dichloropropylene, trans-1,3-	10061-02-6	µg/L	<0.30	----	----	----	----	----	----	----
Ethylbenzene	100-41-4	µg/L	<0.50	----	----	----	----	----	----	----
Hexane, n-	110-54-3	µg/L	<0.50	----	----	----	----	----	----	----
Methyl ethyl ketone [MEK]	78-93-3	µg/L	<20	----	----	----	----	----	----	----
Methyl isobutyl ketone [MIBK]	108-10-1	µg/L	<20	----	----	----	----	----	----	----



Analytical Results Evaluation

Matrix: Water			Client sample ID	TW1-6HRS	----	----	----	----	----	----
			Sampling date/time	07-Mar-2023 18:00	----	----	----	----	----	----
			Sub-Matrix	Water	----	----	----	----	----	----
Analyte	CAS Number	Unit	WT2305666-001	-----	-----	-----	-----	-----	-----	-----
Volatile Organic Compounds										
Methyl-tert-butyl ether [MTBE]	1634-04-4	µg/L	<0.50	----	----	----	----	----	----	----
Styrene	100-42-5	µg/L	<0.50	----	----	----	----	----	----	----
Tetrachloroethane, 1,1,1,2-	630-20-6	µg/L	<0.50	----	----	----	----	----	----	----
Tetrachloroethane, 1,1,2,2-	79-34-5	µg/L	<0.50	----	----	----	----	----	----	----
Tetrachloroethylene	127-18-4	µg/L	<0.50	----	----	----	----	----	----	----
Toluene	108-88-3	µg/L	0.56	----	----	----	----	----	----	----
Trichloroethane, 1,1,1-	71-55-6	µg/L	<0.50	----	----	----	----	----	----	----
Trichloroethane, 1,1,2-	79-00-5	µg/L	<0.50	----	----	----	----	----	----	----
Trichloroethylene	79-01-6	µg/L	<0.50	----	----	----	----	----	----	----
Trichlorofluoromethane	75-69-4	µg/L	<0.50	----	----	----	----	----	----	----
Vinyl chloride	75-01-4	µg/L	<0.50	----	----	----	----	----	----	----
Xylene, m+p-	179601-23-1	µg/L	<0.40	----	----	----	----	----	----	----
Xylene, o-	95-47-6	µg/L	<0.30	----	----	----	----	----	----	----
Xylenes, total	1330-20-7	µg/L	<0.50	----	----	----	----	----	----	----
BTEX, total	----	µg/L	<1.0	----	----	----	----	----	----	----
Hydrocarbons										
F1 (C6-C10)	----	µg/L	<25	----	----	----	----	----	----	----
F2 (C10-C16)	----	µg/L	<100	----	----	----	----	----	----	----
F3 (C16-C34)	----	µg/L	<250	----	----	----	----	----	----	----
F4 (C34-C50)	----	µg/L	<250	----	----	----	----	----	----	----
F1-BTEX	----	µg/L	<25	----	----	----	----	----	----	----
Hydrocarbons, total (C6-C50)	----	µg/L	<370	----	----	----	----	----	----	----
Chromatogram to baseline at nC50	n/a	-	YES	----	----	----	----	----	----	----
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	%	109	----	----	----	----	----	----	----
Dichlorotoluene, 3,4-	95-75-0	%	96.4	----	----	----	----	----	----	----
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	%	96.5	----	----	----	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	%	97.2	----	----	----	----	----	----	----



Analytical Results Evaluation

Matrix: Water			Client sample ID	TW1-6HRS	----	----	----	----	----	----
			Sampling date/time	07-Mar-2023 18:00	----	----	----	----	----	----
			Sub-Matrix	Water	----	----	----	----	----	----
Analyte	CAS Number	Unit		WT2305666-001	-----	-----	-----	-----	-----	-----
Polycyclic Aromatic Hydrocarbons										
Acenaphthene	83-32-9	µg/L		<0.010	----	----	----	----	----	----
Acenaphthylene	208-96-8	µg/L		<0.010	----	----	----	----	----	----
Anthracene	120-12-7	µg/L		<0.010	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	µg/L		<0.010	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	µg/L		<0.0050	----	----	----	----	----	----
Benzo(b+j)fluoranthene	n/a	µg/L		<0.010	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	µg/L		<0.010	----	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	µg/L		<0.010	----	----	----	----	----	----
Chrysene	218-01-9	µg/L		<0.010	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	µg/L		<0.0050	----	----	----	----	----	----
Fluoranthene	206-44-0	µg/L		<0.010	----	----	----	----	----	----
Fluorene	86-73-7	µg/L		<0.010	----	----	----	----	----	----
Indeno(1,2,3-c,d)pyrene	193-39-5	µg/L		<0.010	----	----	----	----	----	----
Methylnaphthalene, 1-	90-12-0	µg/L		0.016	----	----	----	----	----	----
Methylnaphthalene, 1+2-	----	µg/L		0.046	----	----	----	----	----	----
Methylnaphthalene, 2-	91-57-6	µg/L		0.030	----	----	----	----	----	----
Naphthalene	91-20-3	µg/L		0.057	----	----	----	----	----	----
Phenanthrene	85-01-8	µg/L		<0.020	----	----	----	----	----	----
Pyrene	129-00-0	µg/L		<0.010	----	----	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates										
Chrysene-d12	1719-03-5	%		86.7	----	----	----	----	----	----
Naphthalene-d8	1146-65-2	%		99.1	----	----	----	----	----	----
Phenanthrene-d10	1517-22-2	%		104	----	----	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.



Summary of Guideline Limits

Analyte	CAS Number	Unit	ON153/04 T2-GW-C-All	ON153/04 T2-GW-F-All					
Volatile Organic Compounds									
Acetone	67-64-1	µg/L	2700 µg/L	2700 µg/L					
Benzene	71-43-2	µg/L	5 µg/L	5 µg/L					
Bromodichloromethane	75-27-4	µg/L	16 µg/L	16 µg/L					
Bromoform	75-25-2	µg/L	25 µg/L	25 µg/L					
Bromomethane	74-83-9	µg/L	0.89 µg/L	0.89 µg/L					
BTEX, total	----	µg/L							
Carbon tetrachloride	56-23-5	µg/L	0.79 µg/L	5 µg/L					
Chlorobenzene	108-90-7	µg/L	30 µg/L	30 µg/L					
Chloroform	67-66-3	µg/L	2.4 µg/L	22 µg/L					
Dibromochloromethane	124-48-1	µg/L	25 µg/L	25 µg/L					
Dibromoethane, 1,2-	106-93-4	µg/L	0.2 µg/L	0.2 µg/L					
Dichlorobenzene, 1,2-	95-50-1	µg/L	3 µg/L	3 µg/L					
Dichlorobenzene, 1,3-	541-73-1	µg/L	59 µg/L	59 µg/L					
Dichlorobenzene, 1,4-	106-46-7	µg/L	1 µg/L	1 µg/L					
Dichlorodifluoromethane	75-71-8	µg/L	590 µg/L	590 µg/L					
Dichloroethane, 1,1-	75-34-3	µg/L	5 µg/L	5 µg/L					
Dichloroethane, 1,2-	107-06-2	µg/L	1.6 µg/L	5 µg/L					
Dichloroethylene, 1,1-	75-35-4	µg/L	1.6 µg/L	14 µg/L					
Dichloroethylene, cis-1,2-	156-59-2	µg/L	1.6 µg/L	17 µg/L					
Dichloroethylene, trans-1,2-	156-60-5	µg/L	1.6 µg/L	17 µg/L					
Dichloromethane	75-09-2	µg/L	50 µg/L	50 µg/L					
Dichloropropane, 1,2-	78-87-5	µg/L	5 µg/L	5 µg/L					
Dichloropropylene, cis+trans-1,3-	542-75-6	µg/L	0.5 µg/L	0.5 µg/L					
Dichloropropylene, cis-1,3-	10061-01-5	µg/L							
Dichloropropylene, trans-1,3-	10061-02-6	µg/L							
Ethylbenzene	100-41-4	µg/L	2.4 µg/L	2.4 µg/L					
Hexane, n-	110-54-3	µg/L	51 µg/L	520 µg/L					
Methyl ethyl ketone [MEK]	78-93-3	µg/L	1800 µg/L	1800 µg/L					
Methyl isobutyl ketone [MIBK]	108-10-1	µg/L	640 µg/L	640 µg/L					
Methyl-tert-butyl ether [MTBE]	1634-04-4	µg/L	15 µg/L	15 µg/L					
Styrene	100-42-5	µg/L	5.4 µg/L	5.4 µg/L					
Tetrachloroethane, 1,1,1,2-	630-20-6	µg/L	1.1 µg/L	1.1 µg/L					
Tetrachloroethane, 1,1,2,2-	79-34-5	µg/L	1 µg/L	1 µg/L					
Tetrachloroethylene	127-18-4	µg/L	1.6 µg/L	17 µg/L					
Toluene	108-88-3	µg/L	24 µg/L	24 µg/L					
Trichloroethane, 1,1,1-	71-55-6	µg/L	200 µg/L	200 µg/L					
Trichloroethane, 1,1,2-	79-00-5	µg/L	4.7 µg/L	5 µg/L					



Analyte	CAS Number	Unit	ON153/04 T2-GW-C-All	ON153/04 T2-GW-F-All					
Volatile Organic Compounds - Continued									
Trichloroethylene	79-01-6	µg/L	1.6 µg/L	5 µg/L					
Trichlorofluoromethane	75-69-4	µg/L	150 µg/L	150 µg/L					
Vinyl chloride	75-01-4	µg/L	0.5 µg/L	1.7 µg/L					
Xylene, m+p-	179601-23-1	µg/L							
Xylene, o-	95-47-6	µg/L							
Xylenes, total	1330-20-7	µg/L	300 µg/L	300 µg/L					
Hydrocarbons									
Chromatogram to baseline at nC50	n/a	-							
F1 (C6-C10)	----	µg/L	750 µg/L	750 µg/L					
F1-BTEX	----	µg/L	750 µg/L	750 µg/L					
F2 (C10-C16)	----	µg/L	150 µg/L	150 µg/L					
F3 (C16-C34)	----	µg/L	500 µg/L	500 µg/L					
F4 (C34-C50)	----	µg/L	500 µg/L	500 µg/L					
Hydrocarbons, total (C6-C50)	----	µg/L							
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	83-32-9	µg/L	4.1 µg/L	4.1 µg/L					
Acenaphthylene	208-96-8	µg/L	1 µg/L	1 µg/L					
Anthracene	120-12-7	µg/L	2.4 µg/L	2.4 µg/L					
Benz(a)anthracene	56-55-3	µg/L	1 µg/L	1 µg/L					
Benzo(a)pyrene	50-32-8	µg/L	0.01 µg/L	0.01 µg/L					
Benzo(b+j)fluoranthene	n/a	µg/L	0.1 µg/L	0.1 µg/L					
Benzo(g,h,i)perylene	191-24-2	µg/L	0.2 µg/L	0.2 µg/L					
Benzo(k)fluoranthene	207-08-9	µg/L	0.1 µg/L	0.1 µg/L					
Chrysene	218-01-9	µg/L	0.1 µg/L	0.1 µg/L					
Dibenz(a,h)anthracene	53-70-3	µg/L	0.2 µg/L	0.2 µg/L					
Fluoranthene	206-44-0	µg/L	0.41 µg/L	0.41 µg/L					
Fluorene	86-73-7	µg/L	120 µg/L	120 µg/L					
Indeno(1,2,3-c,d)pyrene	193-39-5	µg/L	0.2 µg/L	0.2 µg/L					
Methylnaphthalene, 1+2-	----	µg/L	3.2 µg/L	3.2 µg/L					
Methylnaphthalene, 1-	90-12-0	µg/L	3.2 µg/L	3.2 µg/L					
Methylnaphthalene, 2-	91-57-6	µg/L	3.2 µg/L	3.2 µg/L					
Naphthalene	91-20-3	µg/L	11 µg/L	11 µg/L					
Phenanthrene	85-01-8	µg/L	1 µg/L	1 µg/L					
Pyrene	129-00-0	µg/L	4.1 µg/L	4.1 µg/L					

Please refer to the General Comments section for an explanation of any qualifiers detected.



Key:

ON153/04	Ontario Regulation 153/04 - April 15, 2011 Standards (JUL, 2011)
T2-GW-C-All	153 T2-Ground Water (Coarse Soil)-All Types of Property Use
T2-GW-F-All	153 T2-Ground Water (Fine Soil)-All Types of Property Use

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: WT2305666	Page	: 1 of 6
Client	: Kollaard Associates Inc.	Laboratory	: Waterloo - Environmental
Contact	: Colleen Vermeersch	Account Manager	: Costas Farassoglou
Address	: 210 Prescott Street Unit 1 Kemptville ON Canada K0G1J0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 613 860 0923	Telephone	: 613 225 8279
Project	: 230124	Date Samples Received	: 08-Mar-2023 12:05
PO	: ----	Issue Date	: 16-Mar-2023 13:25
C-O-C number	: ----		
Sampler	: CLIENT		
Site	: ----		
Quote number	: SOA 2022		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Matrix Spike outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Matrix Spike (MS) Recoveries								
Volatile Organic Compounds	Anonymous	Anonymous	Dichlorodifluoromethane	75-71-8	E611D	56.8 % ^{MES}	60.0-140%	Recovery less than lower data quality objective

Result Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID (Low Level)										
Glass vial (sodium bisulfate) TW1-6HRS	E581.F1-L	07-Mar-2023	13-Mar-2023	----	----		13-Mar-2023	14 days	6 days	✓
Hydrocarbons : Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) TW1-6HRS	E601.SG	07-Mar-2023	10-Mar-2023	14 days	3 days	✓	15-Mar-2023	40 days	5 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) TW1-6HRS	E641A	07-Mar-2023	10-Mar-2023	14 days	3 days	✓	13-Mar-2023	40 days	3 days	✓
Volatile Organic Compounds : VOCs (Eastern Canada List) by Headspace GC-MS										
Glass vial (sodium bisulfate) TW1-6HRS	E611D	07-Mar-2023	13-Mar-2023	----	----		13-Mar-2023	14 days	6 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	861166	1	13	7.6	5.0	✔
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	861167	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	861166	1	13	7.6	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	858694	1	3	33.3	5.0	✔
Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID	E601.SG	858695	1	20	5.0	5.0	✔
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	861167	1	20	5.0	5.0	✔
Method Blanks (MB)							
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	861166	1	13	7.6	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	858694	1	3	33.3	5.0	✔
Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID	E601.SG	858695	1	20	5.0	5.0	✔
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	861167	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	861166	1	13	7.6	5.0	✔
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	861167	1	20	5.0	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID	E601.SG Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are subjected to in-situ silica gel treatment prior to analysis by GC-FID for CCME hydrocarbon fractions (F2-F4).
VOCs (Eastern Canada List) by Headspace GC-MS	E611D Waterloo - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Waterloo - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
F1-BTEX	EC580 Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
SUM F1 to F4 where F2-F4 is SG treated	EC581SG Waterloo - Environmental	Water	CCME PHC in Soil - Tier 1	Hydrocarbons, total (C6-C50) is the sum of CCME Fraction F1(C6-C10), F2(C10-C16), F3(C16-C34), and F4(C34-C50), where F2-F4 have been treated with silica gel. F4G-sg is not used within this calculation due to overlap with other fractions.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs Preparation for Headspace Analysis	EP581 Waterloo - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Waterloo - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: WT2305666	Page	: 1 of 11
Client	: Kollaard Associates Inc.	Laboratory	: Waterloo - Environmental
Contact	: Colleen Vermeersch	Account Manager	: Costas Farassoglou
Address	: 210 Prescott Street Unit 1 Kemptville ON Canada K0G1J0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	:	Telephone	: 613 225 8279
Project	: 230124	Date Samples Received	: 08-Mar-2023 12:05
PO	: ----	Date Analysis Commenced	: 10-Mar-2023
C-O-C number	: ----	Issue Date	: 16-Mar-2023 13:31
Sampler	: CLIENT 613 860 0923		
Site	: ----		
Quote number	: SOA 2022		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Danielle Gravel	Supervisor - Semi-Volatile Instrumentation	Waterloo Organics, Waterloo, Ontario
Sarah Birch	VOC Section Supervisor	Waterloo Organics, Waterloo, Ontario



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 861167)											
WT2305258-006	Anonymous	Acetone	67-64-1	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		Benzene	71-43-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromodichloromethane	75-27-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromoform	75-25-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromomethane	74-83-9	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Carbon tetrachloride	56-23-5	E611D	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Chlorobenzene	108-90-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroform	67-66-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dibromochloromethane	124-48-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dibromoethane, 1,2-	106-93-4	E611D	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Dichlorobenzene, 1,2-	95-50-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,3-	541-73-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,4-	106-46-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorodifluoromethane	75-71-8	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,1-	75-34-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,2-	107-06-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, 1,1-	75-35-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, cis-1,2-	156-59-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, trans-1,2-	156-60-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloromethane	75-09-2	E611D	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Dichloropropane, 1,2-	78-87-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Hexane, n-	110-54-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		Methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Styrene	100-42-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 861167) - continued											
WT2305258-006	Anonymous	Tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethylene	127-18-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,1-	71-55-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,2-	79-00-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethylene	79-01-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichlorofluoromethane	75-69-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Vinyl chloride	75-01-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611D	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 861166)											
WT2305258-006	Anonymous	F1 (C6-C10)	----	E581.F1-L	25	µg/L	<25	<25	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 861167)						
Acetone	67-64-1	E611D	20	µg/L	<20	----
Benzene	71-43-2	E611D	0.5	µg/L	<0.50	----
Bromodichloromethane	75-27-4	E611D	0.5	µg/L	<0.50	----
Bromoform	75-25-2	E611D	0.5	µg/L	<0.50	----
Bromomethane	74-83-9	E611D	0.5	µg/L	<0.50	----
Carbon tetrachloride	56-23-5	E611D	0.2	µg/L	<0.20	----
Chlorobenzene	108-90-7	E611D	0.5	µg/L	<0.50	----
Chloroform	67-66-3	E611D	0.5	µg/L	<0.50	----
Dibromochloromethane	124-48-1	E611D	0.5	µg/L	<0.50	----
Dibromoethane, 1,2-	106-93-4	E611D	0.2	µg/L	<0.20	----
Dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,3-	541-73-1	E611D	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	<0.50	----
Dichlorodifluoromethane	75-71-8	E611D	0.5	µg/L	<0.50	----
Dichloroethane, 1,1-	75-34-3	E611D	0.5	µg/L	<0.50	----
Dichloroethane, 1,2-	107-06-2	E611D	0.5	µg/L	<0.50	----
Dichloroethylene, 1,1-	75-35-4	E611D	0.5	µg/L	<0.50	----
Dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	<0.50	----
Dichloroethylene, trans-1,2-	156-60-5	E611D	0.5	µg/L	<0.50	----
Dichloromethane	75-09-2	E611D	1	µg/L	<1.0	----
Dichloropropane, 1,2-	78-87-5	E611D	0.5	µg/L	<0.50	----
Dichloropropylene, cis-1,3-	10061-01-5	E611D	0.3	µg/L	<0.30	----
Dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	<0.30	----
Ethylbenzene	100-41-4	E611D	0.5	µg/L	<0.50	----
Hexane, n-	110-54-3	E611D	0.5	µg/L	<0.50	----
Methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	----
Methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	<20	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	<0.50	----
Styrene	100-42-5	E611D	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	<0.50	----
Tetrachloroethylene	127-18-4	E611D	0.5	µg/L	<0.50	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 861167) - continued						
Toluene	108-88-3	E611D	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	<0.50	----
Trichloroethylene	79-01-6	E611D	0.5	µg/L	<0.50	----
Trichlorofluoromethane	75-69-4	E611D	0.5	µg/L	<0.50	----
Vinyl chloride	75-01-4	E611D	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611D	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611D	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 858695)						
F2 (C10-C16)	----	E601.SG	100	µg/L	<100	----
F3 (C16-C34)	----	E601.SG	250	µg/L	<250	----
F4 (C34-C50)	----	E601.SG	250	µg/L	<250	----
Hydrocarbons (QCLot: 861166)						
F1 (C6-C10)	----	E581.F1-L	25	µg/L	<25	----
Polycyclic Aromatic Hydrocarbons (QCLot: 858694)						
Acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
Acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
Anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
Benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
Benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
Benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	<0.010	----
Benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
Benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
Chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
Dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
Fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
Fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
Methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
Methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
Naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
Phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
Pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 861167)									
Acetone	67-64-1	E611D	20	µg/L	100 µg/L	110	70.0	130	----
Benzene	71-43-2	E611D	0.5	µg/L	100 µg/L	100	70.0	130	----
Bromodichloromethane	75-27-4	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
Bromoform	75-25-2	E611D	0.5	µg/L	100 µg/L	100	70.0	130	----
Bromomethane	74-83-9	E611D	0.5	µg/L	100 µg/L	101	60.0	140	----
Carbon tetrachloride	56-23-5	E611D	0.2	µg/L	100 µg/L	103	70.0	130	----
Chlorobenzene	108-90-7	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
Chloroform	67-66-3	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
Dibromochloromethane	124-48-1	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
Dibromoethane, 1,2-	106-93-4	E611D	0.2	µg/L	100 µg/L	97.4	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	100 µg/L	100	70.0	130	----
Dichlorobenzene, 1,3-	541-73-1	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
Dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
Dichlorodifluoromethane	75-71-8	E611D	0.5	µg/L	100 µg/L	62.1	60.0	140	----
Dichloroethane, 1,1-	75-34-3	E611D	0.5	µg/L	100 µg/L	104	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E611D	0.5	µg/L	100 µg/L	100	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E611D	0.5	µg/L	100 µg/L	97.9	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	100 µg/L	100	70.0	130	----
Dichloroethylene, trans-1,2-	156-60-5	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
Dichloromethane	75-09-2	E611D	1	µg/L	100 µg/L	103	70.0	130	----
Dichloropropane, 1,2-	78-87-5	E611D	0.5	µg/L	100 µg/L	99.2	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E611D	0.3	µg/L	100 µg/L	93.5	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	100 µg/L	96.0	70.0	130	----
Ethylbenzene	100-41-4	E611D	0.5	µg/L	100 µg/L	100	70.0	130	----
Hexane, n-	110-54-3	E611D	0.5	µg/L	100 µg/L	99.0	70.0	130	----
Methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	100 µg/L	98.9	70.0	130	----
Methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	100 µg/L	95.7	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	100 µg/L	100.0	70.0	130	----
Styrene	100-42-5	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.5	µg/L	100 µg/L	98.5	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	100 µg/L	99.9	70.0	130	----
Tetrachloroethylene	127-18-4	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
Toluene	108-88-3	E611D	0.5	µg/L	100 µg/L	100	70.0	130	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 861167) - continued									
Trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
Trichloroethylene	79-01-6	E611D	0.5	µg/L	100 µg/L	104	70.0	130	----
Trichlorofluoromethane	75-69-4	E611D	0.5	µg/L	100 µg/L	99.5	60.0	140	----
Vinyl chloride	75-01-4	E611D	0.5	µg/L	100 µg/L	88.7	60.0	140	----
Xylene, m+p-	179601-23-1	E611D	0.4	µg/L	200 µg/L	101	70.0	130	----
Xylene, o-	95-47-6	E611D	0.3	µg/L	100 µg/L	99.8	70.0	130	----
Hydrocarbons (QCLot: 858695)									
F2 (C10-C16)	----	E601.SG	100	µg/L	4613.474 µg/L	117	70.0	130	----
F3 (C16-C34)	----	E601.SG	250	µg/L	6464.481 µg/L	115	70.0	130	----
F4 (C34-C50)	----	E601.SG	250	µg/L	4040.361 µg/L	110	70.0	130	----
Hydrocarbons (QCLot: 861166)									
F1 (C6-C10)	----	E581.F1-L	25	µg/L	2000 µg/L	105	80.0	120	----
Polycyclic Aromatic Hydrocarbons (QCLot: 858694)									
Acenaphthene	83-32-9	E641A	0.01	µg/L	0.5263 µg/L	76.6	50.0	140	----
Acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5263 µg/L	82.0	50.0	140	----
Anthracene	120-12-7	E641A	0.01	µg/L	0.5263 µg/L	85.2	50.0	140	----
Benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5263 µg/L	85.4	50.0	140	----
Benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5263 µg/L	81.3	50.0	140	----
Benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	0.5263 µg/L	76.6	50.0	140	----
Benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5263 µg/L	83.9	50.0	140	----
Benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5263 µg/L	78.2	50.0	140	----
Chrysene	218-01-9	E641A	0.01	µg/L	0.5263 µg/L	84.7	50.0	140	----
Dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5263 µg/L	85.1	50.0	140	----
Fluoranthene	206-44-0	E641A	0.01	µg/L	0.5263 µg/L	84.9	50.0	140	----
Fluorene	86-73-7	E641A	0.01	µg/L	0.5263 µg/L	82.3	50.0	140	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5263 µg/L	92.1	50.0	140	----
Methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5263 µg/L	71.6	50.0	140	----
Methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5263 µg/L	69.8	50.0	140	----
Naphthalene	91-20-3	E641A	0.05	µg/L	0.5263 µg/L	71.6	50.0	140	----
Phenanthrene	85-01-8	E641A	0.02	µg/L	0.5263 µg/L	84.9	50.0	140	----
Pyrene	129-00-0	E641A	0.01	µg/L	0.5263 µg/L	84.3	50.0	140	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 861167)										
WT2305258-006	Anonymous	Acetone	67-64-1	E611D	112 µg/L	100 µg/L	112	60.0	140	----
		Benzene	71-43-2	E611D	99.3 µg/L	100 µg/L	99.3	60.0	140	----
		Bromodichloromethane	75-27-4	E611D	103 µg/L	100 µg/L	103	60.0	140	----
		Bromoform	75-25-2	E611D	99.5 µg/L	100 µg/L	99.5	60.0	140	----
		Bromomethane	74-83-9	E611D	94.2 µg/L	100 µg/L	94.2	60.0	140	----
		Carbon tetrachloride	56-23-5	E611D	102 µg/L	100 µg/L	102	60.0	140	----
		Chlorobenzene	108-90-7	E611D	100 µg/L	100 µg/L	100	60.0	140	----
		Chloroform	67-66-3	E611D	103 µg/L	100 µg/L	103	60.0	140	----
		Dibromochloromethane	124-48-1	E611D	101 µg/L	100 µg/L	101	60.0	140	----
		Dibromoethane, 1,2-	106-93-4	E611D	97.6 µg/L	100 µg/L	97.6	60.0	140	----
		Dichlorobenzene, 1,2-	95-50-1	E611D	98.7 µg/L	100 µg/L	98.7	60.0	140	----
		Dichlorobenzene, 1,3-	541-73-1	E611D	98.4 µg/L	100 µg/L	98.4	60.0	140	----
		Dichlorobenzene, 1,4-	106-46-7	E611D	97.7 µg/L	100 µg/L	97.7	60.0	140	----
		Dichlorodifluoromethane	75-71-8	E611D	56.8 µg/L	100 µg/L	56.8	60.0	140	MES
		Dichloroethane, 1,1-	75-34-3	E611D	101 µg/L	100 µg/L	101	60.0	140	----
		Dichloroethane, 1,2-	107-06-2	E611D	102 µg/L	100 µg/L	102	60.0	140	----
		Dichloroethylene, 1,1-	75-35-4	E611D	93.4 µg/L	100 µg/L	93.4	60.0	140	----
		Dichloroethylene, cis-1,2-	156-59-2	E611D	99.7 µg/L	100 µg/L	99.7	60.0	140	----
		Dichloroethylene, trans-1,2-	156-60-5	E611D	96.8 µg/L	100 µg/L	96.8	60.0	140	----
		Dichloromethane	75-09-2	E611D	103 µg/L	100 µg/L	103	60.0	140	----
		Dichloropropane, 1,2-	78-87-5	E611D	99.9 µg/L	100 µg/L	99.9	60.0	140	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611D	93.8 µg/L	100 µg/L	93.8	60.0	140	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611D	94.1 µg/L	100 µg/L	94.1	60.0	140	----
		Ethylbenzene	100-41-4	E611D	97.1 µg/L	100 µg/L	97.1	60.0	140	----
		Hexane, n-	110-54-3	E611D	94.2 µg/L	100 µg/L	94.2	60.0	140	----
		Methyl ethyl ketone [MEK]	78-93-3	E611D	99 µg/L	100 µg/L	98.9	60.0	140	----
		Methyl isobutyl ketone [MIBK]	108-10-1	E611D	95 µg/L	100 µg/L	95.2	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	99.4 µg/L	100 µg/L	99.4	60.0	140	----
		Styrene	100-42-5	E611D	97.0 µg/L	100 µg/L	97.0	60.0	140	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611D	98.1 µg/L	100 µg/L	98.1	60.0	140	----
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611D	98.7 µg/L	100 µg/L	98.7	60.0	140	----



Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 861167) - continued										
WT2305258-006	Anonymous	Tetrachloroethylene	127-18-4	E611D	97.4 µg/L	100 µg/L	97.4	60.0	140	----
		Toluene	108-88-3	E611D	97.6 µg/L	100 µg/L	97.6	60.0	140	----
		Trichloroethane, 1,1,1-	71-55-6	E611D	100.0 µg/L	100 µg/L	100.0	60.0	140	----
		Trichloroethane, 1,1,2-	79-00-5	E611D	101 µg/L	100 µg/L	101	60.0	140	----
		Trichloroethylene	79-01-6	E611D	98.7 µg/L	100 µg/L	98.7	60.0	140	----
		Trichlorofluoromethane	75-69-4	E611D	96.2 µg/L	100 µg/L	96.2	60.0	140	----
		Vinyl chloride	75-01-4	E611D	83.9 µg/L	100 µg/L	83.9	60.0	140	----
		Xylene, m+p-	179601-23-1	E611D	195 µg/L	200 µg/L	97.6	60.0	140	----
		Xylene, o-	95-47-6	E611D	97.3 µg/L	100 µg/L	97.3	60.0	140	----
Hydrocarbons (QCLot: 861166)										
WT2305258-006	Anonymous	F1 (C6-C10)	----	E581.F1-L	1850 µg/L	2000 µg/L	92.4	60.0	140	----

Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Chain of Custody (COC) / Analytical Request Form

ATTACH ALS Barcode Label Here
(lab use only)

COC Number: 17 -

Page 1 of 1

Environmental Division
Waterloo
Work Order Reference
WT2305666



Telephone: -1 519 886 6910

Report To: Contact and company name below will appear on the final report

Company: Kollaard Associates (27196)

Contact: Colleen Vermeersch

Phone: 613.860.0923, ext 230

Street: 210 Prescott Street, Unit 1 P.O. Box 189

City/Province: Kemptville, Ontario

Postal Code: K0G 1J0

Invoice To: Same as Report To ☒ \ ☐ n

Company: Kollaard Associates Inc.

Contact: mary@kollaard.ca

Project Information

ALS Account # / Quote #: 071021

Job #: 230124

PO / AFE:

LSD:

ALS Lab Work Order # (lab use only):

Sample Identification and/or Coordinates
(This description will appear on the report)

ALS Sample # (lab use only)

TW1-6hrs

7-Mar-23

16:00

Water

ALS Contact:

Date

Time

Sample Type

PHC F1-F4

VOCs

PAHs

SAMPLES ON HOLD

Sample is hazardous (please provide)

NUMBER OF CONTAINERS

Report Format / Distribution

Select Report Format: ☒ f ☐ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☒ \ ☐ n

☒ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: colleen@kollaard.ca

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: colleen@kollaard.ca

Email 2

Oil and Gas Required Fields (client use)

AFC/Cost Center:

PO#

Major/Minor Code:

Routing Code:

Requisitioner:

Location:

Select Service Level Below - Contact your /

Regular [R] ☒ Standard TAT if received

4 day [P4-20%] ☐ 1 Busi

3 day [P3-25%] ☐ Same 1

2 day [P2-50%] ☐ (Labor

Date and Time Required for all ERP TATs:

For tests that can not be performed according to the service le

Analy

Indicate Filtered (F), Preserved (P) or Filt

Drinking Water (DW) Samples (client use)

Are samples taken from a Regulated DW System?

☐ \ ☒ n

Are samples for human consumption/ use?

☐ \ ☒ n

SHIPMENT RELEASE (client use)

Released by:

Date:

Time:

Received by:

Date:

Time:

Received by:

Date:

Time:

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below
(electronic COC only)

Ontario Regulation 153/04 - April 15, 2011 Standards

Table 2, Potable, Full depth industrial standards

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen

Ice Packs

Cooling Initiated

SIF Observations

Ice Cubes

Custody seal intact

Yes

Yes

Yes

No

No

No

INITIAL COOLER TEMPERATURES °C

9.9

FINAL COOLER TEMPERATURES °C

9.8

INITIAL SHIPMENT RECEPTION (lab use only)

Received by:

Date:

Time:

3/8/23

03:09/23

10:50

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY

YELLOW - CLIENT COPY

FINAL SHIPMENT RECEPTION (lab use only)

SEP 2017 FROM:

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Ryznar Stability Index

$$RSI = 2(pH_s) - pH$$

RSI << 6 → the scale tendency increases as the index decreases

RSI >> 7 → the calcium carbonate formation probably does not lead to a protective corrosion inhibitor film

RSI >> 8 → mild steel corrosion becomes an increasing problem

Langelier Saturation Index

$$LSI = pH - pH_s$$

If LSI is negative → no potential to scale, the water will dissolve CaCO_3

If LSI is positive → scale can form and CaCO_3 precipitation may occur

If LSI is close to zero → borderline scale potential, water quality or temperature change or evaporation could change the index

where pH measured from sample

pH_s = pH at saturation in calcite or calcium carbonate

$$pH_s = (9.3 + A + B) - (C + D)$$

$$A = \frac{\log_{10}[TDS] - 1}{10}$$

$$B = -13.12 \times \log_{10}(\text{°C} + 273) + 34.55$$

$$C = \log_{10}[Ca^{2+} \text{ as } CaCO_3] - 0.4$$

$$D = \log_{10}[\text{alkalinity as } CaCO_3]$$

	TW1-3hr	TW1-6hr
pH	7.93	8.06
hardness [mg/l as CaCO_3]	394	387
Alkalinity [mg/l as CaCO_3]	282	294
total dissolved solids [mg/l]	663	648
temperature (°C)	9	9.7
→→ RSI	6.55	6.37
→→ LSI	0.69	0.85



ATTACHMENT D
SEWAGE EFFLUENT DILUTION CALCULATIONS

PREDICTED SEPTIC EFFLUENT DILUTION CALCULATIONS

Number of Lots	1
Gross Site Area	4700 m ²
Env. Can. Water Surplus (NPI-Brockville)	402 mm

Hard Surface Area (Post-Development)

Roofs, asphalt	991 m ²
Less Stormwater infiltration (est. min. 50%)	<u>-495.50</u>
	495.5

Net Infiltration Area = Gross Site Area - Hard Surface Area (Post-Development)
4204.5 m²

Recharge = NIA x NPI
1690.209 m³/year
4630.7096 L/day

Expected average daily sewage flow
900 L/day
329 m³/year

Maximum allowable daily sewage flow

Infiltration Reduction Factor:

Topography (flat)	0.30
Soil (glacial till)	0.20
<u>Cover (cultivated/20% woodland)</u>	<u>0.12</u>
Total IRF	0.62

treated effluent nitrate level
40 mg/l

Typical Expected Nitrate Concentration using Average Daily Sewage Design Flow

$$\frac{\text{Volume of Effluent Per Year} \times \text{Nitrate mg/L NO}_3}{\text{Number of Lots} \times \text{Volume Effluent Per Year} + (\text{Net Infiltration Area} \times \text{NPI} \times \text{IRF})} = 9.5 \text{ mg/L NO}_3\text{-N}$$

Brockville PCC

WATER BUDGET MEANS FOR THE PERIOD 1966-2022 DC20492

LAT.... 44.60 WATER HOLDING CAPACITY...150 MM HEAT INDEX... 38.98
 LONG... 75.67 LOWER ZONE..... 90 MM A..... 1.114

DATE	TEMP (C)	PCPN	RAIN	MELT	PE	AE	DEF	SURP	SNOW	SOIL	ACC P
31- 1	-7.8	78	21	28	1	1	0	47	63	148	348
28- 2	-6.6	66	21	33	1	1	0	51	75	150	414
31- 3	-1.0	69	44	74	8	8	0	110	26	150	483
30- 4	6.4	80	77	29	33	33	0	74	0	149	564
31- 5	13.1	81	81	0	78	78	0	18	0	134	645
30- 6	18.1	90	90	0	113	113	0	5	0	105	735
31- 7	21.1	90	90	0	135	128	-7	1	0	66	827
31- 8	20.4	83	83	0	121	101	-20	1	0	47	909
30- 9	16.0	93	93	0	80	75	-5	2	0	63	1002
31-10	9.7	92	92	0	42	41	-1	10	0	104	94
30-11	3.3	87	78	6	14	14	0	39	3	135	180
31-12	-3.9	91	37	22	3	3	0	44	35	147	271
AVE	7.3 TTL	1000	807	192	629	596	-33	402			

Brockville PCC

STANDARD DEVIATIONS FOR THE PERIOD 1966-2022 DC20492

DATE	TEMP (C)	PCPN	RAIN	MELT	PE	AE	DEF	SURP	SNOW	SOIL	ACC P
31- 1	3.2	30	20	28	1	1	0	41	51	11	71
28- 2	2.8	30	21	28	2	2	0	41	67	0	74
31- 3	2.3	31	28	47	5	5	0	60	62	0	79
30- 4	1.6	37	37	61	8	8	0	70	0	5	92
31- 5	1.6	35	35	0	11	11	0	24	0	21	106
30- 6	1.2	36	36	0	9	8	2	11	0	42	110
31- 7	1.2	39	39	0	8	14	14	6	0	46	116
31- 8	1.3	32	32	0	8	23	27	5	0	43	123
30- 9	1.4	36	36	0	8	12	10	10	0	48	122
31-10	1.8	39	39	0	8	9	3	20	0	45	38
30-11	1.8	29	28	8	5	5	0	37	7	28	50
31-12	3.0	35	27	19	3	3	0	39	36	9	63



ATTACHMENT E

EXPECTED WATER DEMAND FOR GROWING OPERATION
PROVIDED BY CLIENT

CANNABIS PLANT ESTIMATED WATER USAGE, 93 DAY CYCLE, 1 PL				COMBINED CANNABIS PLANT MAXIMUM ESTIMATED WATER USAGE, 93 DAY CYCLE, 666 PLANTS				COMBINED CANNABIS PLANT MAXIMUM ESTIMATED AN			
DAY	Water usage (liters)			DAY	Water usage (liters)						
1	1			1	667			101215 L	93 day cycle		
2				2				397242 L	365 day cycle		
3				3				105090 gal	365 day cycle		
4				4							
5	1			5	667						
6				6							
7				7							
8				8							
9	1			9	667						
10				10							
11				11							
12				12							
13	1			13	667						
14				14							
15	0.35			15	233						
16				16							
17	0.5			17	233						
18				18							
19				19							
20	0.5			20	333						
21				21							
22	0.5			22	333						
23				23							
24	0.5			24	334						
25				25							
26	0.5			26	334						
27				27							
28	1			28	667						
29				29							
30				30							
31	1			31	667						
32				32							
33	1			33	667						
34				34							
35	1			35	667						
36	2.5			36	1665						
37				37							
38				38							
39	2.5			39	1665						
40				40							
41	3.78			41	2517						
42				42							
43				43							
44	2			44	1332						
45				45							
46	3.78			46	2517						

COMBINED CANNABIS PLANT MAXIMUM ESTIMATED DA

Peak daily water usage	2517 L / 667 g
Peak water flow rate (overnight, 8 hours	1.39 GPM

- NOTES**
- 1- Figures provided by master grower with extensive experience
 - 2- These figures are theoretical PEAK water usage
 - 3- True water flow rate will be at least 30-40% lower. 630 g
 - 4- Reservoirs will be filled overnight, day usage of water s

47				47										
48	3.78			48	2517									
49				49										
50	3.78			50	2517									
51				51										
52	3.78			52	2517									
53				53										
54	3.78			54	2517									
55				55										
56	3.78			56	2517									
57				57										
58	3.78			58	2517									
59				59										
60	3.78			60	2517									
61				61										
62	3.78			62	2517									
63				63										
64	3.78			64	2517									
65				65										
66	3.78			66	2517									
67	3.78			67	2517									
68	3.78			68	2517									
69	3.78			69	2517									
70	3.78			70	2517									
71	3.78			71	2517									
72	3.78			72	2517									
73	3.78			73	2517									
74	3.78			74	2517									
75	3.78			75	2517									
76	3.78			76	2517									
77	3.78			77	2517									
78	3.78			78	2517									
79	3.78			79	2517									
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82	3.78			82	2517									
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84	3.78			84	2517									
85	3.78			85	2517									
86	3.78			86	2517									
87				87										
88	3.78			88	2517									
89				89										
90	3.78			90	2517									
91				91										
92	3.78			92	2517									
93	2			93	1332									
152.15 liters per plant per cycle				101225 total liters per cycle										

					26776	total gallons per cycle								
--	--	--	--	--	-------	-------------------------	--	--	--	--	--	--	--	--

SCHEDULE “C”

Site Plan Control Agreement

SPECIAL CONDITIONS

1. Location of Building Structures and Facilities

Building structures and facilities shall be located as per the Site Plan forming Exhibit 1 of Schedule “B” to this Agreement.

2. Sediment and Erosion Control

Sediment and erosion control measures shall be maintained in accordance with Exhibit 1 of Schedule “B”.

3. Landscaping

Landscaping shall be maintained as per the plans forming Exhibit 1 of Schedule “B”, including the 5m riparian zone. Fade-resistant signage to protect and identify the naturalized area shall be placed and maintained as per Exhibit 1 of Schedule “B”, at least 18” x 10” in size and 1m above ground.

4. Grading and Drainage

The Grading and drainage of the site shall be managed as per Exhibit 1 of Schedule “B” to this agreement.

5. Stormwater Management

Stormwater shall be managed as per Exhibit 2 of Schedule “B” to this agreement.

A permit shall be obtained from the South Nation Conservation Authority for the outlet for stormwater infrastructure in accordance with Ontario Regulation 170/06, Development Interference with Wetlands and Alterations to Shorelines and Watercourses.

6. Servicing

A Part 8 Ontario Building Code (OBC) permit for the private sanitary system is required from South Nation Conservation. The application must include a design by a licensed septic installer for a tertiary system. The design must show a watering bulk tank if applicable. Floor drains or supplementary discharge will not discharge into the sewage system. The landowner is responsible for ensuring that all annual

**SITE PLAN CONTROL AGREEMENT
BETWEEN HB HOLDINGS INC. AND
THE TOWNSHIP OF EDWARDSBUGH CARDINAL**

inspection, reporting and maintenance requirements under the Ontario Building Code are adhered to.

The private well shall be sited, constructed and maintained in accordance with Ontario Regulation 903 and the recommendations provided by Exhibit 3 of Schedule "B".

7. Site Access & Roads

The site shall be accessed as per the site plan forming Exhibit 1 of Schedule "B". A permit shall be obtained from the United Counties of Leeds and Grenville for any extension or relocation of the existing entranceway. No additional entranceways shall be established without the consent of the appropriate road authority.

8. Refuse Storage and Disposal

The property shall be maintained in a neat and tidy condition and all refuse shall be deposited in proper containers which are screened from view. The owner shall be responsible for the disposal of refuse from the property.

9. Snow Removal

Snow removal is the responsibility of the owner.

10. Lighting

All outdoor lighting, including fixtures and signs, shall be designed, installed and maintained to prevent light spill over or glare onto the road allowance and neighbouring residential properties.

11. Parking

Parking spaces shall be clearly marked and a barrier free space shall be provided in accordance with the Township's Zoning Bylaw.

12. Odour

Filters designed for cannabis cultivation facilities shall be used to prevent noxious odours from leaving the site.

**THE CORPORATION OF THE
TOWNSHIP OF EDWARDSBURGH CARDINAL**

BY-LAW NO. 2023-

**“A BY-LAW TO ADOPT, CONFIRM AND RATIFY MATTERS DEALT WITH BY
RESOLUTION”**

WHEREAS Section 5(3) of the Municipal Act 2001, SO 2001, Chapter 25, as amended, provides that the powers of a municipality shall be exercised by by-law;

AND WHEREAS in many cases, action which is taken or authorized to be taken by the municipality does not lend itself to the passage of an individual by-law;

NOW THEREFORE the Council of the Corporation of the Township of Edwardsburgh Cardinal enacts as follows:

1. That the actions of the Township of Edwardsburgh Cardinal, at its meeting held on May 8, 2023 in respect of recommendations contained in the reports of committees considered at the meeting and in respect of each motion, resolution and other action taken by the Township of Edwardsburgh Cardinal at its meeting are, except where the prior approval of the Ontario Municipal Board or other authority is required by law, hereby adopted, ratified and confirmed as if all such proceedings were expressly embodied in this by-law.
2. That the Mayor and the appropriate officials of the Township of Edwardsburgh Cardinal are hereby authorized and directed to do all things necessary to give effect to the actions of the Council of the Township of Edwardsburgh/Cardinal referred to in the preceding section.
3. That except as otherwise provided, the Mayor and Clerk are authorized and directed to execute all documents necessary on behalf of the Township of Edwardsburgh Cardinal.

Read, passed, signed and sealed in open Council this 8 day of May, 2023.

Mayor

Clerk