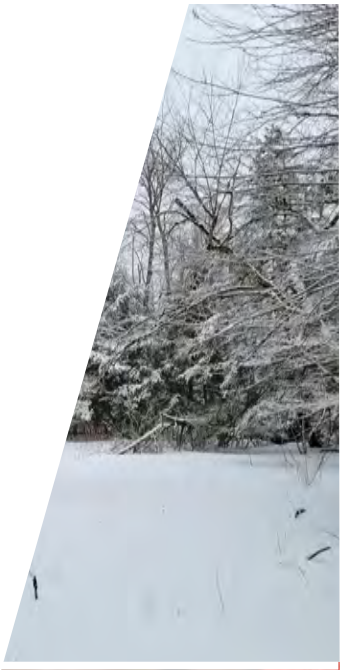
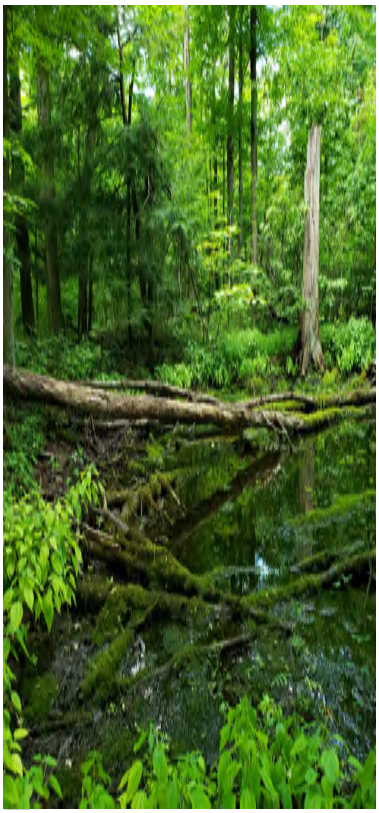
2024 Annual Water Monitoring Report

Dufferin Aggregates Milton Quarry
Region of Halton

Dufferin Aggregates, a CRH Company

Technical Reference Report Version





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MEMORANDUM

To: Neil Hannington, District Manager, Halton-Peel District Office
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Ted Belayneh, Supervisor, Ground Water Unit
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SCP Aurora Mailbox, MNRF
Joe Muller, Niagara Escarpment Commission
Sandy Dobbyn, Niagara Escarpment Commission

From: Rigoberto Ceballos, Site Manager, DFA Milton

Date: March 31, 2025

Subject: **2024 Monitoring Report**
Dufferin Aggregates Milton Quarry, Region of Halton, Ontario

Please find enclosed a copy of our 2024 Monitoring Report for the Milton Quarry, dated March 31, 2025. The report was prepared by GHD and covers the 2024 calendar year. Dufferin Aggregates is a CRH company.

A link to download the report will be provided via Microsoft SharePoint to each addressee on the distribution list. Should you require additional access please contact Kyle Fritz of GHD at Kyle.Fritz@GHD.com.

Should you have any questions I may be contacted at 416-788-0015 or by email at Kevin.Mitchell@ca.crh.com.

Sincerely,

Kevin Mitchell
Director Approvals & Environmental Practices

455 Phillip Street, Unit 100A
Waterloo, Ontario N2L 3X2
Canada
www.ghd.com

Our ref: 010978-LTR-39

31 March 2025

Mr. Rigoberto Ceballos
Dufferin Aggregates
9410 Dublin Line
Milton, Ontario
L9T 2Y3

2024 Annual Water Monitoring Report
Dufferin Aggregates Milton Quarry, Region of Halton, Ontario

Dear Mr. Ceballos

Enclosed please find a copy of the 2024 Annual Water Monitoring Report for the Milton Quarry, Region of Halton, Ontario prepared by GHD.

If you should have any questions, please do not hesitate to contact us.

Regards

Kyle Fritz, P. Eng.
Project Manager

519 340-3754
kyle.fritz@ghd.com

Encl.

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1. Introduction

GHD Limited (GHD) was retained by Dufferin Aggregates (Dufferin), a CRH Company, to complete the 2024 Annual Water Monitoring Report for the water-related monitoring program at the Milton Quarry (Site). The Site is located within the Towns of Milton and Halton Hills, in the Regional Municipality of Halton. The Site location is presented on Figure 1.1.

The Site consists of the Main Quarry, North Quarry, and East and West Cell (Extension Quarry) areas. In total, an area of 552 hectares (ha) (1,364 acres) is licensed by the Ministry of Natural Resources and Forestry (MNR) under the Aggregates Resources Act (ARA) for aggregate extraction at the Site, including 468 ha (1,156 acres) in the Main Quarry and North Quarry, and 85 ha (209 acres) in the Extension. Quarrying operations are ongoing in the Main Quarry and the North Quarry under ARA License No. 5481 and in the Extension under ARA License No. 608621. Extension extraction commenced in 2007 with Phase 1 (East). Phase 2 (West Cell) extraction above the water table began in fall 2012. Extraction below the water table in Phase 2 began in June 2013 and continued through 2020. Phase 3 (East Cell) extraction above the water table began in 2016, and extraction below the water table in Phase 3 began in 2017 and continued through 2024.

The various approvals and agreements related to aggregate extraction at the Site have resulted in the development of an environmental monitoring program and the construction and operation of a Water Management System (WMS) that supports aggregate extraction activities and facilitates water storage/handling, mitigation of water-related environmental features, and long-term rehabilitation.

This report presents the results of the monitoring programs for the Main Quarry, North Quarry, and Extension.

The results and interpretations presented in this report are based on monitoring data collected by Dufferin, GHD, Goodban Ecological Consulting Inc. (GEC), and WSP at the Site and surrounding area, up to and including 2024. The 2024 monitoring program was undertaken based on the conditions presented in the following permits/approvals:

– Aggregate Resources Act Licenses 5481 and 608621.
– Amended Permit to Take Water (PTTW) No. PTTW No. 5256-BUUP62 (issued November 2, 2020).
– Amended Environmental Compliance Approval No. 6124-C42GL4 (issued June 21, 2021).
– Work Permit No. AUR-45-03/04 issued by MNR under the Lakes and Rivers Improvement Act (LRIA) on September 3, 2003.
– October 2003 Water Management Agreement (Extension Quarry) between Dufferin and Conservation Halton (CH).
– Updated Adaptive Environmental Management and Protection Plan (AMP) May 2003 – Modified December 2011 implemented through the Extension Site Plans, Ontario Water Resources Act (OWRA approvals), and the AMP Agreement.

This report and previous annual reports present the results of the monitoring activities required by the various applicable permits/approvals for the Site. In addition to the required monitoring, various additional monitoring activities have been undertaken in the areas of the North Quarry and the Extension since the mid-late 1990s. This additional monitoring has been conducted to establish baseline hydrogeologic conditions and to facilitate evaluation of various aspects related to quarrying and mitigation in the Extension. All monitoring data collected in relation to the Site in 2024 are presented in this report. Historical data are also presented and discussed, where appropriate, to facilitate interpretation of the 2024 monitoring results.

This report is organized as follows:

Section 1 Introduction

Section 2 Background

Section 3 Quarrying and WMS Construction/Operation

Section 4 Hydrometeorologic Monitoring

Section 5 Hydrologic/Hydrogeologic Monitoring

Section 6 Water Taking and Discharge

Section 7 Water Quality Monitoring

Section 8 Residential Well Monitoring

Section 9 Ecological Monitoring

Section 10 Annual AMP Reporting Summary

Section 11 Conclusions

Section 12 Recommendations

Section 13 References

An electronic copy of this document is provided in Appendix A.

2. Background

This section presents background information relevant to the monitoring activities that are conducted at the Site.

This section is organized as follows:

Section 2.1 Hydrologic/Hydrogeologic Setting

Section 2.2 Permits and Approvals

Section 2.3 AMP

Section 2.4 Additional Monitoring

2.1 Hydrologic/Hydrogeologic Setting

The physiographic setting of the Milton area comprises two distinct features. The two features are the Dolostone Plain above the Niagara Escarpment (Escarpment) and the Halton Till Plain below the Escarpment. The Escarpment is a major feature, which trends in a general northeast to southwest direction (directions refer to "planning" north, which is approximately 45 degrees west of true north), and locally represents approximately 60 metres (m) of topographic relief.

The Dolostone Plain is characterized by undulating topography and localized wetlands. The bedrock of the Escarpment consists of a sequence of dolostones, shales, and sandstones, which overlies a thick shale formation that extends easterly at the base of the Escarpment.

The upper rock in the Niagara Escarpment is the dolostone of the Amabel Formation[1], which is approximately 15 to 30 m in thickness in the Main Quarry, 15 to 35 m in thickness in the North Quarry, and 25 to 35 m thick in the Extension. Structural features that occur within the Amabel Formation include fractures, joints, and bedding planes. The Amabel Formation is underlain by the Reynales Formation, which is a thin (generally 2 to 3 m) grey-brown, fine-grained, interbedded argillaceous dolostone, with similar or lower permeability relative to the Amabel Formation.

The dominant hydrostratigraphic unit at the Site is the unconfined dolostone bedrock aquifer consisting of the Amabel and Reynales Formations. Underlying the dolostone bedrock aquifer is the Cabot Head shale, which is approximately

[1] The traditional nomenclature has been retained to be consistent with the Site Approvals.

18 m in thickness in the Main Quarry, 14 m in thickness in the North Quarry, and approximately 19 m in thickness in the Extension. This formation has a relatively low hydraulic conductivity and acts as an aquitard. The elevation of the groundwater table is typically observed in the upper portion of the Amabel Formation, except where it is lowered by quarry and/or Escarpment dewatering effects. The Quarry is located in the West Sixteen Mile Creek Watershed. A generally shallow tributary of the West Sixteen Mile Creek, referred to as Sixth Line Tributary, receives surface water runoff and groundwater discharge from the Site and surrounding lands. Sixth Line Tributary is located to the north of the Extension and west of the Main and North Quarries, as shown on Figure 1.1. Sixth Line Tributary has permanent flow due to groundwater discharge (from seeps, springs, and upwelling), and is designated as a cold water fishery along Sixth Line Road near the North Quarry and to the north of the Extension.

In the Main Quarry, a tributary channel of Sixteen Mile Creek (referred to as the Hilton Falls Reservoir Tributary [HFRT]) was intercepted in 1990 to allow for quarrying activities. The flow regime intercepted by the quarry has been replaced by discharge from the Main Quarry to maintain base flow.

2.2 Permits and Approvals

This section provides the background for the annual hydrologic/hydrogeologic monitoring program for the Main Quarry, North Quarry, and Extension, including the various permits, approvals, and agreements pertaining to monitoring at the Site.

2.2.1 Summary of Monitoring Program Requirements

The Site monitoring program was first implemented in 1990 and has evolved since that time through permit/approval requirements and the collection of baseline data to support licensing and extraction in the Extension. In June 2013, with the commencement of extraction below the water table in Phase 2 of the Extension, the full mitigation and monitoring provisions of the AMP came into effect.

Monitoring locations are presented on Figures 2.1 through 2.5. Table 2.1 summarizes the monitoring requirements of the AMP that apply for 2024, along with references to where the required monitoring results can be found in this report. Table 2.2 summarizes the monitoring requirements of the other (i.e., non-AMP) approvals/agreement, along with references to where the required monitoring results can be found in this report.

2.2.2 ARA Licenses 5481 and 608621

Dufferin conducts aggregate extraction and processing in the Main Quarry and North Quarry under ARA License No. 5481. Environmental monitoring is required under the PTTW, ECA, and the LRIA permit for the Site.

The MNR issued ARA License No. 608621 to Dufferin in February 2007 for aggregate extraction in the Extension. This license addresses environmental mitigation by requiring that the AMP be implemented for extraction below the water table in Phase 2 and Phase 3 of the Extension.

2.2.3 Amended Permit to Take Water (PTTW)

The MECP issued Amended PTTW No. 0117-8BHQPL to Dufferin on December 16, 2010 for water taking in the Main Quarry and Extension. This permit was valid for the Site until Amended PTTW No. 8575-A3BKYB was issued on November 23, 2015 when the PTTW amendment was conducted to reflect Dufferin's corporate name change. The MECP issued PTTW No. 5226-UUP62 to Dufferin on November 2, 2020 and this PTTW is currently valid for the Site. The PTTW in effect for the Site in 2024 is presented in Appendix B.

The PTTW establishes limits on water takings and requires the implementation of a monitoring program. The PTTW contains conditions for both interim and long-term operating conditions at the Site. The Site is currently operating under ***interim conditions*** and will continue to do so in the near term. Once it is clear that water quantity and quality criteria can be reliably met for the Reservoir over the long term and the Reservoir becomes the sole source to provide the required base flow to the HFRT, Dufferin will notify the MECP District Manager and apply to the MECP Director for

an amendment to the ECA to transition from interim to long-term conditions, as specified in the ECA and as noted in the PTTW.

2.2.4 Amended Environmental Compliance Approval (ECA)

The MECP issued Amended Environmental Compliance Approval (ECA) No. 3406-8U6RQ5 to Dufferin on September 13, 2012. The amendment to the existing approval was conducted at that time to reflect the satisfaction of Condition 10 of the October 27, 2009 approval (MECP approval of the Pre-Extraction Report). On June 6, 2016 MECP issued a letter to CRH advising that their corporate name change has been registered with respect to ECA No. 3406-8U6RQ5 in MECP's records. An ECA amendment was submitted in 2021 to allow for flow monitoring to clusters of recharge wells, rather than requiring individual metering. Amended ECA No. 6124-C42GL4 was issued on June 21, 2021 and this ECA is currently valid for the Site. The ECA in effect for the Site in 2024 is presented in Appendix C.

The ECA contains conditions for both interim and long-term operating conditions at the Quarry. The quarry is currently operating under ***interim conditions*** and will continue to do so in the near term. Once it is clear that water quantity and quality criteria can be reliably met for the Reservoir over the long term and the Reservoir becomes the sole source to provide the required base flow to the HFRT, Dufferin will notify the MECP District Manager and apply to the MECP Director for an amendment to the ECA to transition from interim to long-term conditions, as specified in Condition 3 of the ECA.

The ECA requires water quality monitoring of all effluent discharged from the Site, water level monitoring at trigger and recharge monitoring wells, and ecological monitoring of the Brook Trout spawning areas in the Sixth Line Tributary.

2.2.5 Lakes and River Improvement Act (LRIA) Work Permit No. Aur-45-03/04 and Main Quarry Rehabilitation Plan

The LRIA Work Permit No. AUR-45-03/04 was issued to Dufferin on September 3, 2003 for the construction of the Main Quarry west side rehabilitation components, including the Reservoir. A copy of LRIA Work Permit No. AUR-45-03/04 is presented in Appendix D. The LRIA permit requires that the Main Quarry Discharge (to the HFRT) be done in accordance with plans agreed to by CH (based on their modelling analyses) and that the temperature of discharge flows to the Hilton Falls Reservoir Tributary be recorded hourly with a data logger, from June 1 to September 30.

2.2.6 CH Agreement and CH/Region Agreement

The following two agreements between Dufferin, CH, and the Region (AMP Agreement Only) are in effect:

– Water Management Agreement (Extension Quarry) (October 2003)
– AMP Agreement (August 2003)

These agreements are discussed below.

Water Management Agreement (Extension Quarry)

The Water Management Agreement (Extension Quarry) between CH and Dufferin took effect on June 12, 2007, superseding the previous Water Management Agreement (Main Quarry). This agreement includes requirements for discharge from the Main Quarry to the HFRT and a monitoring program for the Main Quarry/North Quarry.

AMP Agreement

The AMP Agreement between the Region, CH, and Dufferin took effect following MNR issuance of ARA License No. 608621 and commencement of Site preparation activities in Phase 1 (East) of the Extension. This agreement requires the implementation of the AMP for extraction activities in the Extension Phases 2 and 3.

2.3 AMP

The AMP was developed in support of the mitigation and management measures for the Extension Quarry. The AMP forms the framework for managing the implementation and operation of the mitigation measures to ensure that water resources and associated ecological features are protected.

The AMP is required to be implemented for aggregate extraction in Phases 2 and 3 of the Extension by ARA License No. 608621 and the associated Site Plans, the Water Management Agreement (Extension Quarry) between Dufferin and CH, and the AMP Agreement between Dufferin, CH, and the Region. Although the AMP pertains to Extension Phase 2 and Phase 3 extraction, it included requirements for background data collection and other work prior to the commencement of Phase 2 extraction. The overall approach of the AMP is discussed below.

Groundwater flow within the Amabel aquifer supports water resources in the area, including private water supply wells, cold water fisheries, and wetlands. The AMP incorporates comprehensive mitigation measures to prevent any adverse effects on water resources from either a water quantity or water quality perspective. Under active quarry conditions, mitigation measures include operation of the WMS consisting of quarry dewatering and discharge to the Reservoir and drawing water from the Reservoir for use in a groundwater recharge system based on a series of recharge (injection) wells along appropriate segments of the quarry perimeter. The groundwater recharge system is designed to generally maintain the natural groundwater levels in the vicinity of the wetlands and other water dependent features around the quarry and beyond. Quarry rehabilitation will involve the creation of three separate lakes created by extraction in three quarry cells. Once these lakes attain their designed water levels, they will serve to passively maintain surrounding groundwater levels and associated water resources. Some active management of water will continue post-rehabilitation, to ensure the lakes are maintained at appropriate levels, the on-Site wetlands are maintained, and may include some localized seasonal groundwater recharge along the eastern part of the quarry area.

The purpose of the adaptive management approach is to recognize the inherent variability in the natural environment and implement a flexible system of mitigation and monitoring to ensure the mitigation measures provide ongoing protection of water resources. The AMP is based on the planned implementation of proven mitigation measures and an organized process of design, implementation, monitoring, evaluation, and optimization for the active quarry operation and rehabilitation periods.

The AMP establishes the water resources monitoring program for the Extension. The key performance monitoring aspect for the mitigation measures for the Extension is to maintain groundwater levels at defined trigger monitoring wells that ensure protection of the adjacent water resources and associated features.

The AMP includes measures to ensure the proactive construction, demonstration, and verification of the WMS. A response action framework is defined to provide a structured response to any conditions where the target levels are not being suitably maintained, including Agency notification.

Target water levels are required for trigger wells to regulate the performance of the mitigation measures. The AMP establishes the protocol for defining appropriate target levels, as well as the methodology for adapting them in the future in response to changes in any relevant factors, including climate change.

The approach using groundwater recharge wells operated to maintain target water levels in trigger wells is consistent with the North Quarry Recharge Well System requirements although the AMP includes further details for monitoring and mitigation operations for the Phase 2 and Phase 3 Extension Quarry.

It is also necessary to ensure that the quality of recharged water is acceptable for the protection of adjacent water resources. Water quality monitoring and other supplemental monitoring programs are defined in the AMP to provide a comprehensive monitoring and evaluation program.

The AMP focuses on the protection of ecological water resources as they are more sensitive to water level variations than water supply wells; therefore, the protection of ecological features generally provides protection of water supply wells. Dufferin is fully committed to protecting the water supplies (both quantity and quality) for neighbours as is currently done under the existing domestic well program for the Site, and detailed requirements are included in the AMP.

In addition to this annual report, the AMP requires a comprehensive 5-year review commencing with the start of extraction below the water table in the West Cell (Phase 2). The first 5-year review covered the period from June 2013 to December 2018 and was submitted under separate cover (GHD, 2020). It is anticipated that the second 5-year review covering the 2019-2023 period will be submitted in 2025.

2.4 Additional Monitoring

In addition to the monitoring required by the above approvals, additional monitoring is conducted for a number of purposes, including to ensure that the WMS is operated appropriately and to provide additional characterization of conditions. The additional monitoring beyond the requirements of the Site approvals that was conducted in 2024 includes the following:

– Water level monitoring at trigger wells and recharge monitoring wells associated with operating portions of the recharge well system at more frequent intervals than required (e.g., North Quarry trigger wells typically monitored once or twice per week rather than twice per month as required by the PTTW).
– Annual water level monitoring at all available Main Quarry monitoring wells not required by the Site approvals.
– Water quality monitoring at WMS locations required in the future under long-term conditions but not currently required under interim conditions (including North Quarry and Central Sump discharges to the Reservoir).
– Expanded monthly list of water quality monitoring parameters (i.e., same list as required by ECA for recharge water) for WMS water quality sampling locations.
– Monthly surface water elevation monitoring at all staff gauges and other surface water level monitoring stations associated with Sixth Line Tributary and Extension wetlands, subject to access.
– Monthly photos at staff gauges to further document the conditions of the various surface water features.
– Additional temperature monitoring at the culvert where the Main Quarry discharge to the HFRT crosses under Sixth Line (SG50).

The types of additional monitoring activities will vary over time based on the conditions that are encountered.

3. Quarrying and WMS Construction/Operation

This section presents information related to quarrying and WMS construction/operation activities conducted at the Site in 2024.

This section is organized as follows:

Section 3.1 Quarrying Activities in 2024

Section 3.2 WMS Construction Activities in 2024

Section 3.3 WMS Operation in 2024

3.1 Quarrying Activities in 2024

In 2024, bedrock production extraction occurred in the East Cell and North Quarry with minor extraction also occurring in the Main Quarry. Figure 2.7 presents the 2024 limits of extraction, as well as the 2023 limits of extraction and the licensed extraction limits for comparative reference.

Main Quarry

Main Quarry extraction was limited to the removal of minor remaining reserves along the eastern extraction limit. Ongoing clean-up of remaining reserves will continue until rehabilitation is complete within the processing area.

North Quarry

In 2024, a single full height bench was advanced to the final extraction limit in the southwest corner of the North Quarry. Some removal of remaining floor reserves also took place in 2024.

East Cell

In 2024, a full height single bench was advanced to the eastern boundary of the East Cell. Additional extraction along the northern limit of the East Cell took place, including advancement of the lower bench adjacent the Townline Pillar. This northward advancement stopped approximately at the location of the East Cell to West Cell hydraulic control structure, with reserves being substantially exhausted in this area. Some minor floor removal took place in addition to production scale extraction.

3.2 WMS Construction Activities In 2024

In the Extension, there were no recharge well or diffuse discharge additions to the WMS; however, recharge optimization will be ongoing for the near future. Despite no additions in 2024, future additions may be considered and will be documented here as they occur.

In the North Quarry there were no changes or additions to the WMS. The North Quarry recharge system is presented on Figure 2.3.

In the West Cell, the recharge connection was utilized at MWX1-15 in 2024. The West Cell recharge system is presented on Figure 2.4.

In the East Cell there were no changes or additions to the WMS. The East Cell recharge system is presented on Figure 2.5.

3.3 WMS Operation In 2024

This section presents information related to operation of the WMS in 2024.

3.3.1 Main Quarry/North Quarry/Extension Water Handling

In order to maintain dry working conditions in the Main Quarry, North Quarry, and Extension, the WMS dewatering components collect surface water and groundwater inflow from the quarry areas and convey it to the Reservoir where it is stored and/or discharged from the Site. Some of the water collected from the North Quarry and Extension is diverted for quarry operations, as needed. The water in the Reservoir can be retained to increase storage or can be discharged (to the HFRT to provide the required baseflow), pumped to the Main Quarry Lake/Wetland Complex (to maintain a lake level of approximately 302.5 to 303.5 m above mean sea level [AMSL]), pumped to the recharge well system, or used in the Main Quarry operations area.

Lake Filling commenced in the West Cell in mid-2021 and continued through 2024. As at the end of 2024, the water level in the West Cell was approximately 318.20 m AMSL (final lake level of 326 m AMSL) and total water in storage is currently 2,200,000 m^3. It is anticipated that during the lake filling period some water may be returned to the Reservoir via the North Quarry Sump periodically so the rate of filling does not exceed the water surplus for the Site. Sufficient water will remain in storage in the Reservoir to meet both mitigation and off-Site discharge (HFRT) requirements.

Dufferin met the minimum required annual discharge to the HFRT of 700,000 cubic metres (m^3) in 2024 (see Section 6.2.3). As presented in the 2023 Annual Water Monitoring Report (GHD, 2024), no Excess Water was anticipated to be available for discharge in 2024 to the HFRT; a condition that is anticipated during active lake filling periods such as is currently underway in the West Cell. No surplus water was discharged to the HFRT in 2024; however, the required 700,000 m^3 discharge was completed in cooperation with Conservation Halton.

During 2024, water was discharged to the HFRT from both the West Sump and the Reservoir outfall to an on-Site wetland located immediately east of Sixth Line. Flow from the wetland via the HFRT is in a westerly direction through

a culvert beneath Sixth Line. The HFRT downstream (west) of Sixth Line is also a component of the wetland in this area. Water discharges from the HFRT flow into the Hilton Falls Reservoir. Water discharged from the Hilton Falls Reservoir is subsequently discharged to the Kelso Lake Reservoir. Conservation Halton owns and manages both of these reservoirs.

3.3.2 Recharge Well System

Dufferin continued to operate the North Quarry and Extension portions of the recharge well system throughout 2024 in accordance with the related approvals. Short-term power outages occasionally occurred at the Site. Generally, these outages are not a concern because water levels are typically restored to above target within a matter of a few hours or days.

Operating and monitoring information related to the recharge well system is presented in the following sections:

Section 5 Hydrologic/Hydrogeologic Monitoring

Section 6 Water Taking and Discharge

Section 7 Water Quality Monitoring

4. Hydrometeorologic Monitoring

In the fall of 1990, a hydrometeorologic station with computerized data logging equipment was established by Dufferin in the Main Quarry. Data collection first began in October 1990. The station was moved from the west central area to the recharge pumping station in 2008. The following data were collected in 2024:

Air Temperature Hourly average of readings taken every 5 seconds.

Precipitation Total accumulation recorded every 15 minutes by a tipping bucket rain gauge.

Evaporation Total evaporation manually recorded twice per week using a Class "A" evaporation pan.

Hydrometeorologic data for precipitation, evaporation, and air temperature from 1991 to 2024 are presented graphically in Appendix E.

This section is organized as follows:

Section 4.1 Air Temperature

Section 4.2 Precipitation

Section 4.3 Evaporation

Section 4.4 Summary

4.1 Air Temperature

The Site weather station measures air temperature every 5 seconds and records hourly average temperatures. When air temperature measurements are not available from the Site weather station, the data has been previously supplemented with temperature data from the Acton Wastewater Treatment Plant (WWTP) located approximately 9 kilometres (km) from the Site and Georgetown WWTP. During 2024, air temperature (and precipitation) data from Scotch Block Dam were obtained from Conservation Halton and used as the supplemental source of data. Scotch Block Dam is substantially closer to the Site and is located approximately 3.2 kilometres to the east.

In mid-September, anomalous temperature values were identified at the Milton Quarry weather station. GHD contacted Conservation Halton to assess the temperature sensor, which was subsequently replaced on

October 24, 2024. The air temperature data set has been supplemented with data from Scotch Block Dam for the interim period when troubleshooting was underway.

Average monthly air temperatures for 2024 are presented in Table 4.1, and graphically on Figure 4.1, along with the long-term monthly average temperatures for comparative reference. Average daily air temperatures from 2024 are presented in Appendix E Table E.1.

Mild conditions were observed at the start of winter 2024 from January to March with monthly average temperatures 2.2°C, 4.6°C, and 2.9°C warmer than the long-term average, respectively. Air temperature was consistently above the long-term monthly averages for the balance of the year, though not as markedly as during the winter months. The hottest average daily temperature of the year was recorded on June 19, 2024 at 26.2°C. The coldest day of the year occurred on December 22, 2024, with an average daily temperature of -14.6°C.

The overall average air temperature for 2024 was 9.6°C, which is 1.8°C warmer than the long-term average of 7.8°C for the Milton Quarry. The highest and lowest monthly average temperatures in 2024 were in July at 21.2°C and in January at -3.3°C, respectively.

4.2 Precipitation

During 2024, the Milton Quarry rain gauge was operational between April 8 and November 25. The rain gauge only collects rainfall data and therefore is typically operated during non-freezing conditions (i.e., typically April to November). The rain gauge was successfully calibrated on May 10, 2024; however, issues were identified post-calibration. GHD contacted Conservation Halton to assess the tipping bucket portion of the rain gauge. A site visit occurred on May 26, 2024. Conservation Halton re-wired the datalogger connections, re-levelled the tipping bucket, tightened the gear clamps, and applied silicone to the strain relief wire entrances to prevent insect intrusion. Post maintenance, Conservation Halton compared precipitation recordings to other local weather stations (e.g., Scotch Block Dam) and confirmed that values were comparable.

In previous assessments, when data was not available from the Site weather station it was first supplemented using precipitation data from the Acton Wastewater Treatment Plant (WWTP) located approximately 9 km from the Site, and then with data from the Georgetown WWTP. During 2024, a closer station (Scotch Block Dam operated by Conservation Halton) was used to supplement missing data prior to Acton WWTP and Georgetown WWTP as it is located approximately 3.2 km from the Site. The supplemented precipitation data is presented on Figure 4.2. Historical yearly precipitation data is presented in Appendix E Figure E.1.

GHD obtained 2024 rainfall and air temperature data collected at both the Scotch Block Dam weather station from Conservation Halton and the Acton WWTP weather station from the Credit Valley Conservation Authority (CVC). Both sites operate a heated tipping bucket rain gauge year-round. GHD only utilized the precipitation data for the winter period (November to March) when air temperatures for the month were consistently above -5°C, as there are some concerns with the accuracy of precipitation generated by heated tipping buckets when air temperatures are below -5°C. When daily air temperatures dipped below -5°C, the precipitation data was supplemented with Georgetown WWTP data.

Precipitation data for 2024 were also obtained from Environment and Climate Change Canada (the Ontario Climate Centre) for the Georgetown WWTP station in Georgetown, Ontario (located approximately 13 km from the Milton Quarry). Precipitation data for the full year was qualified as preliminary (by Environment and Climate Change Canada) at the time of this report. Environment and Climate Change Canada has not conducted the full QA/QC process on the data; however, this data was reviewed and edited and is considered appropriate for this report. The Georgetown WWTP station precipitation dataset had 54 missing days of data; therefore, supplementation with Toronto International Airport data (also supplied by Environment and Climate Change Canada) was required in January, February, March, July, August, October, November, and December 2024. The Georgetown WWTP station has a complete record of precipitation data between 1882 and 2024, including snowfall data during the winter months that have been converted to precipitation.

Monthly precipitation totals for 2024 are presented in Table 4.2. Daily precipitation totals are also provided in Appendix E Table E.2 for reference.

The 2024 total annual precipitation for the Milton Quarry was 990.5 millimetres (mm), which is approximately 130 mm greater than the long-term average (1991 to 2023). The Georgetown WWTP total annual precipitation for 2024 (1060.9 mm) was greater than its long-term average (1991 to 2023), by approximately 202.7 mm. A comparison of precipitation at Milton Quarry and the Georgetown WWTP is presented in Appendix E Table E.3. The difference in precipitation observed in 2024 is attributed to variability between monitoring locations and is within the range of variability observed historically.

Conditions at the start of the year were typical, and though some variability was present, precipitation conditions can be summarized as average from January to May. Precipitation between June and August was approximately double the long-term average, with July being a significant contributor to the abnormally high precipitation total. During July, 175 mm of precipitation was recorded in a 7-day period resulting in significant regional flooding, including in 6th Line Tributary adjacent the Site. In contrast to the summer, conditions from September to December were quite dry with nearly a 30% reduction in precipitation relative to average. July was the wettest month of 2024, totaling 186.7 mm which is more than double the long-term average of 82 mm.

The 2024 Georgetown WWTP precipitation data reveal the impact that isolated storms can have on the area. During the months of June, August, September and October the Milton monthly data was above the precipitation observed at the Georgetown WWTP. A more in-depth comparison between 2024 Georgetown WWTP and the Milton Quarry precipitation can be seen on Figure 4.2.

A total of 990.5 mm of rain was received in Milton, making 2024 the sixth wettest year since 1991, and the wettest year since 2011 when 1,038 mm of precipitation was recorded. In summary, the winter and spring were typical, the summer was quite wet with recorded precipitation nearly double the average. The wet summer was followed by conditions in the fall that were conversely quite dry and exhibited a 30% reduction in precipitation between September and December. While 2024 may be considered a wet year overall, underlying patterns on a seasonal timescale resulted in variable conditions from very wet in the summer to very dry in the fall and early winter.

4.3 Evaporation

Pan evaporation is measured at the Site using a Class "A" evaporation pan. The evaporation pan is monitored at a minimum twice weekly by collecting manual water level measurements and making the required water level adjustments. Equivalent measured lake evaporation is calculated by multiplying the measured pan evaporation by the pan coefficient (0.70) after correcting for rainfall into the pan. The evaporation pan, similar to the rain gauge, is not operated during winter months. The measured lake evaporation data is presented graphically on Figure 4.3 for months with a complete monitoring record. The monthly measured lake evaporation on Figure 4.3 is presented with the long-term Milton Quarry (1991-2023) mean evaporation observed at the Site. Historical yearly lake evaporation data is presented in Appendix E Figure E.2.

Table 4.3 presents measured and supplemented lake evaporation on a monthly basis. The supplemented lake evaporation includes an over-winter evaporation estimate of 154 mm, as presented in the 5-Year AMP Review Report. The over-winter estimate represents evaporation occurring between November and April.

The total supplemented lake evaporation at the Milton Quarry in 2024 is estimated to be 568 mm. Recorded evaporation is 90 mm below the long-term average (1991 to 2023, excluding 1996 to 1999) of 658 mm. The annual lake water surplus/deficit, which is the difference between the precipitation and lake evaporation is 422 mm, indicating a water surplus over the lake area for the year. The surplus observed in 2024 is much higher than the long-term average surplus of 207 mm. Historical annual precipitation surplus data is presented in Appendix E Table E.4.

4.4 Summary

The overall average air temperature for 2024 was 9.6°C, which is warmer than the long-term average of 7.8°C for the Milton Quarry. The highest and lowest monthly average temperatures in 2024 were in July at 21.2°C and in January at -3.3°C. The highest daily average temperature was recorded in June at 26.2°C and the lowest daily average temperature was recorded in December at -14.6°C. Monthly temperatures in 2024 were warmer compared to the long-term average by 1.8°C.

A total of 990.5 mm of rain was received in Milton, making 2024 the sixth wettest year since 1991, and the wettest year since 2011 when 1,038 mm of precipitation was recorded. In summary, the winter and spring were typical, the summer was quite wet with recorded precipitation nearly double the average. The wet summer was followed by conditions in the fall that were conversely quite dry and exhibited a 30% reduction in precipitation between September and December. While 2024 may be considered a wet year overall, underlying patterns on a seasonal timescale resulted in variable conditions from very wet in the summer to very dry in the fall and early winter.

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5. Hydrologic/Hydrogeologic Monitoring

This section presents the hydrologic/hydrogeologic monitoring data collected in 2024 for the Main Quarry, North Quarry, and Extension.

Monitoring locations are shown on Figures 2.1 (Main Quarry), 2.2 (North Quarry and Extension), 2.3 (North Quarry portion of the recharge well system), 2.4 (West Cell portion of the recharge well system), and 2.5 (East Cell portion of the recharge well system). Monitoring well installation details are presented in Appendix N (Table N.1). Water level and flow monitoring data are provided in Appendices G and H, in graphical and tabular form, respectively. Stratigraphic and instrumentation logs for monitoring wells are presented in Appendix F.

In 2024, water resources generally reflected precipitation patterns. Spring recharge and the associated rapid increase in water levels commenced earlier than typical, with the first indications of rebound occurring in December 2023. Water levels continued to climb rapidly through the end of January as the majority of the snowpack melted and contributed to natural recharge. Late winter and spring precipitation maintained higher than typical water levels from February through mid-April, a longer freshet than typical. A rapid decline in water levels and water availability was observed to occur from mid-April through early July, when a secondary (larger) ‘spring peak’ occurred. This peak was observed in groundwater levels across the Site and resulted in significant flooding in surface water features. This secondary peak is attributed to 175 mm of precipitation that occurred over a 7-day period in mid-July. Water levels, and water availability more generally, decreased rapidly following the July peak, attributed to a 30% reduction in precipitation (relative to average) observed between September and December. These results are evident on background well hydrographs presented in Attachment 11 of Appendix G. Surface water availability and the Site water budget are discussed in detail in Section 6.

Further information is provided as organized below:

Section 5.1 Main Quarry

Section 5.2 North Quarry Recharge System

Section 5.3 Extension Recharge Well Systems

Section 5.4 Spring-Summer Target Transition

Section 5.5 Target Level Adjustments for 2025

Section 5.6 Other Hydrologic Monitoring

5.1 Main Quarry

Hydrologic/hydrogeologic monitoring in the Main Quarry includes measurement of surface water elevations (including the Reservoir and the Main Quarry Lake/Wetland Complex), and groundwater elevations at monitoring wells.

Monitoring of pumped flows is also conducted as reported in Section 6.

5.1.1 Surface Water Elevations

In 2024, the water level in the Reservoir ranged between 307.02 and 308.00 m AMSL, reaching the interim maximum Reservoir level (see hydrograph in Appendix G, Attachment 1). The typical seasonal Reservoir level pattern is a sharp increase with the onset of the spring freshet followed by a decrease during the summer when discharge needs for mitigation and evaporation exceed inflows from dewatering and precipitation. Due to persistent wet conditions in spring and summer 2024, the Reservoir level continued to climb through the summer and peaked in mid-July, following 175 mm of precipitation in 7 days. Drier conditions were observed through the fall; however, despite these conditions the Reservoir level remained within the upper 1 m of the operating interval. In 2024, observed Reservoir water levels and overall surface water availability at the Site were generally consistent with precipitation patterns.

The surface water elevation in the Main Quarry Lake/Wetland Complex fluctuated within the normal range (see hydrograph in Appendix G, Attachment 1). The water level generally follows the typical seasonal trend of a relatively high water level in the spring and relatively low water level in the fall, with the 2024 trend being atypical as described above.

5.1.2 Groundwater Elevations

Five monitoring wells (MW1 to MW5) were previously installed near the licensed boundary of the Main Quarry to obtain groundwater level data at locations surrounding the quarry. The recorded groundwater levels are used to evaluate long-term changes in the water table that may be related to the effects of quarrying, including rehabilitation.

It is noted that these monitoring wells are now located at distances ranging from approximately 6 m (MW5) to 42 m (MW1) from the quarry face. As a result, the groundwater elevations reflect a dewatered condition and no significant changes are anticipated in the future from Main Quarry activities other than at MW5, which is close to the Reservoir and may increase in the future with flooding of the North Quarry cell.

Hydrographs are presented in Appendix G, Attachment 2. A summary of groundwater elevation data is presented in Appendix H. The hydrographs allow comparison of seasonal trends and identification of any significant changes in the groundwater elevations through the years.

The hydrographs for monitoring wells MW1, MW2, MW3, and MW4/4A/4B/4C[2] generally show the effects of historical quarry dewatering and a similar trend of seasonal fluctuations between the years 1991 to 2024. In general, the increase in groundwater elevations each year correlates with the occurrence of the spring freshet, with surplus precipitation relative to potential evaporation. The decline in groundwater elevations each year is generally attributed to the normal seasonal water deficit from late spring to early fall. Since 2008, the groundwater elevation at MW5 has been influenced more by the water level in the Reservoir than by natural groundwater levels.

[2] MW4C replaced MW4B, which was destroyed in January 2007. MW4B replaced MW4A (blocked at depth) in July 2003. MW4A replaced MW4 (destroyed) in Fall 1998.

5.2 North Quarry Recharge System

The North Quarry groundwater recharge used the North Quarry recharge pond(s) from commencement of extraction in 2000 until 2007. In 2007, the North Quarry portion of the recharge well system was commissioned and the recharge ponds were subsequently removed from service and decommissioned. Additional recharge wells have been added to the North Quarry portion of the recharge well system since 2007 as needed.

Hydrologic/hydrogeologic water level monitoring associated with the North Quarry recharge system includes measurement of groundwater elevations at recharge monitoring wells, trigger wells, and background wells. North Quarry recharge system monitoring locations are presented on Figure 2.3.

5.2.1 North Quarry Trigger Wells

Two sets of Trigger Well hydrographs are presented in this report. Hydrographs for North Quarry trigger wells that present 2024 groundwater elevation data, the associated 2024 target levels, and a representation of the recharge rates for the recharge wells located in close proximity are presented on Figures 5.1 through 5.7. Hydrographs for North Quarry trigger wells that present all available historical groundwater elevation data are presented in Appendix G, Attachment 4.

Groundwater elevations at North Quarry trigger wells were generally maintained at or above the target levels by the groundwater recharge well system throughout 2024. North Quarry extraction is nearly complete with remaining reserves predominantly located within a shallow floor bench. As a result, North Quarry trigger well water levels are less influenced by natural seasonal fluctuation, and instead track the target levels more closely. This effect is the result of the reduction in the area of upgradient groundwater recharge catchment and the increased influence of the recharge well system on the trigger wells. In the area of BH37, careful WMS operation to limit springtime groundwater levels has resulted in greatly reduced spring peak groundwater levels relative to earlier recharge operations, conserving water and reducing the potential risk of water concerns at the adjacent property.

5.2.2 North Quarry Recharge Monitoring Wells

Water levels in the North Quarry recharge monitoring wells reflect water levels close to points of groundwater recharge (recharge wells). They are used for operational purposes through automated measurement and control by the Programmable Logic Controllers (PLCs) in the recharge control valve huts or manual measurements at some locations. The automated control system monitors groundwater levels at selected recharge monitoring wells and adjusts the recharge flowrates at associated recharge wells such that programmable groundwater elevation set points are maintained at the recharge monitoring wells. Hydrographs for North Quarry recharge monitoring wells are presented in Appendix G, Attachment 3.

5.3 Extension Recharge System

Dufferin commenced operating the Extension recharge well system in May 2013 to satisfy the mitigation requirements of the AMP for the commencement of extraction below the water table in the West Cell. During 2024, the Extension recharge system was operated in accordance with the mitigation provisions of the AMP to maintain water levels at Extension trigger wells at or above the 2024 target levels.

Hydrologic/hydrogeologic water level monitoring associated with the Extension groundwater recharge well system includes water levels at trigger wells, recharge monitoring wells, and background wells. Extension recharge system monitoring locations are presented on Figures 2.4 and 2.5.

5.3.1 Extension Trigger Wells

Two sets of Trigger Well hydrographs are presented in this report (2024 hydrographs and long-term hydrographs). Hydrographs for Extension trigger wells that present 2024 groundwater elevation data, the associated 2024 target

levels, and a representation of the 2024 recharge rates for the recharge wells located in close proximity are presented on Figures 5.8 through 5.31. Hydrographs for Extension trigger wells that present all available historical groundwater elevation data at trigger wells are presented in Appendix G, Attachments 7 (West Cell) and 9 (East Cell).

Groundwater elevations at Extension trigger wells are generally maintained at or above the target levels by the groundwater recharge well system. In some instances, additional recharge is provided where an opportunity for enhancement exists, as determined by Dufferin's ecologist, Goodban Ecological Consulting (GEC). This is the case in the vicinity of Wetland W10 where adjacent trigger wells OW65-07 and OW66-07 have recently been operated above the target water levels for a period of the spring and summer.

During 2024, water levels were held above the target levels at OW65-07 and OW66-07 to provide additional support for Wetland W10, as was documented in the 2023 Annual Monitoring Report (GHD, 2024). It is anticipated that this approach will be maintained for the foreseeable future for continued enhancement of Wetland W10, as has been achieved at numerous other wetlands including Wetland W5, and Wetland V2 in the past.

While water levels are generally maintained at or above target levels, there are a limited number of exceptions when this is not the case. These exceptions are described in detail below:

– In early-December repairs were undertaken at a valve chamber adjacent to East Cell trigger well OW52-07. The maintenance work required that a number of recharge wells be turned off temporarily. While the repair was successful, water levels recovered slowly (as was expected). The water level at trigger well OW52-07 was measured 50 cm below the target level on Friday December 13, 2024. This level is below the target but above the historically verified minimum water elevation (i.e., in the "Yellow Zone"). The condition was reported to the Agencies on December 16, 2024 because it was in the lower half of the Yellow Zone (i.e., below the mid-point between the target and the minimum). A water level in the Yellow Zone is not a short-term (acute) ecological consideration but does indicate the water management system is not operating as intended. In this scenario the unintended operation resulted due to required maintenance and the resolution was to maintain or increase recharge. The target water level was regained as of December 18, 2024.

An additional category of below-target instances includes where transducer water level data show brief water level drops to slightly below target levels (many of which are related to short-term recharge shutdowns for routine maintenance or WMS additions); these are not cause for concern with respect to the water-dependent ecological features because of the protective nature of the target levels (i.e., corresponding to long-term average conditions in most cases).

One "Occurrence", as defined by the AMP, was recorded in 2024 as described below:

– The water level at the East Cell trigger well OW5-80 was measured below spring target level on May 21, 2024. Agencies were notified on May 28, 2024, following one week below the target, designating the event as an 'occurrence' as defined by the AMP. This level was below the target but above the historically verified minimum water elevation (i.e., in the "Yellow Zone"). A water level in the Yellow Zone is not a short-term (acute) ecological consideration but does indicate the water management system is not operating as intended.
– An update notification was provided to the Agencies on June 18, 2024, in accordance with the AMP Response Action Chart. This communication documented the response effort including the following actions:
    - Increased monitoring frequency at relevant locations during recharge optimization
    - Assessed recharge rates and conducted individual recharge tests
    - Assessed wells for recharge enhancement via installation of a packer assembly and pressurization
    - Reviewed background and climatic conditions
    - Reviewed historical data at OW5-80 and adjacent supplemental monitors
    - Repaired an automated flow control valve
    - Proceeding with procurement and installation of packer assemblies to increase sustainable recharge pressure and flows in affected area

– The target level was regained at trigger well OW5-80 through recharge optimization on June 24, 2024. The conclusion of this Occurrence was communicated to the Agencies on July 2, 2024, following a period of one full week above the target.

5.3.2 On-Site Wetlands

Hydrographs for on-Site wetlands V2, W7, and W8 are presented on Figures 5.32, 5.33, and 5.34, respectively.

During 2024, water levels in the on-Site wetlands were generally maintained at or above target levels through direct diffuse discharge from the water management system as required. In 2024 no instances occurred where a water level was recorded below the target level.

It is worth noting that supplemental monitoring locations in Wetland W7 (SG28, SG29), Wetland W8 (SG51, SG53), and Wetland V2 (SG31A) generally exhibit more movement and variability than the stilling wells used for compliance monitoring due to the conditions in the base of these wetlands (e.g., shallow bedrock and poor anchoring material). Best efforts are made to re-calibrate (survey) the gauges annually and improve the data quality prior to reporting in the AMR.

Wetland water levels are plotted with nearby groundwater monitors in Appendix G Attachment 15. As anticipated, a reduction in groundwater support for on-Site wetlands has been observed with the advancement of bedrock extraction in the East Cell. Changing conditions are summarized as follows:

– Groundwater levels adjacent Wetland W7 are consistently below the historically observed range as seen in Appendix G.15.1a and Appendix G.15.1b. The change in adjacent groundwater conditions is most apparent at BH47 where more than 10 m of drawdown is observed; however, at least 3 m of drawdown is also present in OW74-08 and BH44. As was previously reported, notable drawdown has been evident in the vicinity of W7 since fall 2019.
– Groundwater levels adjacent Wetland W8 exhibit approximately 3 m of drawdown at BH43-I, and more than 3 m at O73-08. Notable drawdown has been evident in the vicinity of W8 since 2020 (refer to Appendix G.15.4a and Appendix G.15.4.b).
– Groundwater levels adjacent Wetland V2 are consistently below the historically observed range as seen in Appendix G.15.14.a and Appendix G.15.14.b. The change in adjacent groundwater conditions is most apparent in monitoring well OW72-08, where approximately 20 m of drawdown is evident. Notable drawdown has been evident in the vicinity of V2 since spring 2017.

It is important to note that while groundwater conditions varied adjacent to the on-Site wetlands, the target levels were continuously maintained in an appropriate manner (as per the AMP, Appendix C "On-Site Wetlands") from an ecological perspective.

5.3.3 Extension Recharge Monitoring Wells

Water levels in the Extension recharge monitoring wells reflect water levels close to points of groundwater recharge (recharge wells). They are used for operational purposes, either through manual measurements or through automated measurement and control by the PLCs in the recharge control valve huts. The automated control system monitors groundwater levels at recharge monitoring wells and adjusts the recharge flowrates at associated recharge wells such that programmable groundwater elevation set points are maintained at the recharge monitoring wells. Hydrographs for Extension recharge monitoring wells are presented in Appendix G, Attachments 6 (West Cell) and 8 (East Cell).

5.4 Target Level Adjustments for 2025

Section 2.3 of the Establishment of Target Levels report for the North Quarry (CRA, April 2005) defines the requirements and protocol for adjusting North Quarry target levels annually (based on trends in the background well data) once recharge wells are operational and controlling the groundwater levels. These annual adjustments allow

mitigation measures to reflect both short-term variations and long-term climatic trends. The initial North Quarry target levels were also presented in the Establishment of Target Levels Report (CRA, 2005).

Similarly, the AMP and the Pre-Extraction Report define the requirements and protocol for adjusting Extension target levels annually. The initial Extension target levels and minimum levels were presented in the Pre-Extraction Report (CRA, 2011a).

Appendix I includes a summary of the North Quarry and Extension target level adjustments and the Extension minimum level adjustments for 2025. Generally wet conditions in summer 2023 and 2024 have resulted in a significant increase in the average summer water level recorded at background wells used for setting targets. This increase has resulted in a proportional and corresponding increase to assigned summer targets for 2025. In many cases, the summer 2025 targets are the highest that have ever been assigned. Should climatic support falter, some operational challenges may be expected given these aspirational targets. A summary of the 2024 and 2025 target levels for the North Quarry and Extension trigger wells is presented in Tables 5.1a to 5.1e for comparative reference.

Section 6.1 of the AMP requires that Dufferin provide Extension target water levels for future operating seasons to the agencies at least three months prior to the start of the relevant operating season. Dufferin provided winter and spring 2025 Extension target level adjustments to the agencies in a GHD memorandum dated September 30, 2024. Adjustments to the winter and spring Extension minimum levels were also provided to the agencies in that memorandum.

As discussed in the 2017 Annual Water Monitoring Report (GHD, 2018), West Cell background wells OW40-04 and OW41-04 appear to have been influenced by nearby beaver activity in Sixth Line Tributary. Ongoing flooding and potential beaver activity has been observed in the area again since mid-2021 and is once again affecting water levels at OW40-04 and OW41-04. As has been the case since 2018, background well OW39-04 is used for the calculation of targets at associated trigger wells OW27-04, OW28-04, OW29-04, and OW30-04.

5.5 Other Hydrologic/Hydrogeologic Monitoring

Other hydrologic/hydrogeologic monitoring conducted at the Site includes groundwater elevations, surface water elevations, and surface water flow measurements at various locations in the North Quarry, Extension, and surrounding lands. This includes the supplementary monitoring program outlined in the AMP, monitoring required by the PTTW, and other monitoring.

Surface water flow gauging (monitoring) is conducted at SW4 (Pumphouse) and Sixth Line Tributary (SW20) throughout the year.

North Quarry and Extension monitoring well locations are presented on Figures 2.2, 2.3, 2.4, and 2.5. Hydrographs for all North Quarry and Extension monitoring wells that were included in the 2024 monitoring program are presented in Appendix G, Attachments 5 and 10, respectively. Hydrographs for all background monitoring wells and domestic wells are presented in Appendix G, Attachments 11 and 12, respectively. Groundwater and surface water elevation data are provided in Appendix H. Hydrographs for surface water monitoring locations along the 6th Line Tributary, the West Cell wetlands, and the East Cell wetlands, are presented in Appendix G, Attachments 13, 14, and 15, respectively.

An overall evaluation of the results of the groundwater elevation, surface water elevation, and flow monitoring results for the North Quarry and the Extension areas follows.

5.5.1 Groundwater Flow Patterns

Groundwater elevation contour plots for April 2024 and October 2024 are presented on Figures 5.35 and 5.36, respectively. These figures show groundwater elevations under high and low water level conditions in 2024. It is noted that the timing of maximum and minimum levels varies somewhat by location; however, the selected monitoring events are generally representative of high and low groundwater conditions for the year as influenced by the climatic conditions of 2024.

Dewatering for the extracted areas of the North Quarry and Extension has lowered nearby groundwater elevations in the surrounding area. The operation of the North Quarry recharge system maintained a positive gradient towards Sixth Line Tributary to the west in 2024. In 2024, the operation of the Extension recharge system continued to maintain a positive gradient towards the Sixth Line Tributary to the north and towards the off-Site wetlands.

5.5.2 BH65, BH66, and OW69-08

Section 4.4 of the Pre-Extraction Report (CRA, November 2011a) outlines that historical monitoring "envelopes" will be established for BH65, BH66, and OW69-08 to facilitate data evaluation to ensure protection of water resources in this area. The Extension groundwater recharge well system is operational in accordance with the mitigation provisions of the AMP. The baseline data sets for BH65, BH66, and OW69-08 are complete and the water level "envelopes" have been established as shown on Figures 5.37 to 5.39, respectively. The key minimum levels for these envelopes are defined consistent with the trigger well approach as evident on the charts.

Water levels observed since commencement of below water extraction in the West Cell (Spring 2013), including the water levels measured in 2024, have generally remained above their historical minimum levels. Water levels at BH65, BH66, and OW69-08 remained within the historic range in 2024. No quarry influence is evident at BH65, BH66 or OW69-08.

5.5.3 BH113

Monitoring well BH113, located north of Sixth Line Tributary to the northeast of the Pumphouse Pond, continues to show behaviour that is influenced by local hydraulic connection to the recharge well system to the south (see Appendix G.10.18). GHD previously (CRA, November 2011a) identified this local condition. As a result, BH113 was removed from the proposed background monitoring well network and retained as a supplemental monitoring well. Monitoring has continued at this location as a component of the supplemental monitoring program and data is reviewed regularly and included in the annual report.

The monitoring data illustrates that groundwater levels at BH113 are highly correlated to groundwater levels, trends, and the overall behavior corresponds to trends in WMS operation as exhibited by recharge monitoring well OW77-11. The minimum seasonal groundwater levels at BH113 continue to remain well above (approximately 2 m) the adjacent surface water levels in Sixth Line Tributary and continue to support southwesterly flow and discharge to the creek. In 2022, further operational adjustments were made to the WMS that positively affected BH113. These adjustments continued in 2024, though some operational variability is evident late in the year.

It is recognized that continued monitoring, adjustment, and optimization of recharge operations is warranted and will continue to be undertaken in this area as extraction progresses to final limits in the East Cell.

5.5.4 SW4 Pumphouse Flow Monitoring

Surface water flow monitoring at SW4 (see Figure 2.5) is conducted weekly from July to September and monthly for the remainder of the year in accordance with the AMP. This is not a structure installed to facilitate monitoring, but rather a feature from previous land use activities. Flow is measured using a timed-volume method. Water flow has typically been measured at two ports on the SW4 pump house, the upper port and the lower port. In 2016 the lower port was re-plugged (historically the lower port was commonly plugged until regular maintenance was initiated) to conserve recharge water and support upgradient groundwater levels, as recommended in the 2015 annual monitoring report. The plug acts to raise water levels by approximately 10 cm at BH48, thus less recharge is required in this area. Air and water temperatures are also recorded concurrent with flow measurements. This monitoring was initiated in 2005, although some data are available prior to 2005. At SW4, flows generally vary with the groundwater level, with higher flows in spring and lower flows in summer and fall.

All SW4 flow monitoring results are presented in Appendix N (Table N.2) and the flows are shown on Figure 5.40. The 2024 flow data at SW4 are consistent with or above average historic flows. Periodically, reduced flow is observed as a result of a partial blockage; however, flow typically returns to normal when the blockage is removed. No significant

blockages were reported in 2024, and no reduction in flow is currently identified as a result of quarrying activities. The northern limits of the East Cell are at the final extraction limit so no further reduction in flow due to quarrying would be anticipated.

5.5.5 Streamflow Monitoring Station – Sixth Line Tributary

Stream flow monitoring station SW20 is located on Sixth Line Tributary west of the Reservoir and includes a triangular-notched weir installed in a box culvert with an automated level recorder (station SW20A). This location was established in August 1994 and monitoring commenced on June 6, 1995. A parallel 900-mm corrugated metal culvert located approximately 20 m east of the weir (station SW20B) functions as a by-pass during high flow conditions (or blockage of the weir).

A beaver dam upstream of SW20 has in the past raised water levels causing relatively constant flow through the overflow channel (SW20B). During 2022, beavers were observed to be active, and a dam was visible about 100 m upstream of the weir. By 2023, no beaver activity was suspected at SW20, and the dam built in the previous year remained as a vegetated mound. However, potential beaver activity (i.e., build-up of wooden material) within the culvert was noted between the October and November 2023 field visits and was cleared after noting the observation. No further beaver activity was observed in 2024.

The bypass channel at SW20B was active throughout periods of 2024 with the exception of June, and August to December (i.e., no flow in summer and fall as is typical). Atypically, the highest measured flow occurred in July at SW20A due to a period of significant precipitation and regional flooding. The hydrologic monitoring program includes collection of stream flow data at locations SW20A and SW20B, as shown on Figure 2.1 and Figure 5.41.

Collection of flow data at these monitoring stations continued in 2024 including the recording of continuous data with a pressure (level) transducer and monthly manual flow measurements. A logger malfunction resulted in minor data loss from August 13, 2024 to September 10, 2024. Refer to the 2023 Annual Water Monitoring Report (GHD, 2024) and prior reports for further details on historic monitoring activities.

Stream flows are calculated using the water level data (described above) and standard weir formula. The stream flow values are verified through field measurements of flow velocity and depth, at locations immediately adjacent to the weir, to confirm that the weir measurements are representative.

5.5.5.1 **Results**

The manually recorded and calculated continuous stream flow data for 2024 are shown on Figure 5.41, along with precipitation data for 2024 as recorded at the Milton Main Quarry weather station and supplemented with data reported by Scotch Block Dam (3.2 km from Site), Georgetown WWTP station in Georgetown, Ontario and the Acton WWTP station in Acton, Ontario (as discussed in Section 4.2).

When compared to previous monitoring years, flows at SW20A in 2024 followed similar seasonal trends, though flow was abnormally high in July and August as a result of significantly above-average precipitation. Greater flows were also observed in the early winter months, attributed to warm temperatures and earlier than typical loss of the snowpack. Flows through the spring were moderate to high following the freshet which occurred from mid-March to mid-April. Fall flows usually display responses to large precipitation events, however, the fall of 2024 was significantly drier than average. Responses to precipitation events are evident throughout the monitoring period by observed flow peaks. The 2024 calculated peak flow of 2.211 m^3/s occurred on July 17, 2024, following two days of precipitation on July 15 and 16 totaling 95.3 mm. The average flow calculated for 2024 was 0.270 m^3/s, which is greater relative to the 2019 to 2023 average flows of 0.191 m^3/s.

Active flow at SW20B was observed from January to May as a result of the spring freshet and elevated water levels at SW20A which caused the bypass channel to flow, as well as during July due to high precipitation which resulted in flooding of Sixteen Mile Creek. The highest measured flow in SW20B occurred on April 15, 2024. During this site visit, a flow of 0.073 m^3/s was recorded. The next highest flow of 0.0416 m^3/s was noted during the previous site visit on March 12, 2024. Flow tapered off until the July 22, 2024 visit when a flow of 0.033 m^3/s was recorded.

6. Water Taking and Discharge

This section presents the 2024 water takings and discharges for the Site. The monitoring of these flows is conducted to fulfill the monitoring requirements of the PTTW that are related to individual water taking limits, to facilitate the calculation of the total water taking for the Site per the PTTW, and to facilitate the evaluation of the water budget for the Site that is required by the PTTW and the AMP.

This section is organized as follows:

Section 6.1 Flowmeter Calibration Verification

Section 6.2 PTTW Water Takings

Section 6.3 PTTW Overall Water Taking

Section 6.4 WMS Flows

Section 6.5 Water Budget Evaluation

Section 6.6 Excess Water Estimate

6.1 Flow Meter Calibration Verification

Calibration verification is conducted annually on flow meters and open channel flow measuring instrumentation used to monitor water flows in the WMS. In 2024, the calibration values indicated larger discrepancies than are typically observed, with similar results reported across a range of verifications. Additional flow verifications will be undertaken in 2025 to confirm if these results are accurate, or if there was an issue with the rented meter used for verification. The WMS flow meter calibration was conducted in 2024 as follows:

- Calibration verification of flow meters associated with the West Sump and Recharge Pumping Station was conducted using a top-mounted strap-on portable transit time flowmeter. Differences between the Site flow meter readings and the portable transit time flow meter readings were found to be 5.2% for the Pumping Station meters and 10.2 for the West Sump meters.
- Calibration verification of the flow meter associated with the North Quarry Sump was conducted using two top-mounted strap-on portable transit time flowmeters (a Rosemount and a Krohne). The calibration verification indicated a 7.7% discrepancy between the Krohne strap on meter and a 7.26% discrepancy with the Rosemount meter.
- Calibration verification of the flow meter associated with the Central Sump was conducted using a top-mounted strap-on portable transit time flowmeter. The difference between the Sump flow meter and the portable transit time flow meter readings was approximately less than 1%.
- Calibration verification of the open channel flow measurement instrumentation associated with the Reservoir outfalls P-01 and P-02 was conducted by gradually reducing the discharge flows and verifying the zero calibration. At P-01, typical flows range from 0 to 3,500 L/min, and zero calibration was confirmed at 0 L/min. At P-02, there was no flow for most of 2024, however overall flow ranged from 0 to 300 L/min, and zero calibration was confirmed at 0 L/min. This is deemed to be acceptable.
- Calibration verification of the flowmeters associated with individual recharge wells was conducted by comparing the total flow at the recharge pumping station against the sum of the flows recorded for the individual recharge points (recharge wells and wetland surface water discharges; see Table 6.3). As noted in Table 6.3, discharge to the West Cell Quarry Lake is only measured at the Pumping Station, and if accounted for, the variability is approximately 1% in reported flows. This is deemed to be acceptable.

6.2 PTTW Water Takings

This section presents a summary of 2024 water takings that correspond to the water taking limits outlined in the PTTW for interim conditions.

6.2.1 North Quarry and Extension Dewatering

In 2024, West Cell Extension dewatering was accomplished by temporary dewatering equipment installed on the slope of the West Cell Buttress with flow conveyed across the East-West Pillar into the North Quarry Sump. East Cell Extension dewatering was similarly accomplished by conveying water overland from the East Cell Sump directly into the North Quarry. At the North Quarry Sump, water from North Quarry, West Cell, and East Cell dewatering was pumped to the Main Quarry.

A summary of North Quarry and Extension dewatering quantities for 2024 is presented in Table 6.1. Daily North Quarry and Extension dewatering quantities for 2024 are presented in Appendix N (Table N.10) and compared against the daily limit shown for Source 1 in Table A of the PTTW. There were no exceedances of the PTTW daily flow limit for North Quarry and Extension dewatering in 2024.

The calculated annual water taking from the environment for North Quarry and Extension dewatering is presented in Appendix N (Table N.3) based on the parameter values incorporated into the PTTW approvals. The calculated water taking is 1,034,905 cubic metres per year (m^3/year) and is less than the PTTW limit of 1,359,000 m^3/year (see Condition 3.5 of the PTTW). An alternate calculation was performed using updated water budget parameter values refined for the AMP 5-Year Review (GHD, 2020). The alternate calculation is presented in Appendix N (Table N.3a) and reflects a slightly lower water taking of 992,459 m^3/year.

A summary of North Quarry water handling over the period of 2001 through 2024 is presented in Table 6.2 including both the original and alternate water-taking values.

6.2.2 Recharge System

The 2024 capacity of the recharge pumping station was approximately 18,000 litres per minute (L/min), well below the PTTW flow rate limit of 36,000 L/min (Source 2 in Table A of the PTTW).

A summary of recharge system water takings is presented in Table 6.3. Daily recharge system water takings are presented in Appendix N (Table N.11). Daily recharge system data for individual recharge wells are presented in Appendix K (Attachment 5). As presented in Table N.11, there were no exceedances of the PTTW daily water-taking limit in 2024. Note that the high PTTW limit is intended to allow for potential future increase in the rate of groundwater recharge pumping due to anticipated high rates of recirculation of recharge water back into the quarry. The high PTTW limits are not indicative of any high consumptive use of water now or in the future as the quarry consumes very little water.

There were no exceedances of the PTTW limits for recharge system flows in 2024.

6.2.3 Main Quarry Discharge

This PTTW limit includes discharge to the HFRT from the Main Quarry Lake/Wetland Complex and/or from the Reservoir.

A summary of Main Quarry discharge water takings is presented in Table 6.4. Daily Main Quarry discharge water takings are presented in Appendix N (Table N.12). As presented in Table N.12, there were no exceedances of the PTTW daily water-taking limit in 2024.

As discussed in Section 3.3.1, no Excess Water was allocated for discharge in 2024. The minimum HFRT discharge requirement (700,000 m^3) was met and total discharge to the HFRT was 1,334,853 m^3. Discharge was provided from both the Main Quarry Lake/Wetland Complex and the Main Quarry Reservoir. The target average daily flows of 0.058 m^3/s (during July through September) and of 0.010 m^3/s (during January through June and October through

December) were met as an average over each period. This discharge occurred in accordance with the objectives of, and consultation with, Conservation Halton.

A summary of Main Quarry discharge water takings over the period of 1991 through 2024 is presented in Table 6.5.

6.3 PTTW Overall Water Taking

The PTTW requires the calculation of the overall water taking for the Site using the method presented in the PTTW.

Calculations related to the 2024 overall water-taking are presented in Table 6.6 (calculations to estimate the total volume of water used for operations in 2024 are presented in Appendix J). The overall water taking for 2024 was 2,496,471 m^3 (2,496,471,436 L), which is approximately 40% of the annual limit of 6,417,600 m^3 (6,417,600,000 L) established in the PTTW for interim operating conditions.

6.4 WMS Flows and Temperature

Water flows and temperature are measured at a number of points throughout the WMS. Some of these points correspond to water takings under the PTTW (as presented above in Section 6.1), some correspond to water handlings under the PTTW, and others are strictly for water balance or operational purposes.

WMS flow and temperature data are presented in charts and tables in Appendix K. Where applicable, PTTW limits are identified on the charts and tables.

6.5 Water Budget Evaluation

This section presents an evaluation of the 2024 water budget for the Site.

6.5.1 Background and Methodology

The water budget estimates the total volume of water entering the quarry, the total volume of water leaving the quarry, and the resulting change in water storage within the quarry on an annual basis. The water budget for the Site is discussed in the AMP (Section 4.4 and Appendix E).

The water budget is important to the overall operation, planning, and general management of water handling activities at the Site, and ensures that sufficient water is available for:

– Discharge to the HFRT as required by the LRIA permit and the CH Water Management Agreement
– Operation of the groundwater recharge system
– Quarry operations (dust control and aggregate washing)
– Quarry rehabilitation (including lake filling)

More specific objectives of the water budget evaluations identified in the AMP (both short and long term) include:

– Verify that the amount of water available/in storage is consistent with water budget forecasts to confirm the representativeness of the overall water budget calculations.
– Identify if more or less water is available than forecasted such that filling time and associated operational and cost aspects can be appropriately addressed.
– Establish the annual distribution of water from the Reservoir in accordance with an agreed water hierarchy.
– Establish the amount of "excess" water that may be available.
– Confirm the representativeness of key water budget parameter values that have the potential to significantly affect the reliability of the long-term water budget calculations in a negative manner (i.e., potentially less water available than forecast).

– Identify and adapt to any long-term trends in water budget availability that are evidenced by the monitoring data and/or recognized by the scientific community.

The AMP (Section 4.4 and Appendix E) presents the water budget verification program for the Site. The water budget verification program outlined in the AMP is summarized as follows:

1. Complete water budget analysis as described herein. This analysis occurs at different levels of detail at different frequencies:
   – Ongoing – assessment of flow and storage data relative to previous measurements, forecasted water budget conditions, and ongoing operations and climatic conditions.
   – Annual – review of data relevant to individual monitoring parameters and overall water budget.
   – 5-Year Review – analysis of overall water budget considerations and recalibration of water budget with updated forecast of future conditions.
2. Identification of whether actual water budget conditions are consistent with forecasted conditions, or whether more/less water is available.

Due to necessary assumptions for un-measurable or difficult-to-measure values, a water budget evaluation is subject to a degree of variability or uncertainty. Regardless, the water budget evaluations are effective tools to help assess conditions as they evolve and to understand trends and variability.

6.5.2 Water Budget Evaluation

This section presents the results of the ongoing and annual water budget evaluations conducted in 2024.

Ongoing Water Budget Evaluation

The Reservoir currently provides the majority of the water storage at the Site and water budget evaluations are performed for it on an ongoing basis. Throughout 2024, ongoing water budget evaluations included monitoring water levels in the Reservoir (see hydrographs in Appendix G, Attachment 1) and comparison of the resulting actual water storage changes (using stage-storage information) relative to the calculated water storage changes (using flow data and stage-storage information).

A summary of ongoing Reservoir water budget evaluations for each month over the period of January 2024 through December 2024 is presented in Appendix N (Table N.4). The estimated change in storage within the Reservoir is 97,736 m^3, whereas the water budget calculates a change of 251,127 m^3. This indicates that less water (153,391 m^3) was available than predicted by the water budget. This represents a discrepancy of 1.1% relative to the total water handled or transferred through the reservoir on an annual basis, and attests to the appropriateness of the parameters selected.

Annual Water Budget Evaluation

The water budget for the whole Milton Quarry Site was initially presented in the AMP (Appendix E, Table E.2), was updated in CRA's December 2003 Witness Statement in relation to Consolidated Board Hearings – Case No: 03-086 (Witness Statement), and was updated again in the Pre-Extraction Report (CRA, 2011). The Site water budget was further updated in the 5-Year AMP Review, and subsequently as a component of the Milton Quarry East Extension (MQEE) Geology and Water Resources Assessment report (GWRA). Additional groundwater flow modelling was undertaken for the GWRA and the relevant data incorporated into the water budget. The same water budget parameter values (i.e., the most current values) are employed herein and presented in Appendix N (Tables N.5 and N.6). The predictive water budget provided in Table N.5 is applied for the 2024 annual water budget evaluation for estimation of components that are not directly measurable (e.g., groundwater inflow). The conditions presented in Table N.5 are predicted annual average and are provided for reference only. All water budget adjustments reflecting observed conditions are reflected in Table N.6.

Adjustments to the water budget and assessment of water budget accuracy are completed on an annual basis in Appendix N (Table N.6). Measurable parameters (e.g., precipitation and evaporation) are adjusted, and a comparison

of observed and calculated conditions is made. If a discrepancy larger than the safety factor (in the negative) is observed, then sensitivity analysis may be completed to determine potential sources of error to the water budget.

In 2024 some components of flow in the water budget were reduced, including groundwater inflow and WMS recharge. In 2024 substantial periods of above-average precipitation were recorded, particularly through the summer. During these periods the WMS automatically adjusts and reduces recharge as necessary, which inadvertently also reduces the volume of recharge water recirculating to the quarry. Somewhat counterintuitively, the net effect of this dynamic relationship is that both recharge and groundwater inflow are reduced when climatic conditions are naturally supportive. This effect is not directly reflected in the predicted (average annual) groundwater inflow normally used in the water budget calculations resulting in a variance between the observed and calculated results. An adjustment was made in the presented calculations for 2024 (Table N.6) to address this difference.

In 2024 the observed annual surplus for the Site was 1,551,532 m^3 and the calculated available surplus was 2,280,400 m^3. The water budget overestimates available water by 728,867 m^3 for 2024 (i.e., less water is observed to be available at the Site than calculated by the water budget). This amount represents approximately 5.2% of the water handled by the Site. The water budget parameters and estimated available water remain conservative and fit for purpose (e.g., ongoing confirmation that sufficient water is available to meet the mitigation objectives).

The overestimation of available water is potentially attributable to unaccounted evaporation from shallow standing water on the quarry floor, which has only recently become a prominent feature within areas where the quarry floor reserves are removed. In 2024, quarry floor areas that were clearly submerged were treated in a similar manner as the Reservoir or West Cell Quarry Lake, and a lake evaporation rate was applied. Future reviews (e.g., 5-Year AMP Review) will consider if the “Dry Quarry Floor” evaporation rate of 300 mm should be increased to account for the shallow standing water observed in aerials, both in the Extension and Main Quarry areas.

In 2024, storage of water within the Reservoir increased by 97,736 m^3, the Lake/Wetland storage increased by 39,611 m^3, and West Cell Storage increased by 779,332 m^3. The net change in storage at the Site in 2024 was 916,679 m^3, a larger than average amount as expected given the extremely wet conditions observed through the summer. Volumes are tracked and accounted for in the surplus/deficit estimate above. Appendix N (Table N.7) presents the storage calculation for the Lake/Wetland.

Summary

The ongoing and annual water budget evaluations demonstrate the variability inherent in water budget assessments; however, they also demonstrate the results are sufficiently accurate to serve their intended purpose of assessing shorter and longer term conditions.

Overall, the annual water budget evaluation for 2024 and previous years indicates that there is sufficient water available for the successful performance of the Milton Quarry WMS and rehabilitation in the near-term and long-term.

6.6 Excess Water Estimate

Excess Water is defined in the October 2003 Water Management Agreement (Extension Quarry) as any water stored in the Reservoir at the end of the year above the elevation of 306 m AMSL that is not required to meet the needs outlined in paragraphs 1 to 8 of the Water Hierarchy (Schedule 6 of the Water Management Agreement [Extension Quarry]) in the following year. Section 3.5 of the Water Management Agreement (Extension Quarry) outlines that Excess Water is to be allocated during the following year in accordance with the Water Hierarchy, subject to reasonable interim adjustments agreed to by Dufferin and CH, as may be necessary to reflect actual versus estimated results.

Excess Water was available for the first time in 2008 when the water level in the Reservoir reached the normal operating range. Prior to 2008, any surplus water was used for filling the Reservoir. During 2024 there was no Excess Water required to be discharged to the HFRT, as presented in the March 2024 GHD memorandum entitled "Excess Water Determination for 2024".

The calculation for Excess Water that is available for discharge in 2025 is presented in Appendix N (Table N.8). Based on the planned quarry extraction and lake filling in the West Cell in 2025, it is calculated that no Excess Water will be available for discharge during 2025, beyond the planned minimum discharge of 700,000 m^3 (required discharge). If any Excess Water becomes available for discharge, to the extent practical the discharge will be coordinated with CH.

7. Water Quality Monitoring

This section presents a summary of 2024 water quality monitoring for the Site.

This section is organized as follows:

Section 7.1 Background

Section 7.2 Main Quarry Water Quality

Section 7.3 Recharge System Water Quality

Section 7.4 Other WMS Locations

Section 7.5 Temperature

7.1 Background

The ECA requires water quality sampling at the following locations under interim operating conditions:

1. Effluent (discharge) from the West Sump in the Main Quarry Lake and/or from the Reservoir to the HFRT (weekly and monthly sampling)
2. Effluent (discharge) from the Recharge System pumping station to the Recharge Well System (weekly and monthly sampling)
3. Effluent (discharge) from the North Quarry Sump to the North Quarry Recharge Well System (if any)

In addition, following startup of the recharge well system, three recharge wells (including the first and last wells along the distribution header and the closest recharge well to DW103) are required to be sampled monthly for benzene, toluene, ethylbenzene, xylenes (collectively referred to as BTEX), metals, and general chemistry parameters, as specified in the ECA.

Items 1 and 2 above are discussed in Sections 7.2 and 7.3, respectively. Item 3 above is not applicable for 2024 because there was no direct connection from the North Quarry Sump to the recharge well system.

Items 1, 2, and 3 constitute "effluent" from the works approved under the ECA and the effluent criteria listed in the ECA apply. Other water quality monitoring data are collected for analysis purposes and compared to Provincial Water Quality Objectives (PWQOs) and/or historical conditions, as appropriate.

The ECA establishes the following sampling schedule and Effluent Limits for the effluent water quality samples collected in accordance with items 1 through 3 above.

Parameter	Frequency	ECA Effluent Limit
Total Suspended Solids	Weekly	25 mg/L (monthly average)
Oil & Grease	Monthly	15 mg/L
Un-ionized Ammonia	Monthly	0.02 mg/L
pH (field)*	Monthly	Between 6.0 and 9.5
Temperature (field)*	Monthly	No objective

Note:

* These parameters are collected in the field for calculation of the un-ionized ammonia concentration.

A non-compliance is deemed to have occurred if any single result for oil and grease or un-ionized ammonia is greater than the Effluent Limit. Similarly, a non-compliance for pH is deemed to have occurred if any single measurement is outside of the specified range. A non-compliance for TSS is deemed to have occurred if the arithmetic mean concentration of all samples taken in a calendar month is greater than the Effluent Limit.

The results of this water quality monitoring are discussed in the following sections.

7.2 Main Quarry Discharge Water Quality

This section presents a summary of 2024 water quality monitoring for the Main Quarry and associated discharge to the HFRT.

Water quality sampling of the discharge from the West Sump in the Main Quarry Lake/Wetland Complex to the HFRT was conducted in accordance with the ECA in 2024. The water quality results for the monthly and weekly sampling are provided in Appendix L, with comparison to the ECA Effluent Limits. A summary of the 2024 analytical data is presented in Table 7.1. No exceedances of the Effluent Limits were observed.

Water quality sampling of the discharge from the Reservoir to the HFRT was also conducted. In 2024, discharge to the HFRT from the Reservoir occurred throughout the year. The water quality results for the monthly and weekly sampling are provided in Appendix L, with comparison to the ECA Effluent Limits. A summary is presented in Table 7.2. No exceedances of the Effluent Limits were observed.

In general, the discharge water quality is good, and similar to previous years. The comparison of all discharge water quality data for 2024 to the PWQOs does not indicate any adverse effects to the downstream system. No detections were reported within the recharge system at 3 different sampling points, nor were any detections reported at any other sampling location on-Site in 2024.

Occasionally there are detections of some metal parameters in the Main Quarry discharge above the PWQO concentrations; however, these are not considered indicative of adverse effects from the quarry as they have historically been present in background samples, they are infrequent and/or relatively low, and/or due to the nature of the receiving water.

No water quality concerns are evident in the Main Quarry discharge water quality.

7.3 Recharge System Water Quality

This section presents a summary of 2024 water quality monitoring for the groundwater recharge system.

7.3.1 Recharge Pumping Station

Water quality sampling of the discharge from the recharge pumping station to the recharge watermain was conducted in accordance with the ECA in 2024.

The water quality results for the monthly and weekly water samples in the watermain at the recharge pumping station are provided in Appendix L, with comparison to the ECA Effluent Limits. A summary is presented in Table 7.3. No exceedances of the Effluent Limits were observed.

No water quality concerns are evident in the Reservoir water quality.

7.3.2 Recharge Wells

Water quality sampling of the recharge water at select recharge wells was conducted in 2024 in accordance with the ECA to monitor recharge water quality discharged upstream of Sixth Line Tributary with respect to the ambient surface water quality.

The water quality results for the monthly recharge well samples are provided in Appendix L, with comparisons to the ECA Effluent Limits and PWQOs. A summary is presented in Table 7.4. The comparison of recharge well sample results to ECA Effluent Limits and PWQOs is intended to provide a convenient basis for evaluation of the data; these criteria are not concentration limits under the ECA.

While some past results have had metals parameters detected above PWQO concentrations, none are reported in 2024. Detections above the PWQOs are not considered indicative of adverse effects from the quarry, have historically been present in background samples, are infrequent and/or relatively low, and/or due to the nature of the receiving water, as discussed in prior annual monitoring reports.

No water quality concerns are evident in the recharge wells.

7.4 Other WMS Locations

While not required by the ECA, water quality sampling at the North Quarry Sump and the Central Sump was undertaken in 2024. This sampling was done to characterize water quality at these locations that will correspond to discharge points (effluent) under the ECA once the WMS is operating under Long-Term Operating Conditions. As such, it is useful to monitor water quality at these locations to evaluate any potential future need for water quality improvements via changes to operating practices or water treatment; however, ECA Effluent Limits are not applicable under current Interim Operating Conditions.

The water quality results for the North Quarry Sump and Central Sump are presented in Appendix L and summarized in Tables 7.5 and 7.6, respectively, with comparisons to the (non-applicable) ECA Effluent Limits and the PWQOs.

In 2024, some metals parameters were detected above the PWQOs within the North Quarry Sump, though not consistently. Similar conditions are reported for the Central Sump where periodic detections above PWQOs occur. These results are generally consistent with long-term water quality monitoring results at these locations.

In general, the water at these locations is comparable to the water in the Reservoir (as determined through sampling of recharge and Main Quarry discharge water) and continues to exhibit good water quality.

7.5 Temperature

This section presents a summary of 2024 water temperature monitoring.

7.5.1 Surface Water Temperatures

HFRT Discharge Temperature Monitoring

The LRIA Permit requires hourly temperature recording of all discharges to the HFRT from June 1 to September 30. To meet this requirement, water temperature loggers are installed at the West Sump and the Reservoir outfall. An additional temperature logger is also voluntarily installed on a temporary basis where the HFRT crosses Sixth Line (from the wetland) to collect supplementary temperature data. In 2024, the supplemental temperature logger was operational for portions of the year, though two thefts occurred resulting in data loss from mid-June to November. The temperature loggers at the west sump and wetland areas have since been relocated to prevent future theft. HFRT discharge temperature monitoring results from these locations are presented on Figure 7.1 along with air temperature monitoring results from the on-Site hydrometeorological station for comparative reference.

Review of Figure 7.1 reveals that the water temperatures in the Reservoir, West Sump, and wetland are generally similar. Daily temperature fluctuations in the Reservoir and West Sump were muted in comparison to the wetland, where shallow water is more susceptible to ambient temperatures.

Sixth Line Tributary Temperature Monitoring

As required by the AMP, surface water temperature monitoring near four trigger well monitoring locations along the key cold-water fishery reaches north of the Extension was continued in 2024. This monitoring was first implemented in 2007. In consultation with Dufferin's fishery biologist (WSP), the four locations were selected based on their ecological and hydrogeological relevance. The locations selected for monitoring are shown on Figure 2.2, and include SG41, SG42, SG47, and SG48. There is a surface water logger installed at each location at/above the streambed and a second logger installed in a streambed piezometer at SG47.

In May 2024, significant beaver activity was observed approximately 20 m upstream of Townline Road. This activity raised the water level significantly at SG41 and SG42, and to a lesser extent at SG43, making access unsafe. The temperature loggers were retrieved with a dedicated team provisioned with water rescue gear; however, this level of effort is not practical on a monthly basis. Moving forward, temperature loggers will continue to be employed with periodic downloads at SG41 and SG42, and new temporary gauges will be installed for water level monitoring in shallower (accessible) water closer to the bank.

Surface water temperatures in the Sixth Line Tributary generally vary diurnally from the spring to the fall, while the temperature remains relatively constant during the winter months while under ice. This phenomena is observed in all surface water locations, except those most heavily moderated by groundwater discharge.

Temperature monitoring results are presented in Appendix M. Based on review of the 2024 temperature monitoring results for Sixth Line Tributary monitoring locations, the following observations are made:

– Temperatures at SG41 were generally consistent with previous years. Temperatures in the summer were average in relation to temperatures since the start of recharge mitigation. Peak temperatures were comparable to temperatures prior to commencement of groundwater recharge under the provisions of the AMP in May 2013.
– Temperatures at SG42 were generally consistent with previous years. Temperatures in the summer were average in relation to temperatures since the start of recharge mitigation. Temperatures were consistent with temperatures prior to commencement of groundwater recharge under the provisions of the AMP in May 2013.
– Temperatures at SG47 were generally consistent with previous years with the exception of the summer peak, when temperatures briefly spiked due to suspected shallow logger positioning. Temperatures were consistent with temperatures prior to commencement of groundwater recharge under the provisions of the AMP in May 2013. SG47 has a streambed logger (installed in a streambed piezometer) to assist with discerning temperature data that may be biased high by the water level dropping below the logger in the summer. Moderation of temperatures is evident. Relatively cooler groundwater discharge moderates or reduces temperatures through the warmer summer months. In addition, diurnal variability is muted relative to fluctuations observed in the open channel.
– At SG48, 2024 temperature data continue to indicate significant moderation by groundwater discharge. Increased temperature moderation from increased groundwater seepage became evident with the startup of Extension recharge in May 2013, and the pattern has continued to be observed since that time. Overall the temperatures remain within pre-recharge levels. The temperatures have less diurnal variation through the year in comparison to pre-recharge (2013) years, indicating that the data logger is still situated over the groundwater seep.

Further discussion of 2024 and historical Sixth Line Tributary temperatures in the context of Brook Trout habitat conditions is presented in Appendix O.

7.5.2 Groundwater Temperatures

Sixth Line Tributary Temperature Monitoring

As required by the AMP, groundwater temperature monitoring is conducted at four Extension trigger wells near the Sixth Line Tributary surface water temperature monitoring locations discussed above (including OW37-04, OW38-04, OW60-07, and OW63-07). Groundwater temperature monitoring is also conducted at various additional locations in the North Quarry and Extension in conjunction with automated water level monitoring, including background wells (OW39-04, OW40-04, OW41-04, OW68-07, and BH112) and selected additional wells. Groundwater temperature monitoring locations are identified on Figure 2.2.

Temperature monitoring results are presented in Appendix M. Groundwater temperatures are generally relatively stable within the range of 6ºC to 9ºC, though some wells did exhibit an uptick in temperatures in 2024 as high as 12ºC. Where elevated, the temperature increases generally occurred in the latter portion of the year and could potentially be attributed to higher than typical summer recharge following the significant precipitation in July (175 mm of precipitation in 7 days).

Milton Quarry wells typically fluctuate seasonally from as little as 0.5ºC to approximately 5ºC. These minor temperature fluctuations are caused by transient heat conduction from the surface, and may be out of phase and attenuated in comparison to the temperature of the ground surface because of the time lag for heat to be conducted to the depths of the temperature loggers in the wells. Recharge water also affects some locations depending upon their proximity to recharge wells, recharge flow rates, and recharge water temperature. Consistent with previous years, varying responses to snowmelt and precipitation were also apparent in 2024.

At OW60-14, increased seasonal temperature fluctuations are apparent from groundwater recharge, however no adverse influences on creek temperature are indicated in the monitoring results.

8. Residential Well Monitoring

Dufferin has historically monitored the residential domestic wells at selected properties near the Site as part of their neighbour relations program. This residential well monitoring was subsequently formalized and refined for inclusion in the Extension AMP requirements.

The residential well monitoring program currently consists of quarterly water level monitoring and annual water quality monitoring at up to 15 residences (18 locations) in the vicinity of the Milton Quarry, subject to access from the property owners, which meets or exceeds the requirements of the AMP. All current and historical residential well locations included in the Extension AMP requirements (including 3 additional residential wells included in Dufferin's neighbour relations program but outside of the AMP baseline survey zone) are presented on Figure 8.1.

Appendix N (Table N.9) presents a summary of residential well monitoring conducted in 2024, including a summary of monitoring activities conducted and explanations for instances where monitoring was not conducted.

Hydrographs for residential wells at which water level monitoring was conducted in 2024 are presented in Appendix G, Attachment 12. A summary of 2024 residential well groundwater elevation data and water quality data are presented in Tables 8.1 and 8.2, respectively.

Based on the results of the residential well monitoring program, there is no indication that Dufferin operations have had any adverse water quantity or quality effects on the residential wells in the vicinity of the quarry.

9. Ecological Monitoring

A variety of ecological monitoring studies are completed in association with the Milton Quarry as described below.

Ecological monitoring of Sixth Line Tributary is undertaken to satisfy the requirements of the ECA, PTTW, and the AMP. The Sixth Line Tributary ecological monitoring includes monitoring Brook Trout spawning west of the North Quarry and monitoring Brook Trout spawning and macrobenthic invertebrate communities to the north of the Extension. This monitoring is currently conducted annually and was conducted in 2024. The findings of the ecological monitoring for brook trout and for macrobenthic invertebrate are discussed in Section 9.1.

Ecological monitoring of terrestrial and wetland features is conducted pursuant to the AMP for the Extension. This monitoring is currently conducted annually and was conducted in 2024. The findings of the ecological monitoring of the wetlands are discussed in Section 9.2.

Ecological monitoring is also conducted to monitor the effects of Main Quarry rehabilitation on the existing biota in the adjacent wetlands. Main Quarry ecological monitoring was originally requested by CH (Trow, Dames & Moore, 1989). The basic requirement for Main Quarry ecological monitoring is continued in the Water Management Agreement (Extension Quarry) with CH. The rehabilitation measures for the quarry are anticipated to have minimal influence on the hydrology and biota in the area immediately beyond the Main Quarry. In some instances, influences are expected to be favourable. This monitoring is currently conducted biannually. In the 2018 annual monitoring report (GHD, 2019), it was recommended that Dufferin cease the biannual ecological monitoring program because the west side of the Main Quarry has been in its final rehabilitated form since around 2008 and conditions at the two off-Site monitoring stations west of Sixth Line have been similar from 1993 to 2020. Communications since 2019 between Dufferin Aggregates and Conservation Halton have continued to consider this recommendation. While the recommendation is being considered, biannual monitoring has continued and was conducted in 2020 and 2022.

9.1 Sixth Line Tributary

9.1.1 Brook Trout Survey

The results of the 2024 Brook Trout survey are provided in the WSP report entitled, "2024 Brook Trout Spawning Survey Along Sixth Line Tributary of Sixteen Mile Creek in the Vicinity of Dufferin Aggregates Milton Quarry Site" (WSP, 2025b), a copy of which is presented in Appendix O.

The overall findings of the 2024 Brook Trout survey are summarized as follows:

Sixth Line Reaches:

– The 2024 spawning surveys marked the fourth year of confirmed spawning within the Sixth Line reaches with the observation of a total of six Brook Trout in the attendance of three separate redds. The absence of confirmed spawning activity from 2018 to 2020 was concerning. However, the observation of the two confirmed redds with four and eight adult Brook trout in attendance during the 2021and 2022 surveys respectively, and the three confirmed redds with eight and six adult Brook Trout observed in 2023 and 2024 respectively, along with an increase in spawning evidence or sign (e.g., probable redds, scrapes) from 2019 through 2024, confirms that Brook trout are still present and actively spawning in the Sixth Line reaches and that a recovery from the 2018 to 2020 spawning activity is well underway.
– It was not clear why confirmation of use by adult Brook Trout was not being documented during the 2018 to 2020 spawning surveys, however angling pressure on the population is suspected. It is possible the spawning activity at the particular sites was brief due to smaller numbers of fish using each site, so that the survey windows did not capture their presence.
– The level of spawning activity varies naturally year-to-year based on a wide variety of factors (e.g., surface flow levels and other climatic factors, groundwater flow levels, beaver dams and associated accessibility, varying year

class(es) of Brook Trout due to varying incubation success in previous year(s), food availability, competition, angling activity, and other stress factors), as demonstrated in the findings over the years. However, in years previous to 2018 as noted, there had been an increase in spawning activity, confirmed redds and adult observations, making the absence in 2018 all the more obvious and suggestive of an event occurrence (e.g., angling pressure) rather than any decline in habitat quality (or associated water quality or groundwater discharge)

– Some variation in spawning can also be expected to occur depending on the specific timing of the surveys year to year in relation to the height of the spawning season. However, similar to 2018, the timing of the 2019 and 2020 surveys (when spawning was not confirmed), appeared to correspond generally with peak activity of all of the previous years when spawning was confirmed. As noted, no direct cause has been identified however it is speculated that angling pressure might have caused the sudden change noted in 2018. There were no other habitat factors evident during the survey and the thermal monitoring, groundwater indicators and groundwater movement patterns to the creek remain unchanged.
– The results of the 2024 thermal data collected in the main 'historical' redd indicate that groundwater discharge continues to occur into the redd site within the stream bed during the spawning period and is moderating the local environment. The 2024 results of the temperature survey within the permanent spring further indicate that groundwater discharge continues to occur along this area of the Sixth Line reaches during the spawning season. This information is consistent with GHD's monitoring of groundwater flow patterns toward the stream reaches. Therefore, despite the lack of confirmed redds or Brook Trout observations along the Sixth Line reaches during the 2018 to 2020 period, the key element that supports habitat conditions suitable for Brook Trout, that is groundwater discharge, persisted during that time and continued from 2021 to 2024 when confirmation of Brook Trout spawning returned.

Townline reaches:

– The AMP (GHD 2019) recommended transitioning the aquatic monitoring (i.e., spawning surveys) for the Townline reaches from the annual frequency to a biennial frequency for the 10-year period following the 5-Year Review, assuming the monitoring findings had remained stable. In 2021, a full set of spawning surveys (four) were completed in the Townline reaches and as noted these surveys continued in 2023 and again in 2024. In 2020 and 2022, the spawning surveys were not completed along the Townline reaches. As per the biennial recommendation, the Townline spawning surveys will not be completed in 2025. However, continuation of yearly thermal temperature monitoring as noted below, is recommended as an indication of the groundwater discharge and maintenance of the coldwater habitat conditions.
– Consistent with the previous 20 years, no spawning activity was observed along the Townline reaches in 2024. The most recent evidence of Brook Trout along these reaches was the observation of one scrape and three adult Brook Trout (in different locations to the scrape) in 2004. The initiation of the lack of observations and apparent change in spawning activity coincided with the construction of a beaver dam in 2003, and two smaller dams in 2004, upstream of Townline, which appeared to have had an effect on the local habitat conditions and Brook Trout population.
– It appears that the local Brook Trout population along the Townline reaches has been extirpated. While the spawning surveys are continuing on a biennial basis in order to assess the potential recovery of the local population, such a recovery appears unlikely.
– The 2024 thermal data collected by WSP in the main 'historical' redd along the Townline reaches, indicate that groundwater discharge continues to occur into the redd site within the stream bed during the spawning period. This thermal monitoring of the 'historical redd' will continue in 2025 along with a supporting assessment of the habitat conditions during the survey to look for any evidence of habitat change that might be occurring (e.g., new beaver dams).

9.1.2 Macrobenthic Invertebrate Community Survey

The results of the 2024 macrobenthic invertebrate community survey are provided in the WSP report entitled, "2024 Benthic Macroinvertebrate Community Monitoring Along Sixth Line Tributary of Sixteen Mile Creek in the Vicinity of Dufferin Aggregates Milton Quarry Site, 2005 – 2024" (WSP, 2025a), a copy of which is presented in Appendix P.

The overall findings of the 2024 macrobenthic invertebrate community survey are summarized as follows:

– The 2024 benthic community monitoring findings represent the aquatic habitat conditions in the eleventh year of below-water table extraction in the Milton East and West Cell Quarry Extension. Overall, the findings of the assessment conducted on November 18, 2024, showed that the benthic community at Station 1 is indicative of excellent (3.64) water quality, reflecting conditions and variability expected in a small groundwater fed, headwater stream. The benthic community at Station 2 has shown a higher degree of variability as a result of the beaver activities, clearing debris and the channel modification over the past few years. Despite this, the benthic community at Station 2 is indicative of fair (5.87) water quality. Further to this, with Stations 1 and 2 being located in a small headwater stream, they are susceptible to be influenced by various climatic and physical factors, such as water depth and change in channel morphology.
– The benthic community structure and composition at Station 1 is indicative of relatively high (‘Excellent’) water quality based on the FBI scores obtained for the 2024 survey, with the abundance and diversity of taxa likely fluctuating as a result of habitat availability (gravel and cobbles), the timing of the survey and the quantitative approach to sampling. All metrics showed a slight improvement from the 2023 data.
– The 2024 indices at Station 1 were all within the ranges established during the baseline monitoring years and were largely aligned to the previous during-extraction ranges, with the exception of percent contribution of the different FFGs, where the scrapers have increased.
– The benthic community structure and composition at Station 2 is indicative of ‘fair’ water quality based on the FBI scores obtained for the 2024 survey, with the abundance and diversity of taxa likely fluctuating as a result of habitat availability, alteration of habitat, the timing of the survey and the quantitative approach to sampling.
– At Station 2, the 2024 metrics were largely aligned to the 2023 results, with a slight decrease in quality noted across the indices. All metrics were within the range of previous during-extraction ranges, but frequently exceeded those established during the baseline monitoring years. This was primarily driven by the higher number and proportion of Chironomidae, dominance of the collector-gatherers and lower diversity within the community (Shannon-Wiener index).
– The 2024 results from other monitoring components support continued groundwater and habitat integrity in this watercourse. Water resources analysis shows groundwater continues to move toward the channel as outlined in the overall 2024 monitoring report (GHD, 2024). The thermal monitoring done during the Brook Trout spawning survey also indicates that groundwater continues to discharge to key sites such as the site of the previous spawning redd in the Town Line Reach (WSP, 2024).
– Previously the five-year AMP monitoring recommendations contemplated transitioning the monitoring to a biennial frequency following 2019 decline. The 2022 and 2023 monitoring reports recommended that given the trends identified at Station 2, that annual monitoring be continued to further assess whether the values in 2022 and 2023 indicate a true ‘reversal’ of the previously observed declining trend in quality or reflects natural fluctuation and cycles in the invertebrate community. Based on the current results and trends observed, it is recommended that the monitoring of the benthic community be undertaken on a biennial basis going forward, with the assumption that the frequency may need to be increased if a significant decline in the community is identified.

9.2 Extension Wetlands

The results of the 2024 Extension wetland ecology monitoring are provided in the Goodban Ecological Consulting Inc. (GEC) report entitled, "2024 Wetland Ecology Monitoring" (GEC, 2025), a copy of which is provided in Appendix Q.

The overall findings of the 2024 Extension wetland ecology monitoring are summarized as follows:

– Based on the available wetland ecology monitoring data, in 2024, off-Site wetlands W21 and W41, and on-Site wetlands W7 and W8 appear to be functioning within the normal ranges of variation for these types of wetland features, in terms of spring high water levels, hydroperiod, amphibian breeding activity and vegetation composition and structure. Some natural changes to vegetation structure and composition are occurring as a result of the December 2013 ice storm and infestations of ash trees by the Emerald Ash Borer. Wetland W9 was added to the wetland monitoring network in 2013 and it appears to be functioning within the normal ranges of variation for this type of wetland.
– Off-Site Wetland W5 appears to have experienced reduced hydroperiod, reduced amphibian breeding activity and changes to vegetation composition and structure during the period from 2002-2012. Between 2013 and 2024, with the operation of the groundwater recharge well system under the mitigation provisions of the AMP, Wetland W5 was wetter than in the recent past. As a result, the cover/height of Reed Canary Grass was considerably reduced and the cover of some other native wetland plant species has increased. Amphibian breeding activity in W5 increased during the period 2013 through 2024, relative to 2012. The mitigation measures implemented in 2013 through 2024 appear to have had a positive effect on Wetland W5 (e.g., increased amphibian activity, reduction of Reed Canary Grass and increase in native wetland plant species).
– Off-Site Wetland W10 had an extended hydroperiod in 2024 due to shallow groundwater recharge support via the WMS, and wetter-than-normal conditions in the summer, with standing water being observed in late August and into early September. This created optimal conditions for salamander larvae in W10 from a hydroperiod perspective, with the hydroperiod being long enough to allow for the metamorphosis of salamander larvae into terrestrial juveniles. As noted above, the use of a WMS was identified by Linton et al. (2018) as a means to mange hydroperiods in salamander breeding pools and potentially offset the effects of climate change.
– On-Site Wetland V2 appeared to have experienced reduced spring high water levels, reduced hydroperiod, reduced amphibian breeding activity and changes to vegetation composition and structure until 2008. The mitigation measures implemented in 2009 through 2023 appear to have had a positive effect on Wetland V2 (e.g., increased amphibian activity; positive changes in vegetation composition and structure such as control of encroaching woody vegetation, etc).

10. Annual AMP Reporting Summary

Section 6.1 of the AMP identifies specific components to be included in the Annual Water Monitoring Report. The following summarizes the reporting for the noted components for ease of reference with the noted components shown in bold text:

– Status and summary of quarry operations (e.g., development, extraction, and rehabilitation).
  - Refer to Section 3.1.
– Status and summary of mitigation system development and implementation.
  - Refer to Sections 3.2 and 3.3.
– Complete presentation of monitoring results, including summary of any notifications provided under the response action framework (Section 1.3).
  - Refer to Sections 4 through 9 for the various components of the monitoring program. Monitoring data is provided within the tables and appendices associated with this annual report.
  - One "occurrence" was recorded as defined by the AMP.
– Summary of response actions taken to maintain target levels (and effectiveness of actions).
  - Refer to Section 5.3.1 regarding Extension trigger well water levels.

- Explanation and assessment of potential for impacts resulting from any period or area in which water level or water quality targets were not continuously maintained.
  - As described in Sections 5.3.1 and 5.3.2, there were a limited number of brief periods in 2024 during which target levels were not continuously maintained. In all instances water levels were restored as intended by the AMP. No impacts to the environment were observed or indicated. It is important to recall that the targets were established at conservatively high levels such that "Small, short-term fluctuations in trigger well water levels below the target levels (i.e., days to weeks) will not create any noticeable adverse ecological effects…" (AMP, Section 3.1.3.1).
  - As described in Section 7, during 2024 water quality targets for all effluent from the WMS were maintained and no exceedances of the Effluent Limits were observed.
- Target levels and minimum water levels (once initial levels are set and then adjusted levels for following years).
  - Refer to Section 5.4 and Table 5.1.
- Assessment of supplemental monitoring program findings, including ecological aspects.
  - Refer to Sections 4 through 8 regarding supplemental "water" monitoring and Section 9 regarding supplemental ecological monitoring.
- Evaluation of overall water budget and determination of "excess water" for the subsequent year.
  - Refer to Section 6.6 and Appendix N (Tables N.6 and N.8).
- Discussing groundwater mitigation system requirements for the subsequent year as the quarry develops.
  - The overall WMS, including reservoir, pumping stations, recharge wells, and wetland diffuse discharges continue to perform as expected. Dufferin plans to continue to proactively implement additional recharge wells as needed to meet the anticipated future increases in recharge system demands as the quarry progresses over time.
- Documentation of any anomalies/glitches that occurred and/or any minor variations that were implemented throughout the year (refer to Section 5).
  - No significant glitches or minor variations occurred in 2024. Removal and correction of data anomalies (data errors) is part of an overall data collection and reporting process. Sometimes anomalous data may be saved in the database or uploaded to webDT as a result of the requirement for promptly providing agency access to collected data. Some anomalies only become apparent over time or through detailed comparison of one location to another. As data undergoes further review and evaluation, in 2024 as in all years, we identified and corrected/removed anomalies (data errors) from the database and webDT, as warranted.
  - The winter target level for on-Site wetland W7 was maintained in 2024 (to support turtle use) instead of allowing the feature to go dry every 2 to 3 years.
- Review appropriateness of response/notification timelines identified in Section 1.3 and Appendix F as well as the reset period for the operating response period described in Appendix F.
  - The mitigation system operated effectively during 2024, and no changes are recommended to the timelines or the reset period.
- Evaluation of the suitability of the interim extraction area and any continued/future interim extraction.
  - Full-scale production is occurring in the East Cell and no further interim extraction is anticipated in the future.
- Summary of any amendments/updates to the AMP which were agreed to throughout the year.
  - No amendments or updates to the AMP were implemented in 2024.
- Conclusions.
  - Refer to Section 11.
- Recommendations, including any proposed amendments to the AMP reflecting knowledge gained from actual operating conditions and monitoring results (e.g., reduction in minimum monitoring frequency).
  - Refer to Section 12.

– No amendments to the AMP are recommended as a result of this report.

In addition, the AMP identifies that the following two questions should be considered as part of the Annual Water Monitoring Report. The following provides a response, summarizing the evaluation included in this 2024 Annual Water Monitoring Report.

Are the operating practices consistent with the mitigation performance objectives?

Yes. Overall, target levels have been maintained at the trigger wells in a manner that is protective of water resources. Some fluctuation did occur in 2024 at the eastern limit of the East Cell adjacent OW52-07 and OW5-80; however, in both instances prompt action was taken and water levels were ultimately restored above the target level. The ecological features (wetlands W7, W8, and V2) were provided with sufficient water to function within the normal range for these types of wetlands. Drops below target levels are not repeatedly occurring.

Are the mitigation measures protective of the groundwater dependent ecological features?

Yes. Overall the ecological features and functions are being maintained and protected. In some instances, enhancement relative to historic conditions are noted such as at Wetland V2, Wetland W5, and Wetland W10. Refer to Section 9 for further discussion.

11. Conclusions

Based on the results of the 2024 monitoring program, the following conclusions are provided:

1. Monitoring was completed for the Milton Quarry to satisfy the required objectives of the related Permits, Approvals, and Agreements.
2. Water-related mitigation measures implemented at the Milton Quarry include operation of the WMS. The WMS generally consists of quarry dewatering, water storage in the Reservoir, and drawing water from the Reservoir for discharge to the HFRT and the recharge well system, as well as maintaining the Main Quarry lake level and providing water for operations use. The quarry is currently operating under interim conditions as specified in the PTTW and ECA and will continue to do so in the near term.
3. A total of 990.5 mm of rain was received in Milton, making 2024 the sixth wettest year since 1991, and the wettest year since 2011 when 1,038 mm of precipitation was recorded. In summary, the winter and spring were typical, the summer was quite wet with recorded precipitation nearly double the average. The wet summer was followed by conditions in the fall that were conversely quite dry and exhibited a 30% reduction in precipitation between September and December. While 2024 may be considered a wet year overall, underlying patterns on a seasonal timescale resulted in variable conditions from very wet in the summer to very dry in the fall and early winter.
4. The surface water elevation in the Main Quarry Lake/Wetland Complex fluctuated within the normal range of 302.5 to 303.5 m AMSL.
5. Groundwater levels at monitoring wells MW1 through MW5 in the Main Quarry in 2024 reflected seasonal trends as influenced by climatic conditions, with the exception of MW4 (relatively close to the quarry face) and MW5 (relatively close to the quarry face and influenced by the Reservoir).
6. Groundwater levels to the west of the North Quarry were maintained by the recharge well system at elevations at or above the 2024 target levels.
7. The operation of the Extension groundwater recharge well system generally maintained water levels at trigger wells and the on-Site wetlands at or above the 2024 target levels, except for some minor short-term variations. These variations at OW52-07 and OW5-80 were communicated to the agencies and are documented herein, as committed.
8. The North Quarry and Extension target levels were adjusted for 2025 to account for variations in natural climatic and groundwater conditions. The approved protocol per the AMP was used. Generally wet conditions in summer 2023 and exceedingly wet conditions in 2024 have resulted in a significant increase in the average summer water

level recorded at background wells used for setting targets. This increase has resulted in a proportional and corresponding increase to assigned summer targets for 2025. In many cases, the summer 2025 targets are the highest that have ever been assigned. Should climatic support falter, some operational challenges may be expected given these aspirational targets.

9. In 2024, all water takings were in compliance with PTTW limits.
10. In 2024, water discharge from the Main Quarry to the HFRT met and exceeded the flow requirements set out in the CH Agreement.
11. An overall evaluation of the water budget for the quarry was conducted. The overall conclusion of this evaluation is that there is sufficient water available for the successful performance of the Milton Quarry WMS and rehabilitation in the near term and the long term. There is no Excess Water identified for 2025 in addition to the minimum required discharge as lake filling is underway in the West Cell.
12. The quality of the water discharged from the West Sump in the Lake/Wetland Complex and from the Reservoir to the HFRT was good and generally similar to historic conditions.
13. The water quality in the Reservoir, recharge watermain, and the recharge wells associated with the recharge well system is suitable for groundwater recharge.
14. There is no indication that Dufferin's operations have had any adverse water quantity or quality effects on the residential wells in the vicinity of the quarry.
15. The 2024 spawning surveys marked the fourth year of confirmed spawning within the Sixth Line reaches with the observation of a total of six Brook Trout in the attendance of three separate redds.
16. The level of spawning activity varies naturally year-to-year based on a wide variety of factors (e.g., surface flow levels and other climatic factors, groundwater flow levels, beaver dams and associated accessibility, varying year class(es) of Brook Trout due to varying incubation success in previous year(s), food availability, competition, angling activity, and other stress factors), as demonstrated in the findings over the years. However, in years previous to 2018 as noted, there had been an increase in spawning activity, confirmed redds and adult observations, making the absence in 2018 all the more obvious and suggestive of an event occurrence (e.g., angling pressure) rather than any decline in habitat quality (or associated water quality or groundwater discharge).
17. The results of the 2024 thermal data collected in the main ‘historical’ redd indicate that groundwater discharge continues to occur into the redd site within the stream bed during the spawning period and is moderating the local environment. The 2024 results of the temperature survey within the permanent spring further indicate that groundwater discharge continues to occur along this area of the Sixth Line reaches during the spawning season. This information is consistent with GHD’s monitoring of groundwater flow patterns toward the stream reaches. Therefore, despite the lack of confirmed redds or Brook Trout observations along the Sixth Line reaches during the 2018 to 2020 period, the key element that supports habitat conditions suitable for Brook Trout, that is groundwater discharge, persisted during that time and continued from 2021 to 2024 when confirmation of Brook Trout spawning returned.
18. The 2024 benthic community monitoring findings represent the aquatic habitat conditions in the eleventh year of below-water table extraction in the Milton East and West Cell Quarry Extension. Overall, the findings of the assessment conducted on November 18, 2024, showed that the benthic community at Station 1 is indicative of excellent (3.64) water quality, reflecting conditions and variability expected in a small groundwater fed, headwater stream. The benthic community at Station 2 has shown a higher degree of variability as a result of the beaver activities, clearing debris and the channel modification over the past few years. Despite this, the benthic community at Station 2 is indicative of fair (5.87) water quality.
19. Stations 1 and 2 are located in a small headwater stream, and they are susceptible to be influenced by various climatic and physical factors, such as water depth and change in channel morphology. The benthic community structure and composition at Station 1 is indicative of relatively high (‘Excellent’) water quality based on the FBI scores obtained for the 2024 survey, with the abundance and diversity of taxa likely fluctuating as a result of habitat availability (gravel and cobbles), the timing of the survey and the quantitative approach to sampling. The benthic community structure and composition at Station 2 is indicative of ‘fair’ water quality based on the FBI

scores obtained for the 2024 survey, with the abundance and diversity of taxa likely fluctuating as a result of habitat availability, alteration of habitat, the timing of the survey and the quantitative approach to sampling.

20. Based on the available wetland ecology monitoring data, off-Site wetlands W21 and W41, and on-Site wetlands W7 and W8 appear to be functioning within the normal ranges of variation for these types of wetland features, in terms of spring high water levels, hydroperiod, amphibian breeding activity and vegetation composition and structure. Some natural changes to vegetation structure and composition are occurring as a result of the December 2013 ice storm and infestations of ash trees by the Emerald Ash Borer. Wetland W9 was added to the wetland monitoring network in 2013 and it appears to be functioning within the normal ranges of variation for this type of wetland.
21. Off-Site Wetland W5 was wetter from 2013 to 2024, compared to 2002 to 2012, following the operation of the groundwater recharge well system under the mitigation provisions of the AMP. The mitigation measures implemented in 2013 through 2024 appear to have had a positive effect on Wetland W5 (e.g., increased amphibian activity, reduction of Reed Canary Grass and increase in native wetland plant species).
22. Off-site Wetland W10 had an extended hydroperiod in 2024 due to shallow groundwater recharge support via the WMS and wetter-than-normal conditions in the summer. This created optimal conditions for salamander larvae in W10 from a hydroperiod perspective; the period was long enough to allow for the metamorphosis of salamander larvae into terrestrial juveniles. The use of a WMS is a means to manage hydroperiods in salamander breeding pools and potentially offset the effects of climate change.
23. On-Site Wetland V2 appeared to have experienced reduced spring high water levels, reduced hydroperiod, reduced amphibian breeding activity and changes to vegetation composition and structure until 2008. The mitigation measures implemented in 2009 through 2024 appear to have had a positive effect on Wetland V2 (e.g., increased amphibian activity; positive changes in vegetation composition and structure such as control of encroaching woody vegetation, etc.).

Overall, in 2024 the water management system continued to be successfully implemented. Operation of the system demonstrated the ability to maintain target levels on a sustained basis. The water budget was in line with the climatic conditions in 2024. No significant negative impacts to the off-Site ecological features were evident.

12. Recommendations

Based on the conclusions of the 2024 water and ecology monitoring program and the status of the equipment at the Site, the following recommendations are provided:

1. The monitoring program, as presented herein and summarized in Tables 2.1 and 2.2, should be continued to satisfy the objectives of the related Permits/Approvals.
2. Continue North Quarry and Extension mitigation measures pursuant to the Site Permits/Approvals and the AMP.
3. Continue to monitor water budget and refine the recharge system operation to continue to maintain targets while maximizing available water surplus or water available for lake-filling.
4. A second flow meter verification event will be undertaken in 2025 to determine if the 2024 rental meter malfunctioned.
5. Due to new beaver activity commencing in May 2024, access to SG41 and SG42 has become challenging. To address this in 2025, we recommend monitoring continue at SG41 and SG42 with temperature loggers and periodic downloads, and new temporary gauges be installed in shallower (accessible) water closer to the bank for water level monitoring.
6. The ongoing Brook Trout monitoring will continue to assess the year-to-year pattern and watch for further evidence of Brook Trout spawning. Angling activity will continue to be monitored.
7. Brook Trout monitoring (i.e., spawning surveys) of the Sixth Line reaches will continue on an annual basis. Brook Trout monitoring of the Townline reaches (i.e., spawning surveys) will continue annually; however, a reduced

monitoring program will be completed every other year (e.g., reduced program in 2025) following the 5-Year AMP recommendation.

8. Continue the annual benthic monitoring program and re-evaluate frequency during the next 5-year review to facilitate continued assessment of patterns in the benthic community.

13. References

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WSP, March 2024b. 2023 Brook Trout Spawning Survey Along Sixth Line Tributary of Sixteen Mile Creek in the Vicinity of Dufferin Aggregates Milton Quarry Site. Prepared for Dufferin Aggregates.

All of Which is Respectfully Submitted,

GHD

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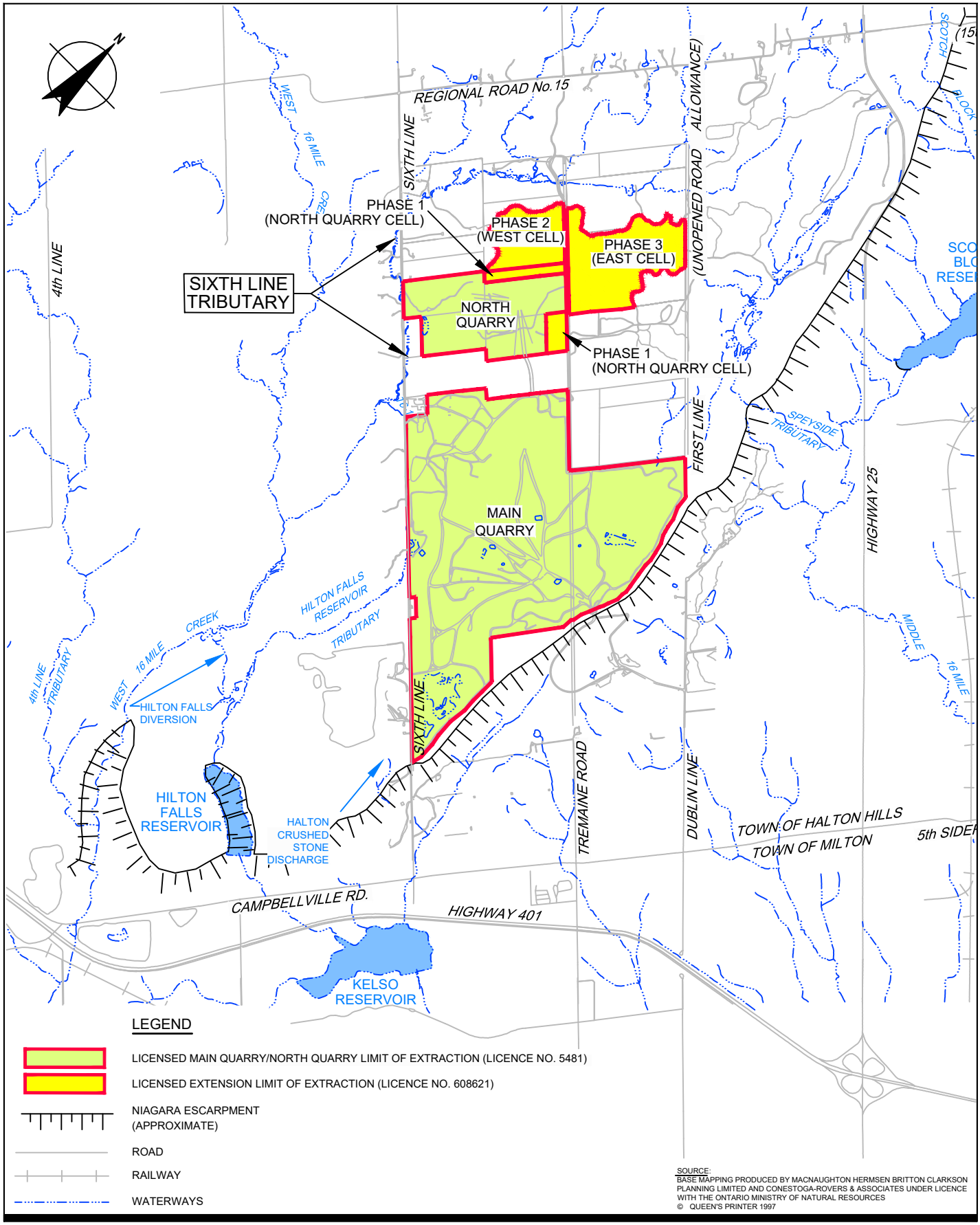
Figures



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MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **March 2025**

SITE LOCATION MAP

FIGURE 1.1

Filename: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Digital_Design\ACAD\Figures\RPT182\010978-GHD-00-00-RPT-EN-D101_WA-182.dwg
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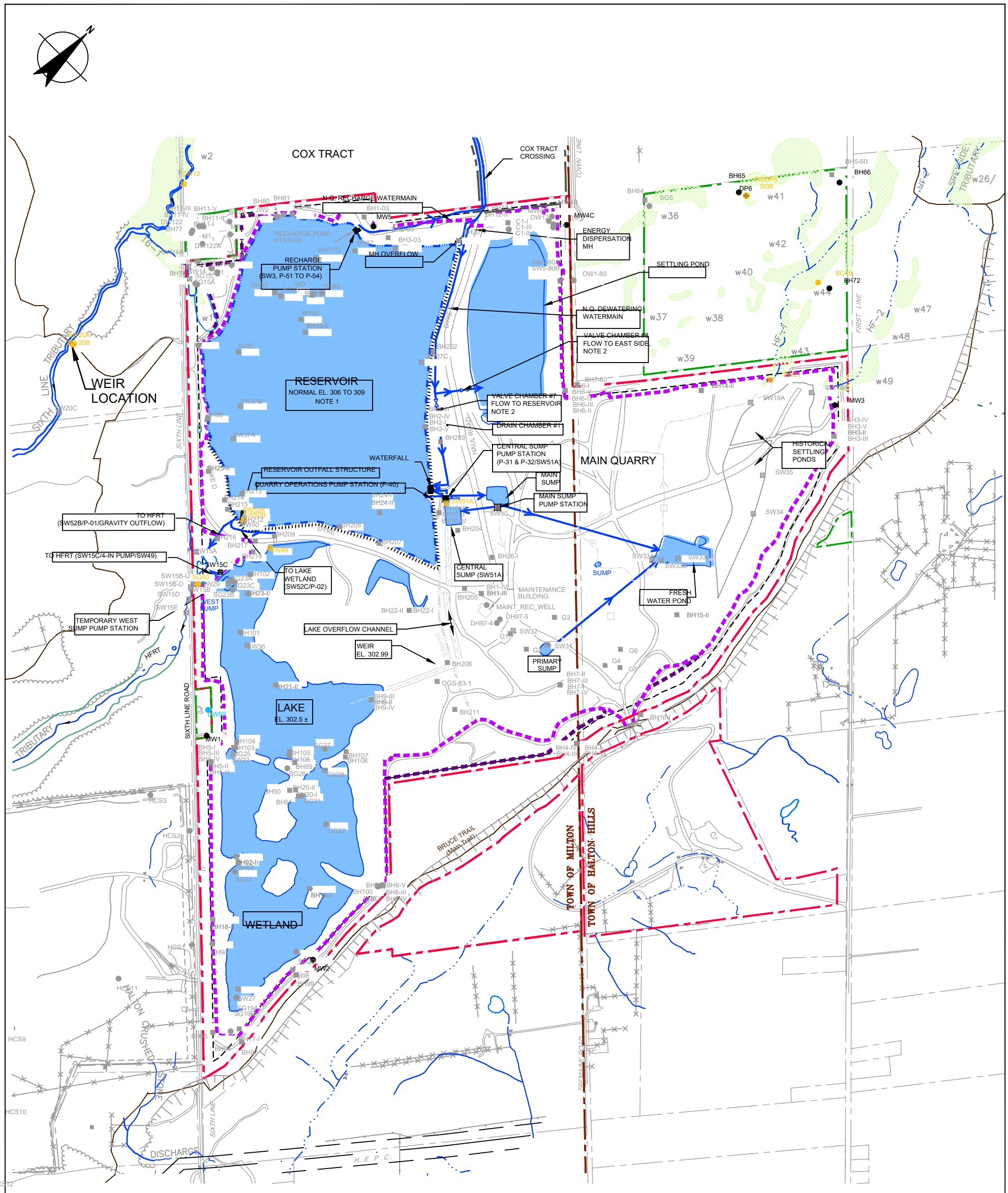

LEGEND

- MONITORING WELL LOCATION
- DW103 — RESIDENTIAL WELL IN USE
- MP1 — MINI PIEZOMETER LOCATION
- SW10 — SURFACE WATER MEASUREMENT LOCATION
- IN1-07 — BOREHOLE INCLINOMETER LOCATION
- MONITORING LOCATIONS SHOWN IN GREY ARE NOT INCLUDED IN CURRENT MONITORING PROGRAM EITHER BECAUSE THEY ARE INACCESSIBLE OR BECAUSE THEY NO LONGER EXIST
- SG8 — STAFF GAUGE LOCATION

- PROPERTY LINE
- LICENSED LIMIT OF EXTRACTION
- MUNICIPAL BOUNDARY
- DUFFERIN OWNED BUFFER
- DUFFERIN OWNED LICENSED
- DUFFERIN LEASED

- MAIN QUARRY LIMITS DECEMBER 2008
- MAIN QUARRY LIMITS DECEMBER 2024
- WETLAND IDENTIFIED AS PROVINCIALLY SIGNIFICANT
- NIAGARA ESCARPMENT
- WATERMAIN (AS-BUILT/EXISTING)
- OVERLAND FLOW

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES

BOUNDARY INFORMATION COMPILED FROM SURVEYS AND SKETCHES PREPARED BY FRED G, CUNNINGHAM, ONTARIO LANDS SURVEYORS, MILTON, ONTARIO, DECEMBER 2,1997.

0 125 250 375m
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Dufferin Aggregates

GHD

MILTON QUARRY
REGION OF HALTON, ONTARIO

MONITORING LOCATIONS
MAIN QUARRY

Project No. **10978**
Date **March 2025**

FIGURE 2.1

Filename: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Digital_Design\ACAD\Figures\RPT182\010978-GHD-00-00-RPT-EN-D102_WA-182.dwg
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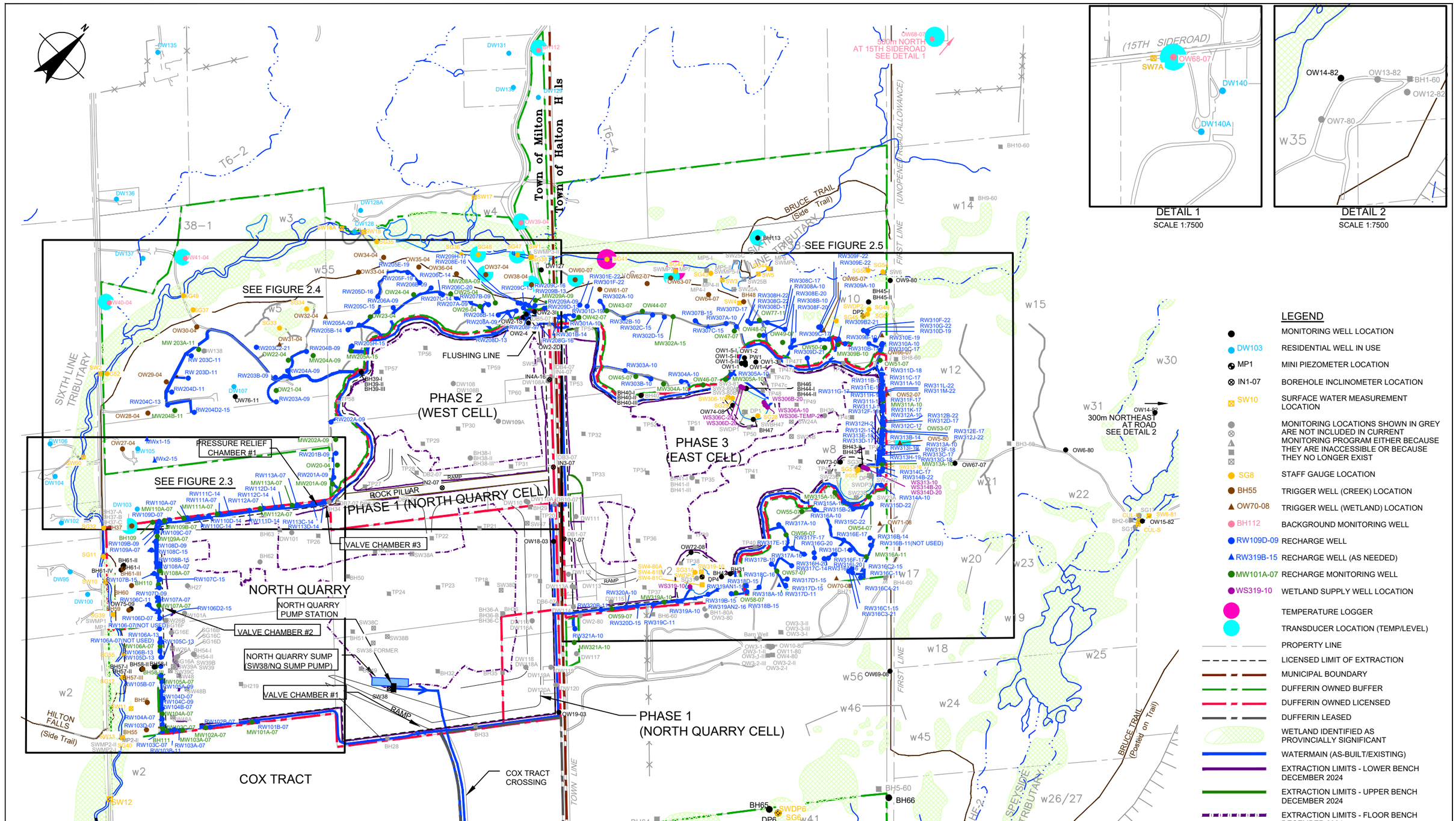

DETAIL 1
SCALE 1:7500

DETAIL 2
SCALE 1:7500

LEGEND

- MONITORING WELL LOCATION
- DW103 — RESIDENTIAL WELL IN USE
- MP1 — MINI PIEZOMETER LOCATION
- IN1-07 — BOREHOLE INCLINOMETER LOCATION
- SW10 — SURFACE WATER MEASUREMENT LOCATION
- MONITORING LOCATIONS SHOWN IN GREY ARE NOT INCLUDED IN CURRENT MONITORING PROGRAM EITHER BECAUSE THEY ARE INACCESSIBLE OR BECAUSE THEY NO LONGER EXIST
- SG8 — STAFF GAUGE LOCATION
- BH55 — TRIGGER WELL (CREEK) LOCATION
- OW70-08 — TRIGGER WELL (WETLAND) LOCATION
- BH112 — BACKGROUND MONITORING WELL
- RW109D-09 — RECHARGE WELL
- RW319B-15 — RECHARGE WELL (AS NEEDED)
- MW101A-07 — RECHARGE MONITORING WELL
- WS319-10 — WETLAND SUPPLY WELL LOCATION
- TEMPERATURE LOGGER
- TRANSDUCER LOCATION (TEMP/LEVEL)
- PROPERTY LINE
- LICENSED LIMIT OF EXTRACTION
- MUNICIPAL BOUNDARY
- DUFFERIN OWNED BUFFER
- DUFFERIN OWNED LICENSED
- DUFFERIN LEASED
- WETLAND IDENTIFIED AS PROVINCIALLY SIGNIFICANT
- WATERMAIN (AS-BUILT/EXISTING)
- EXTRACTION LIMITS - LOWER BENCH DECEMBER 2024
- EXTRACTION LIMITS - UPPER BENCH DECEMBER 2024
- EXTRACTION LIMITS - FLOOR BENCH DECEMBER 2024

0 100 200 300m
1:10000

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES
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BOUNDARY INFORMATION COMPILED FROM SURVEYS AND SKETCHES PREPARED BY FRED G. CUNNINGHAM, ONTARIO LANDS SURVEYORS, MILTON, ONTARIO, DECEMBER 2,1997.

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MILTON QUARRY
REGION OF HALTON, ONTARIO

MONITORING LOCATIONS
NORTH QUARRY AND EXTENSION

Project No. **10978**
Date **March 2025**

FIGURE 2.2

Filename: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Digital_Design\ACAD\Figures\RPT182\010978-GHD-00-00-RPT-EN-D102_WA-182.dwg
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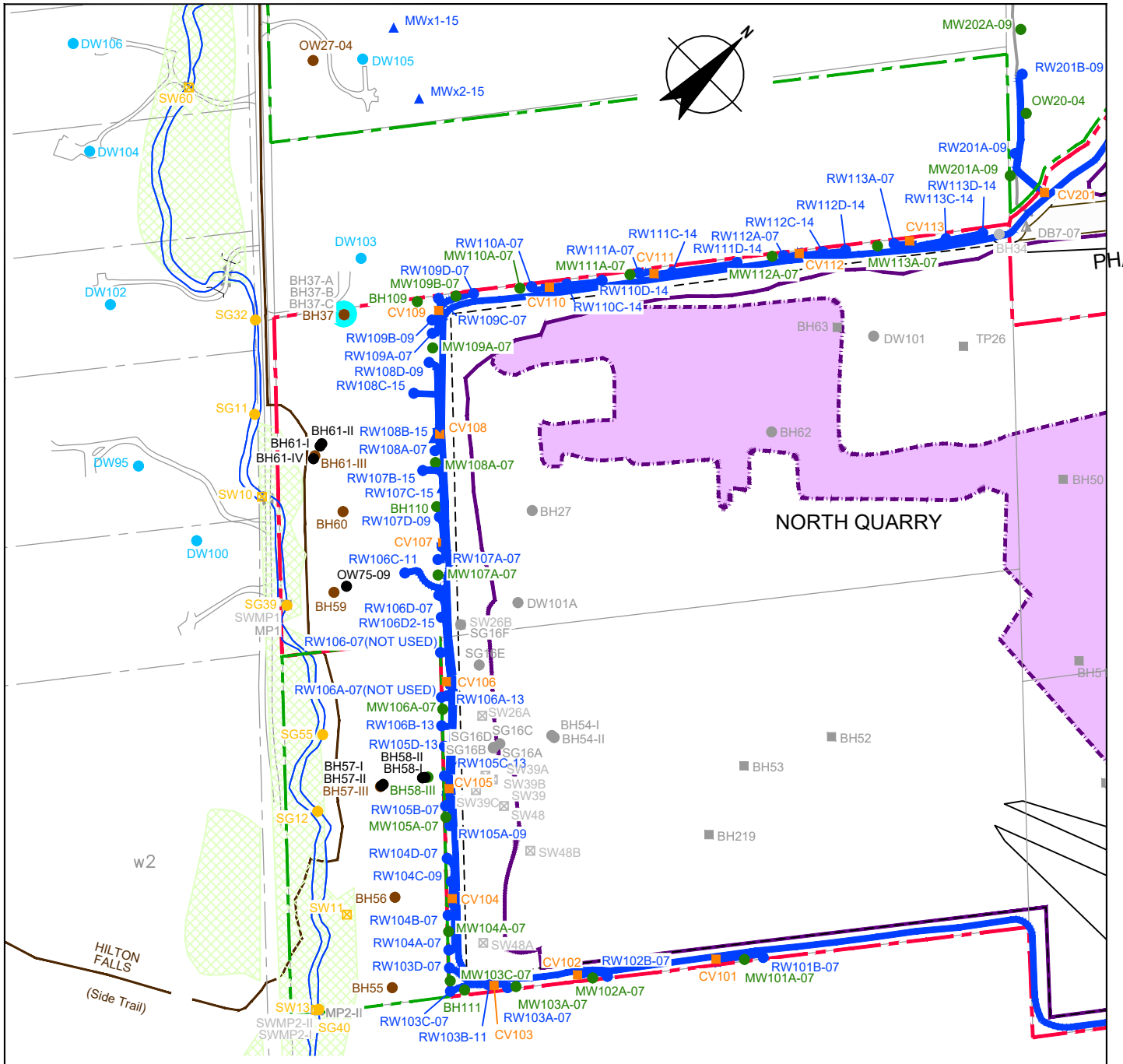

LEGEND

- MONITORING WELL LOCATION
- DW103 RESIDENTIAL WELL IN USE
- SW10 SURFACE WATER MEASUREMENT LOCATION
- MONITORING LOCATIONS SHOWN IN GREY ARE NOT INCLUDED IN CURRENT MONITORING PROGRAM EITHER BECAUSE THEY ARE INACCESSIBLE OR BECAUSE THEY NO LONGER EXIST
- CV103 CONTROL VALVE HUT
- TEMPERATURE LOGGER
- TRANSDUCER LOCATION (TEMP/LEVEL)
- SG8 STAFF GAUGE LOCATION
- BH55 TRIGGER WELL LOCATION
- RW109D-09 RECHARGE WELL
- MWx1-15 RECHARGE WELL (AS NEEDED)
- MW101A-07 RECHARGE MONITORING WELL
- PROPERTY LINE
- LICENSED LIMIT OF EXTRACTION
- DUFFERIN OWNED BUFFER
- DUFFERIN OWNED LICENSED
- WETLAND IDENTIFIED AS PROVINCIALLY SIGNIFICANT
- WATERMAIN (AS-BUILT/EXISTING)
- EXTRACTION LIMITS - LOWER BENCH DECEMBER 2024
- EXTRACTION LIMITS - FLOOR BENCH DECEMBER 2024
- EXTRACTION AREA - FLOOR BENCH DECEMBER 2024

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES
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0 50 100 150m
1:5000

MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **March 2025**

MONITORING LOCATIONS NORTH RECHARGE SYSTEM

FIGURE 2.3

Filename: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Digital_Design\ACAD\Figures\RPT182\010978-GHD-00-00-RPT-EN-D103_WA-182.dwg
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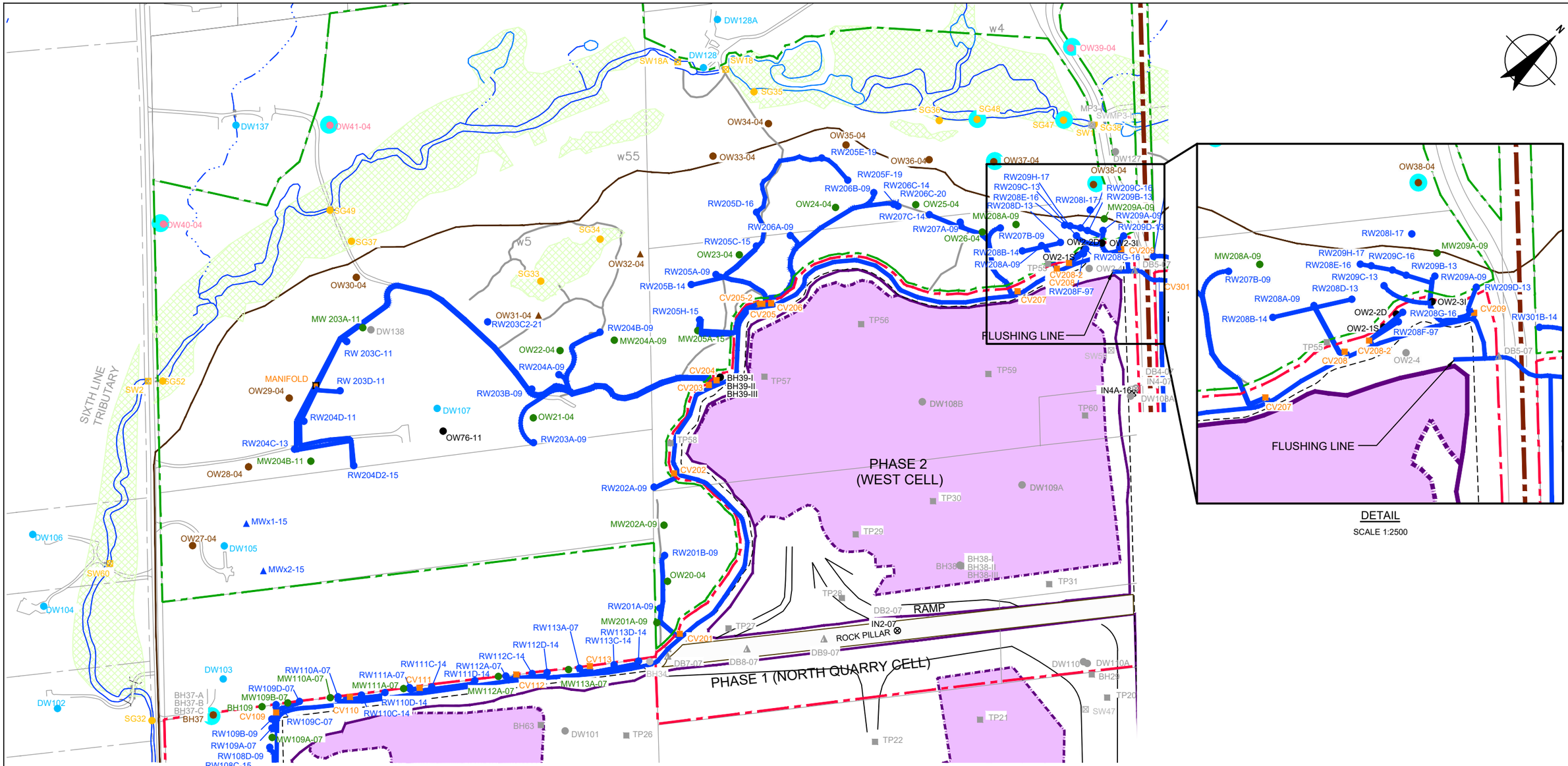

LEGEND

- MONITORING WELL LOCATION
- DW103 — RESIDENTIAL WELL IN USE
- DW113A — DUFFERIN OWNED FORMER DOMESTIC WELL USED AS MONITORING WELL
- IN1-07 — BOREHOLE INCLINOMETER LOCATION
- SW10 — SURFACE WATER MEASUREMENT LOCATION
- MONITORING LOCATIONS SHOWN IN GREY ARE NOT INCLUDED IN CURRENT MONITORING PROGRAM EITHER BECAUSE THEY ARE INACCESSIBLE OR BECAUSE THEY NO LONGER EXIST
- SG8 — STAFF GAUGE LOCATION
- BH55 — TRIGGER WELL LOCATION
- OW70-08 — TRIGGER WELL (WETLAND) LOCATION
- BH112 — BACKGROUND MONITORING WELL
- RW109D-09 — RECHARGE WELL
- MWx1-15 — RECHARGE WELL (AS NEEDED)
- MW101A-07 — RECHARGE MONITORING WELL
- TEMPERATURE LOGGER
- TRANSDUCER LOCATION (TEMP/LEVEL)
- CV103 — CONTROL VALVE HUT
- MANIFOLD
- PROPERTY LINE
- LICENSED LIMIT OF EXTRACTION
- DUFFERIN OWNED BUFFER
- DUFFERIN OWNED LICENSED
- WETLAND IDENTIFIED AS PROVINCIALLY SIGNIFICANT
- WATERMAIN (AS-BUILT/EXISTING)
- EXTRACTION LIMITS - LOWER BENCH DECEMBER 2024
- EXTRACTION LIMITS - FLOOR BENCH DECEMBER 2024
- EXTRACTION AREA - FLOOR BENCH DECEMBER 2024

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES
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PREPARED BY FRED G, CUNNINGHAM, ONTARIO LANDS SURVEYORS,
MILTON, ONTARIO, DECEMBER 2,1997.

0 50 100 150m
1:5000

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MILTON QUARRY
REGION OF HALTON, ONTARIO

WEST CELL RECHARGE SYSTEM

Project No. **10978**
Date **March 2025**

FIGURE 2.4

Filename: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Digital_Design\ACAD\Figures\RPT182\010978-GHD-00-00-RPT-EN-D103_WA-182.dwg
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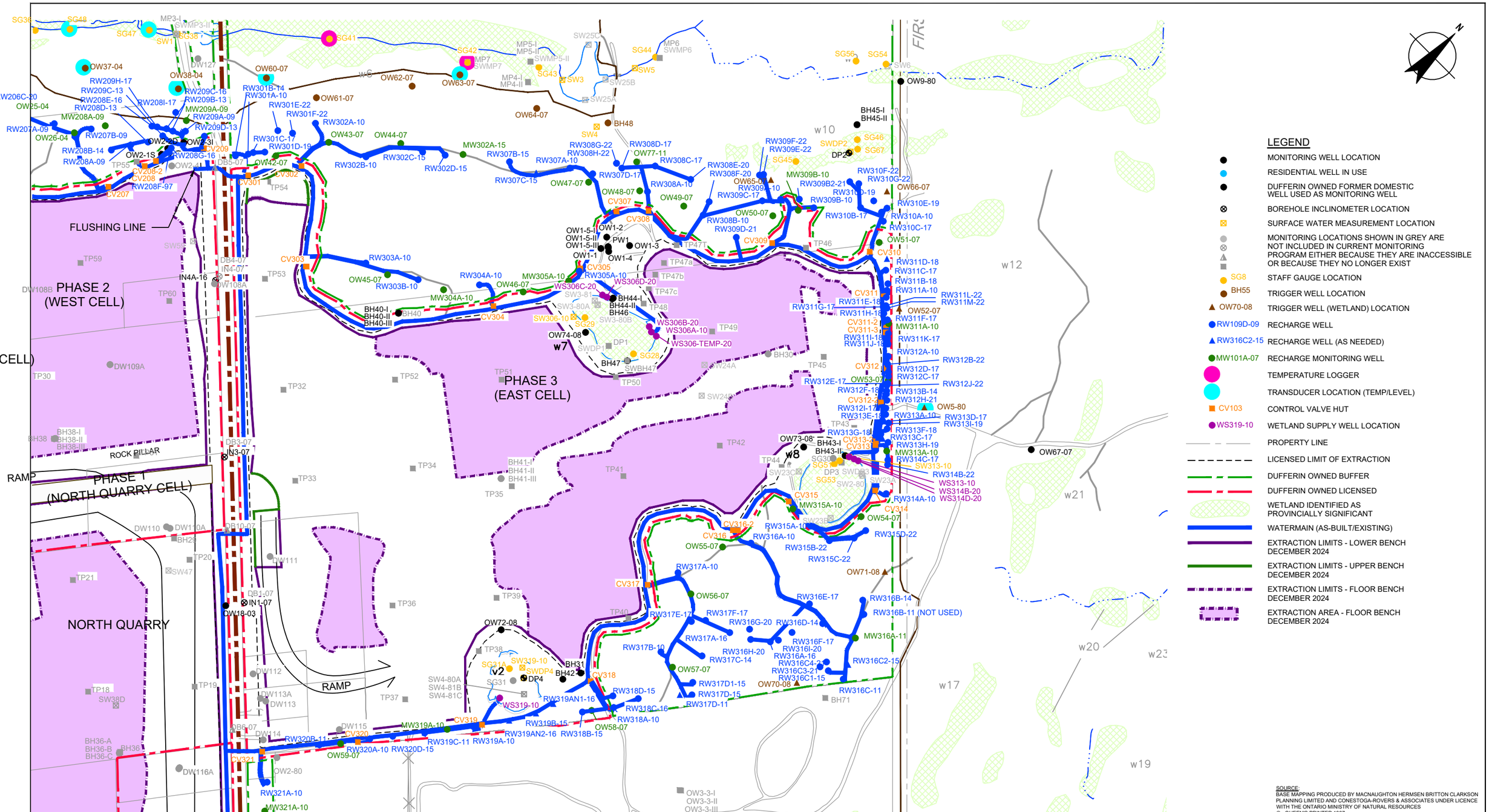

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES
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0 50 100 150m
1:5000

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MILTON QUARRY
REGION OF HALTON, ONTARIO

EAST RECHARGE SYSTEM

Project No. **10978**
Date **March 2025**

FIGURE 2.5

Filename: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Digital_Design\ACAD\Figures\RPT182\010978-GHD-00-00-RPT-EN-D103_WA-182.dwg
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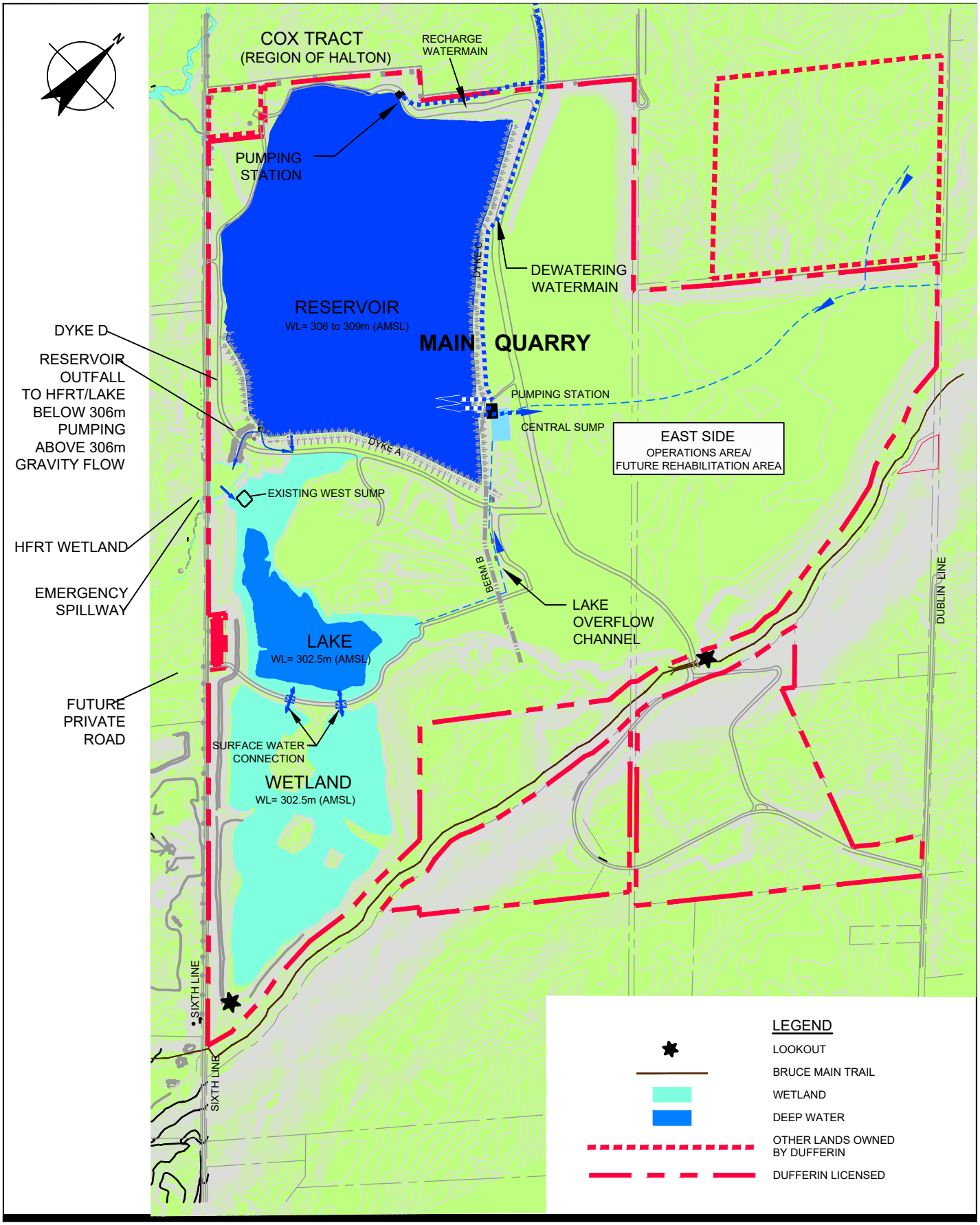

0 150 300 450m

1:15000

MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **March 2025**

MAIN QUARRY
REHABILITATION PLAN CONCEPT

FIGURE 2.6

Filename: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Digital_Design\ACAD\Figures\RPT182\010978-GHD-00-00-RPT-EN-D104_WA-182.dwg
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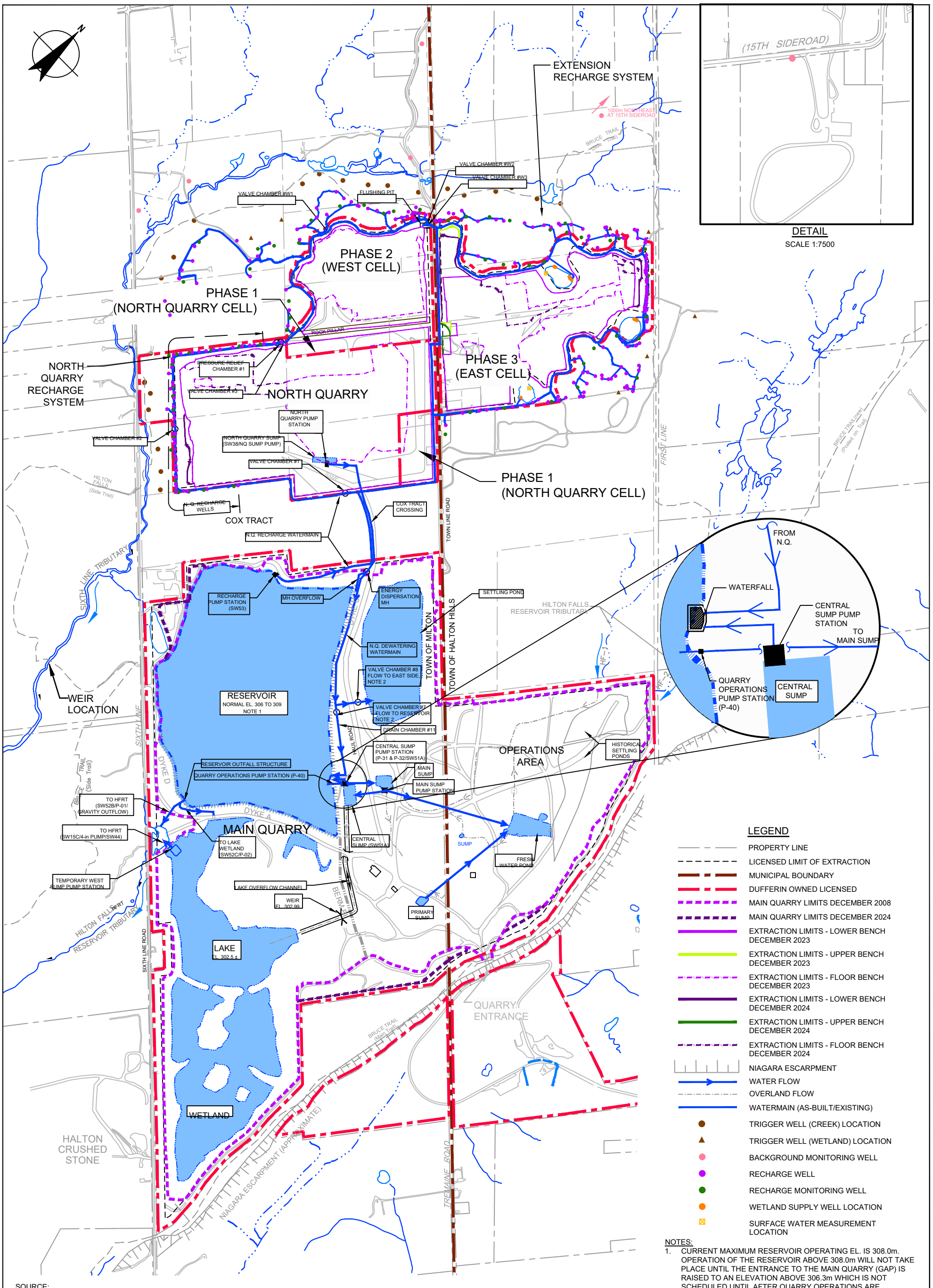

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES

NOTES:
1. CURRENT MAXIMUM RESERVOIR OPERATING EL. IS 308.0m. OPERATION OF THE RESERVOIR ABOVE 308.0m WILL NOT TAKE PLACE UNTIL THE ENTRANCE TO THE MAIN QUARRY (GAP) IS RAISED TO AN ELEVATION ABOVE 306.3m WHICH IS NOT SCHEDULED UNTIL AFTER QUARRY OPERATIONS ARE COMPLETE.
2. VALVE OPERATION FOR VC #7 AND #8 SHOULD ALWAYS HAVE ONE VALVE "OPEN" AND THE OTHER "CLOSED". IF BOTH VALVES ARE "OPEN" WATER WILL FLOW FROM WATERFALL POND TO EAST SIDE.

0 150 300 450m
1:15000

MILTON QUARRY
REGION OF HALTON, ONTARIO

EXISTING CONDITIONS AND WATER MANAGEMENT SYSTEM OVERVIEW

Project No. **10978**
Date **March 2025**

FIGURE 2.7

Filename: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Digital_Design\ACAD\Figures\RPT182\010978-GHD-00-00-RPT-EN-D105_WA-182.dwg
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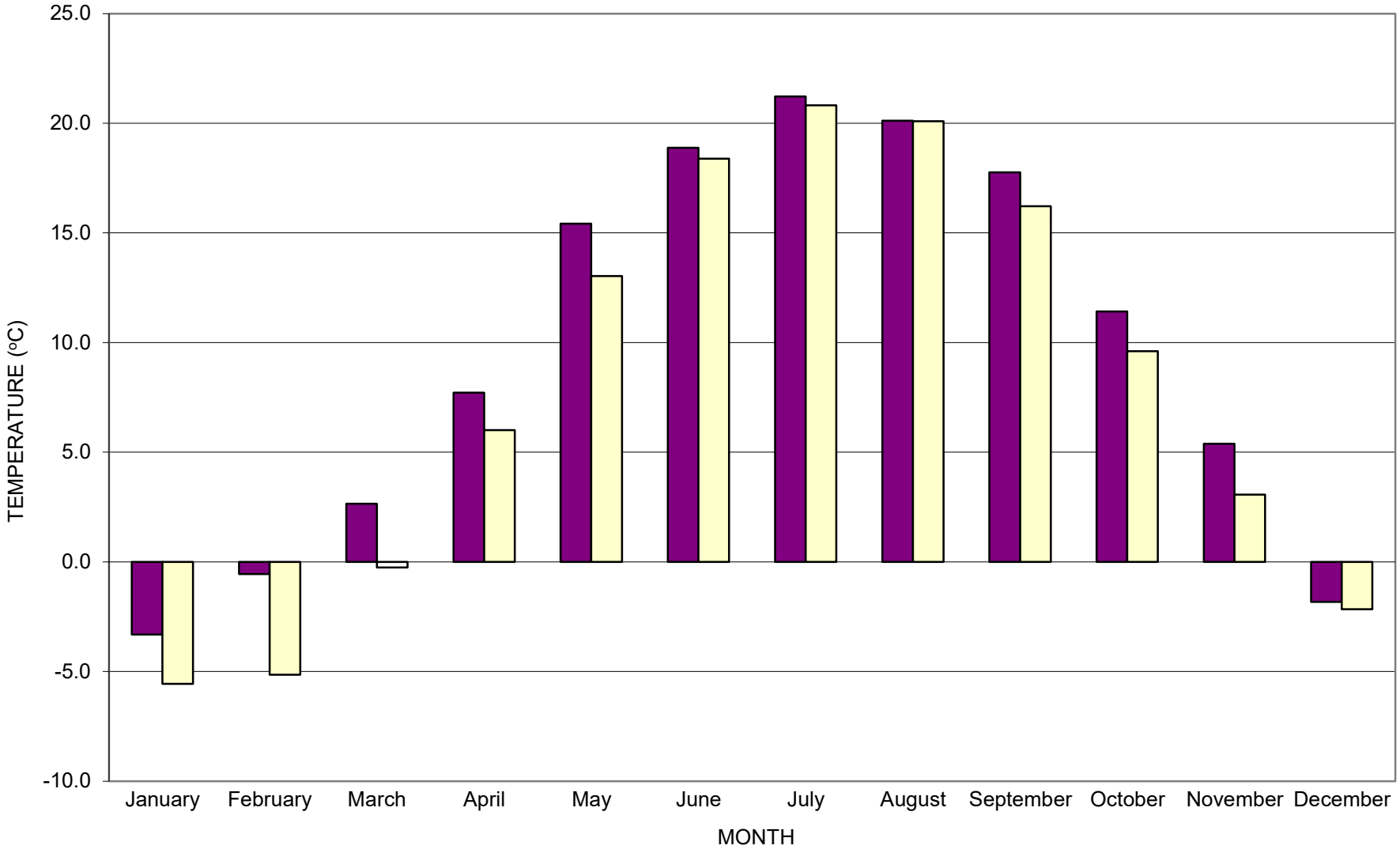
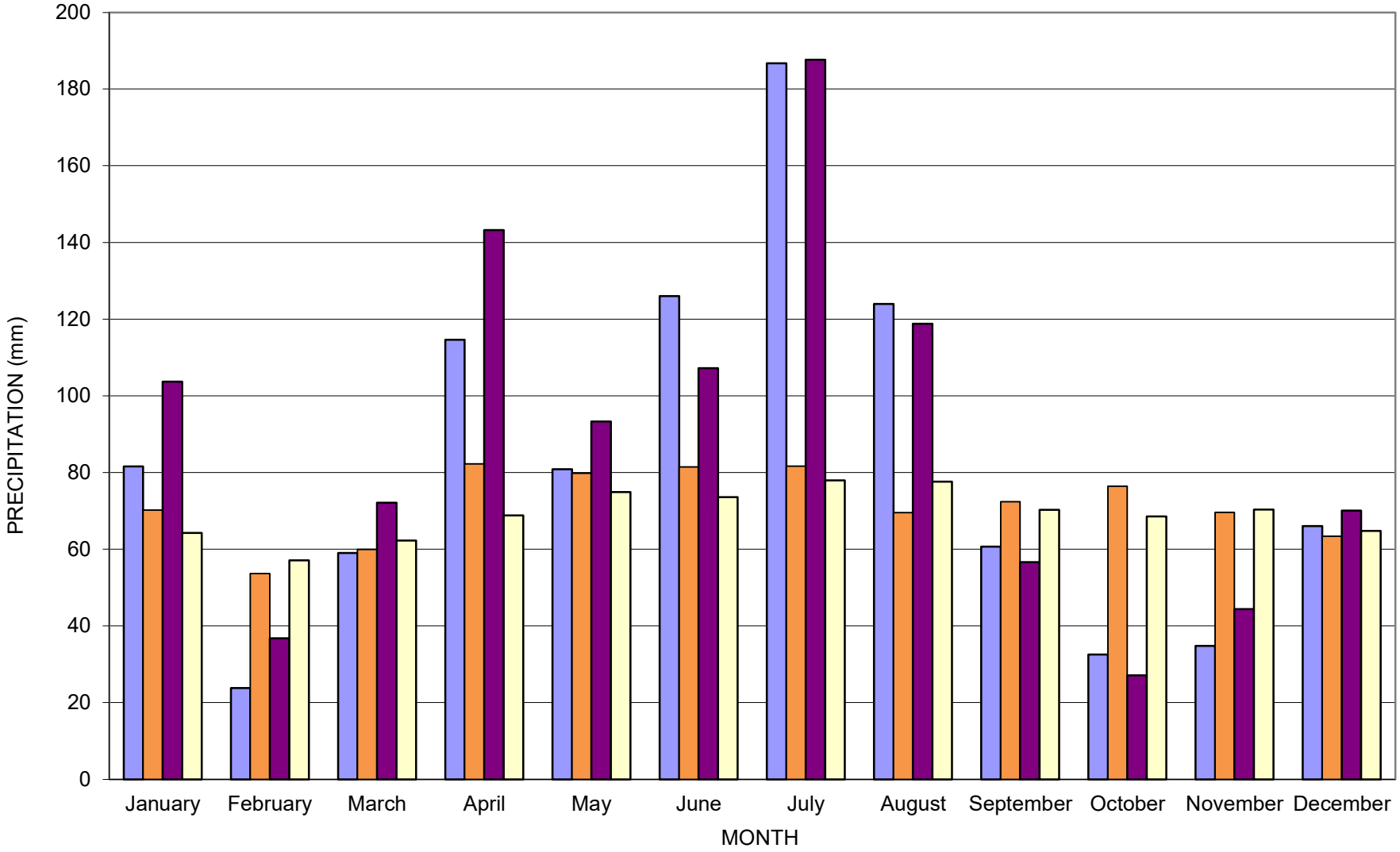


Note:
Air temperature data was collected at the quarry from 1995 to 1998 and then from 2000 to present.

figure 4.1
2024 MONTHLY MEASURED AIR TEMPERATURE AVERAGES
DUFFERIN MILTON QUARRY
Region of Halton, Ontario

010978 (182)



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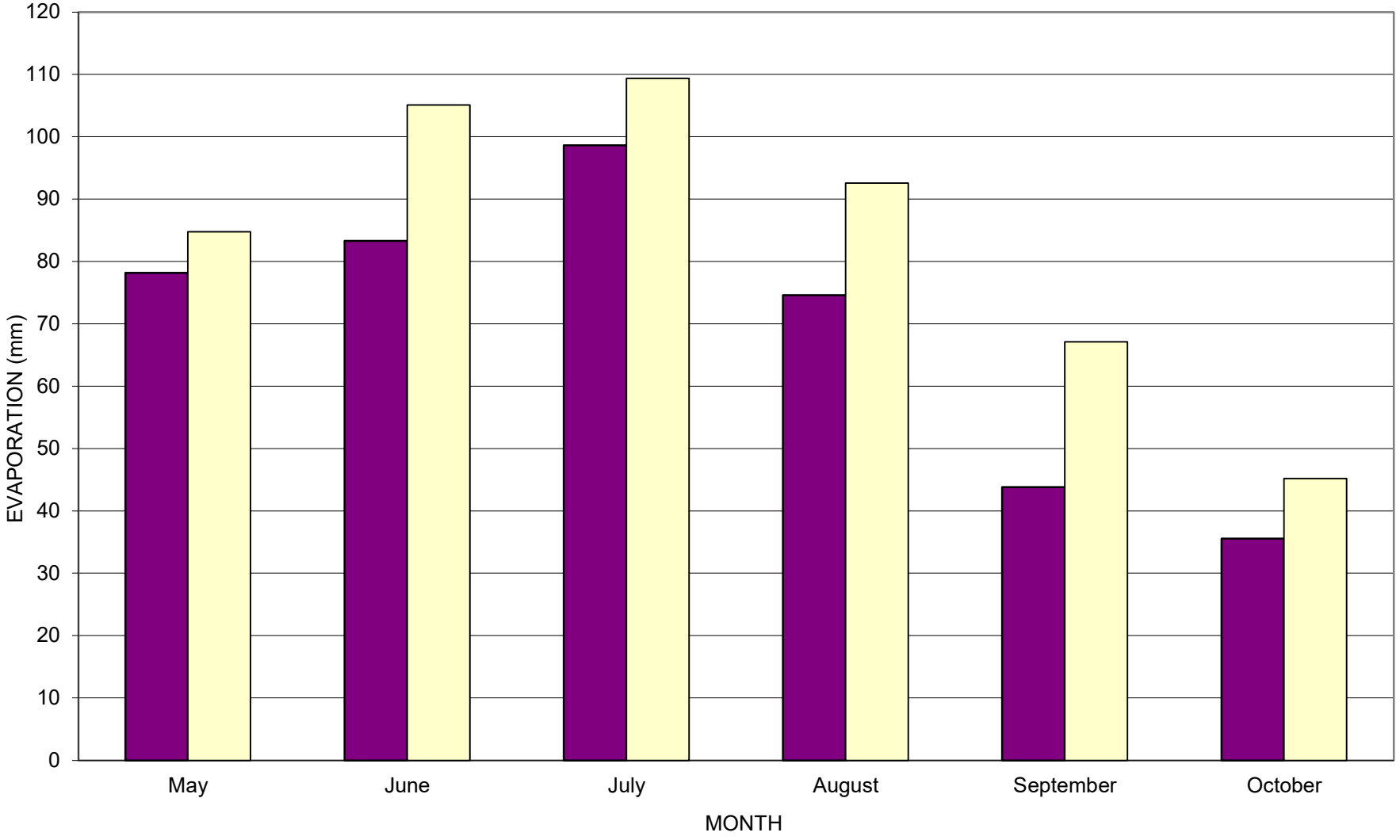
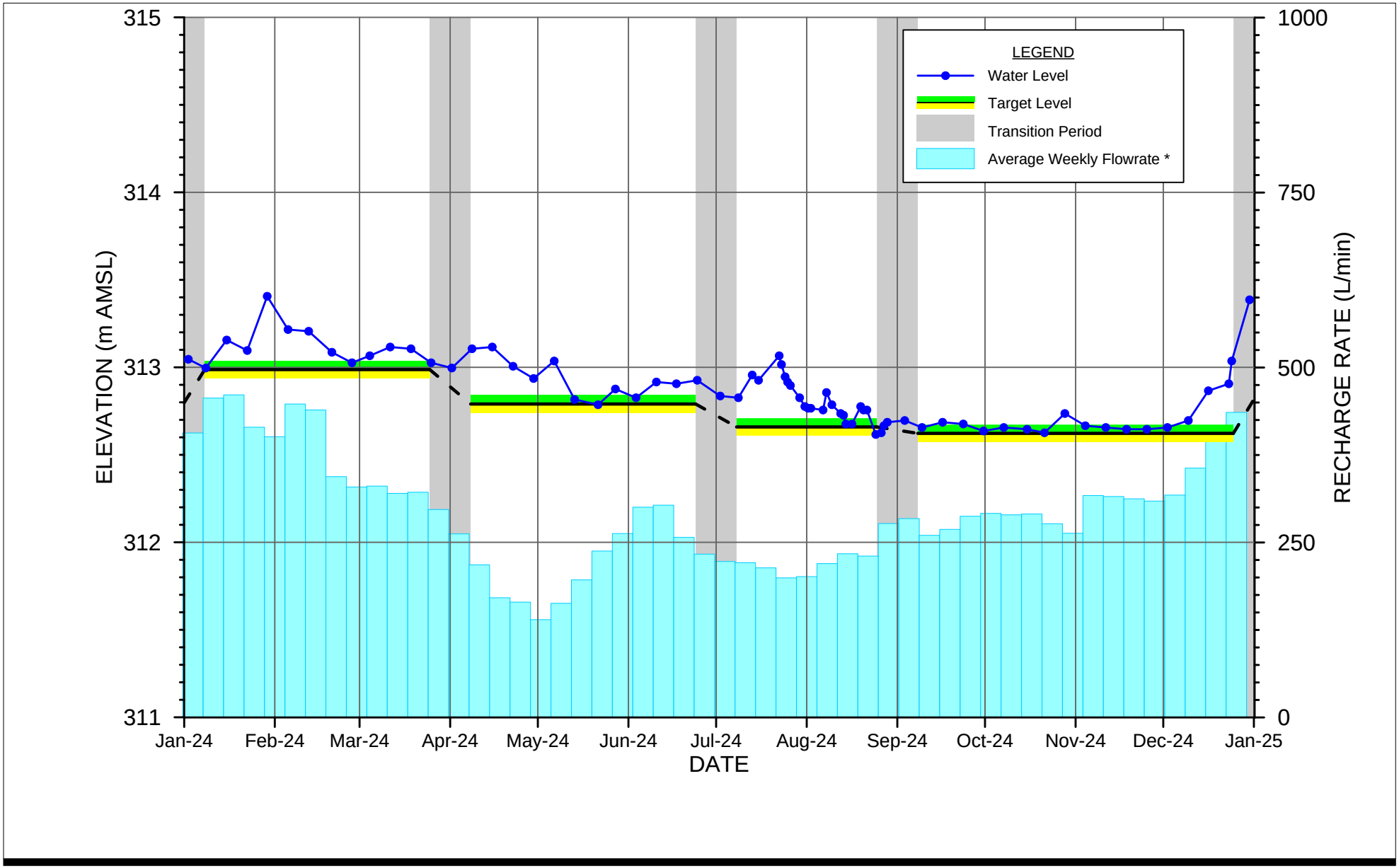
GHD

figure 4.2
2024 MONTHLY SUPPLEMENTED PRECIPITATION TOTALS
DUFFERIN MILTON QUARRY
Region of Halton, Ontario



Note:
The Milton Quarry evaporation pan operated from April 08, 2024 to November 15, 2024. Partial months (April and November) have been excluded above. Measured lake evaporation is obtained by multiplying measured pan evaporation by a 0.70 correction factor.

figure 4.3
2024 MONTHLY MEASURED LAKE EVAPORATION TOTALS
DUFFERIN MILTON QUARRY
Region of Halton, Ontario



* Includes flow from RW103A-07, RW103B-11, RW103C-07, RW103D-07
RW104A-07, RW104B-07, RW104C-09, and RW104D-07

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - BH55
NORTH QUARRY

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.1

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\1 NQ Triggers (5.1-5.7)\BH55.grf
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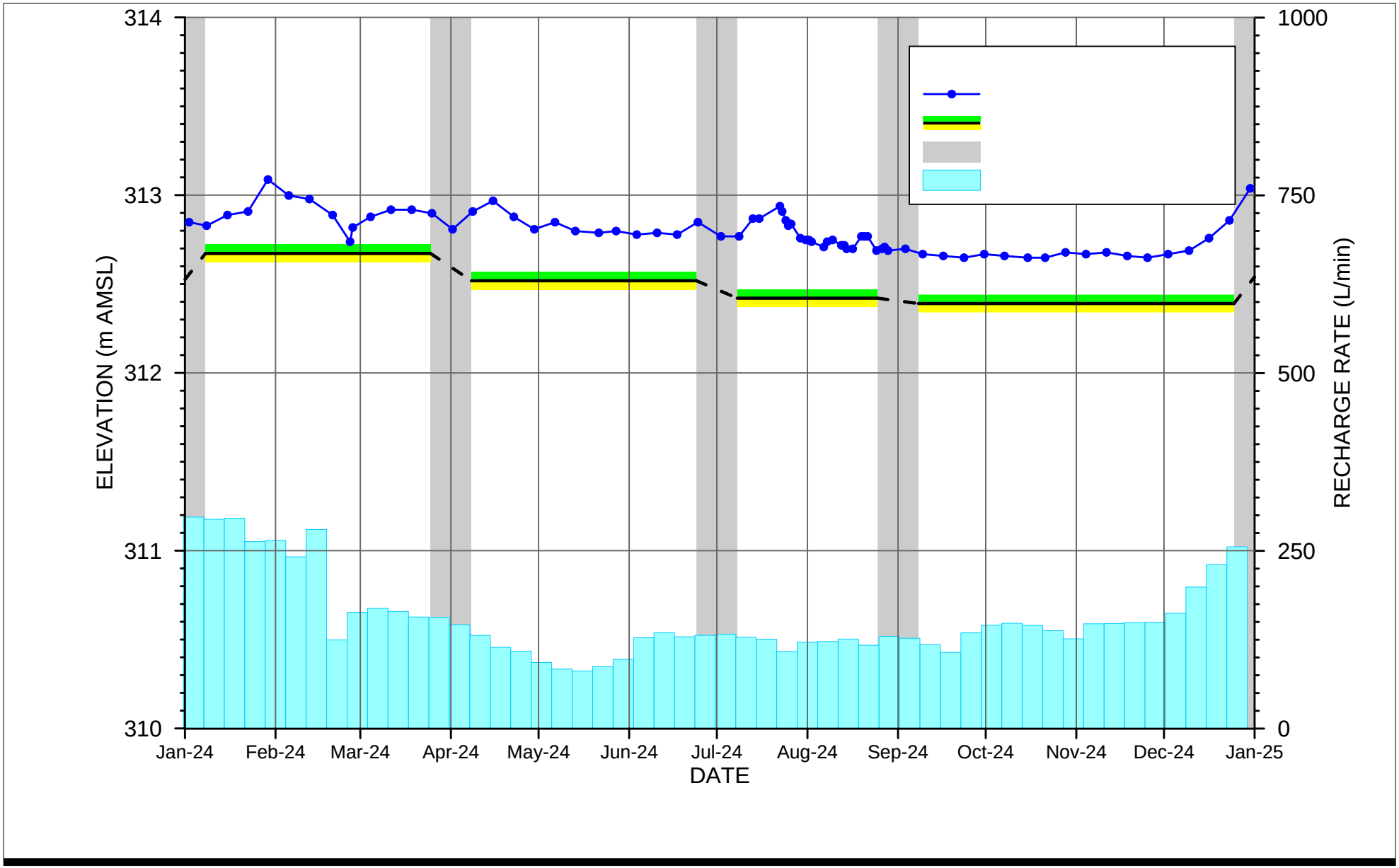


* Includes flow from RW104A-07, RW104B-07, RW104C-09, and RW104D-07

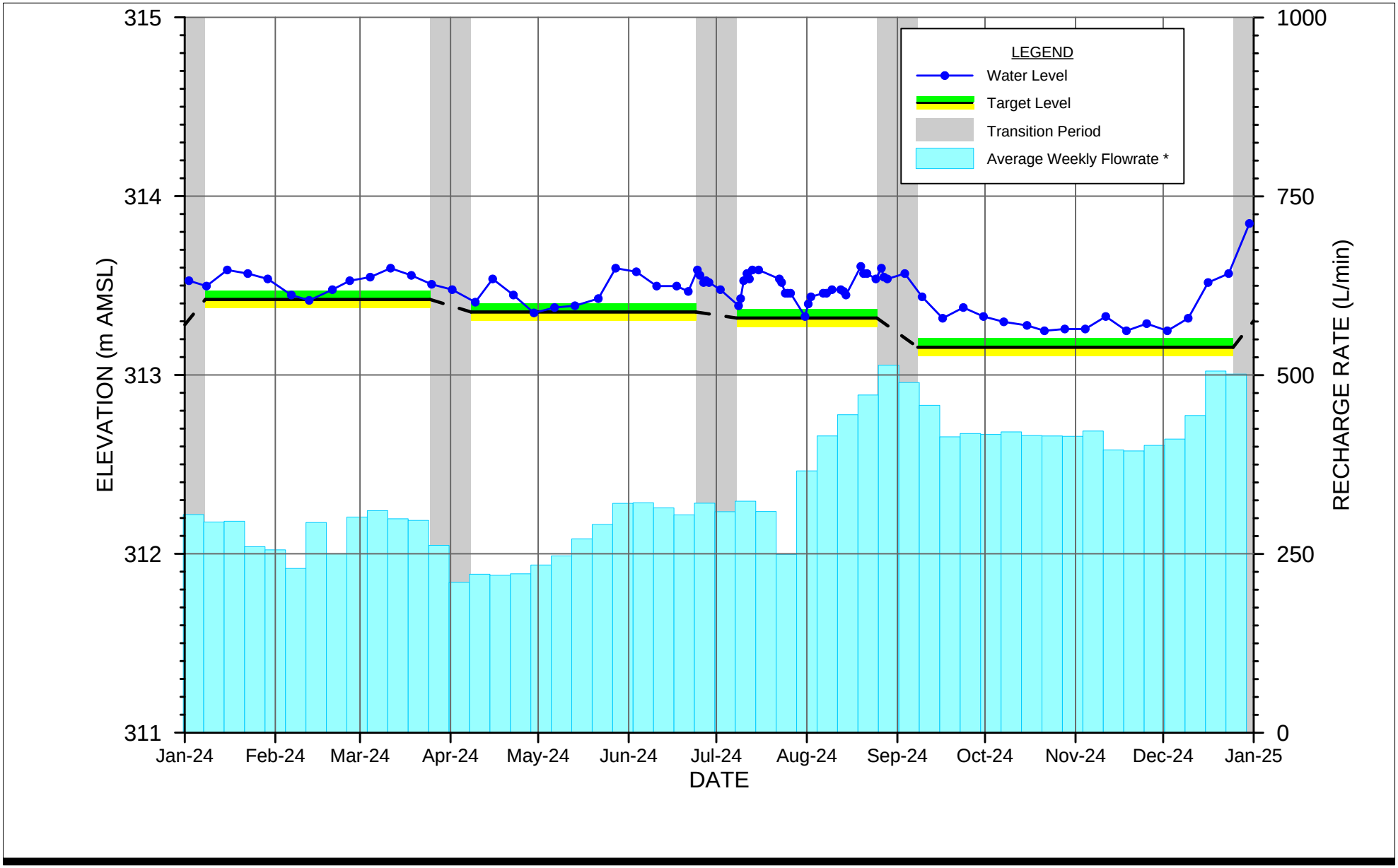
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - BH56
NORTH QUARRY

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.2

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\1 NQ Triggers (5.1-5.7)\BH56.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW104C-09, RW104D-07, RW105A-09, RW105B-07, RW105C-13, RW105D-13, RW106A-07, RW106A-13, and RW106B-13

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - BH57-III
NORTH QUARRY

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.3

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\1 NQ Triggers (5.1-5.7)\BH57-III.grf
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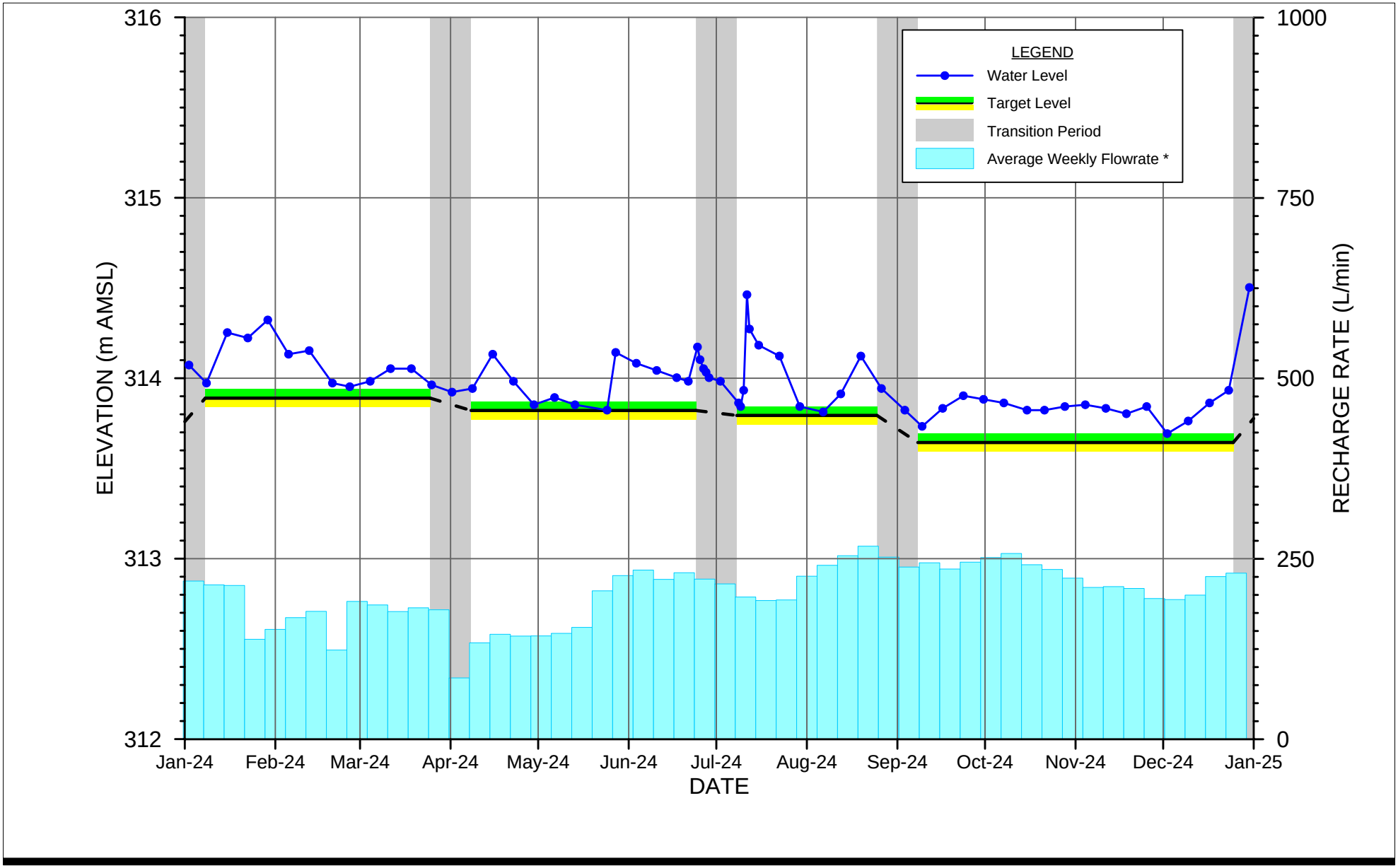

* Includes flow from RW105A-09, RW106A-13, RW106B-13, RW106C-11
RW106D-07, RW106D2-15, RW107A-07, and RW107D-09

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - BH59
NORTH QUARRY

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.4

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\1 NQ Triggers (5.1-5.7)\BH59.grf
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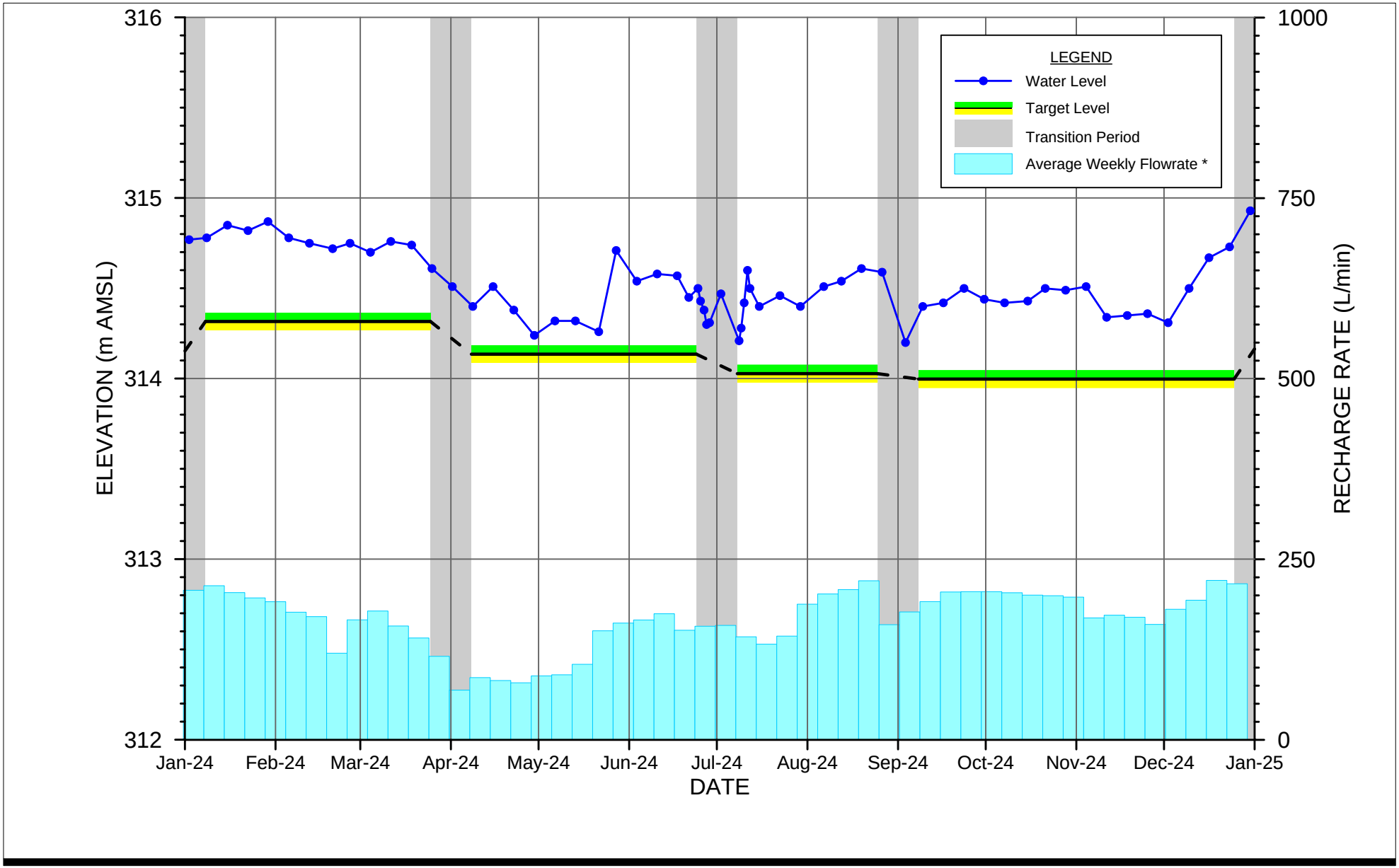

* Includes flow from RW106C-11, RW107B-15, RW107D-09, RW108A-07, and RW108D-09

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - BH60
NORTH QUARRY

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.5

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\1 NQ Triggers (5.1-5.7)\BH60.grf
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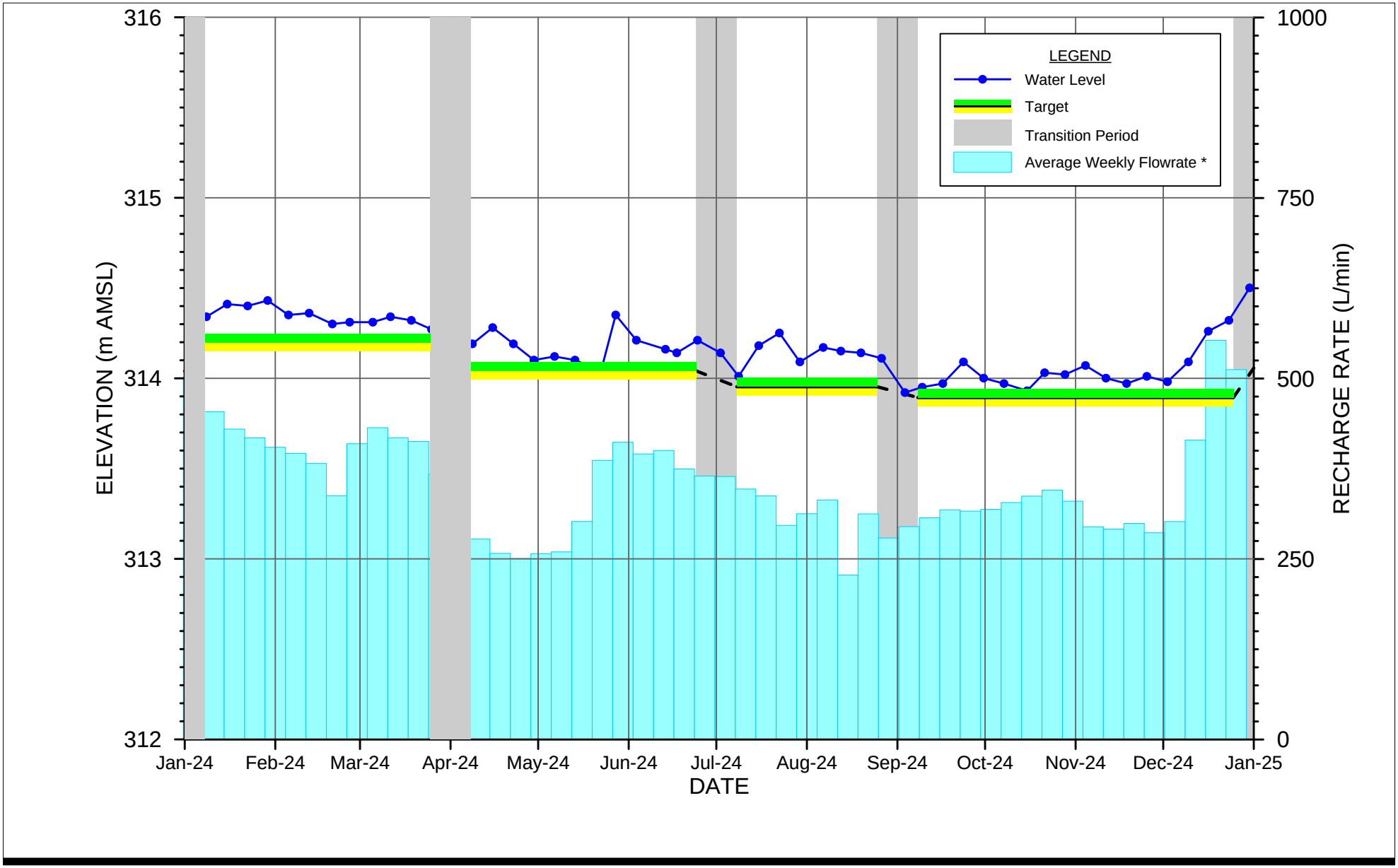

* Includes flow from RW106C-11, RW107B-15, RW107C-15, RW107D-09, RW108A-07, RW108B-15, RW108C-15, and RW108D-09.

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - BH61-III
NORTH QUARRY

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.6

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\1 NQ Triggers (5.1-5.7)\BH61-III.grf
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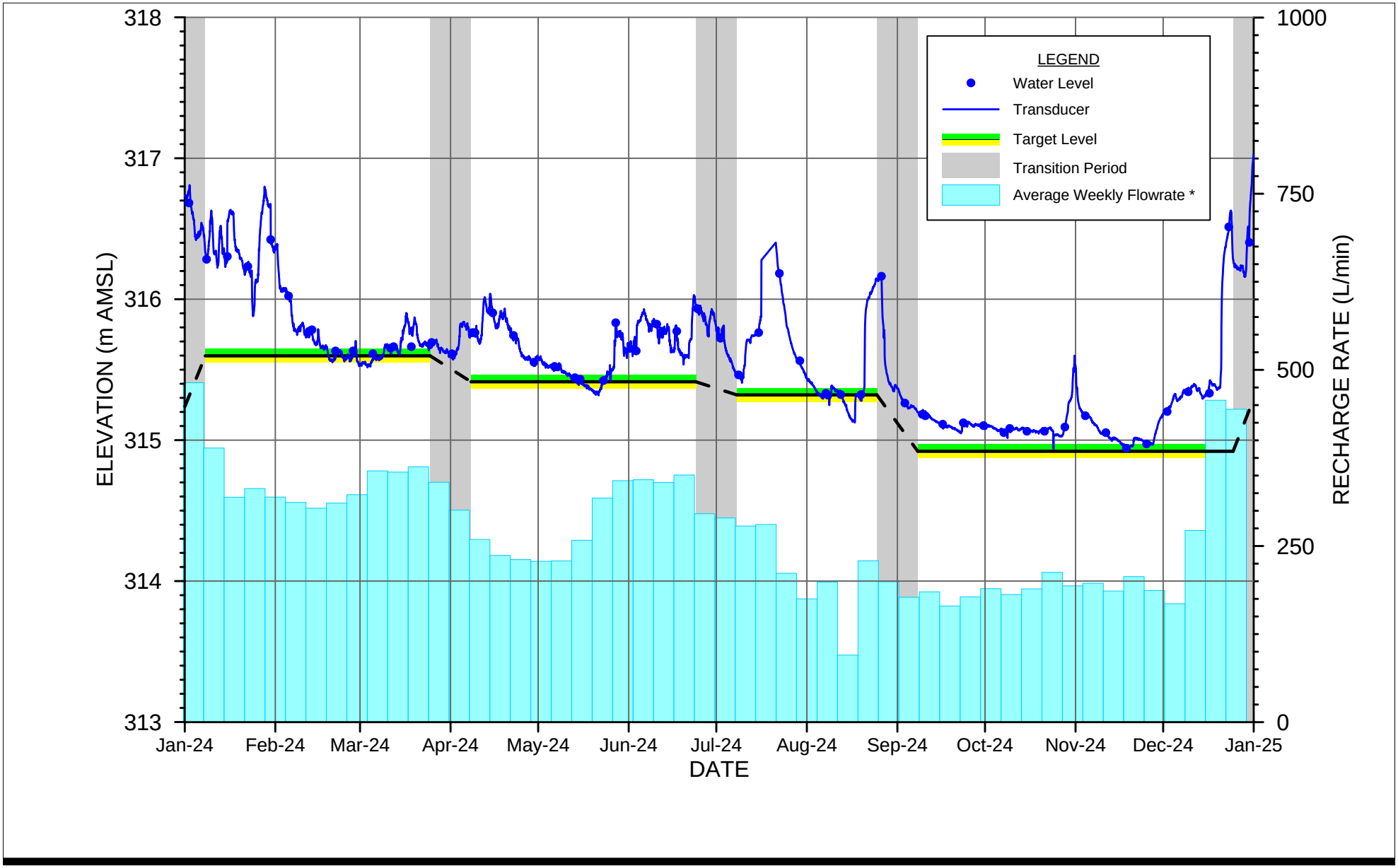

* Includes flow from RW108A-07, RW108C-15, RW108D-09, RW109A-07, RW109B-09, RW109C-07, and RW109D-07.

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - BH37
NORTH QUARRY

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.7

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\1 NQ Triggers (5.1-5.7)\BH37.grf
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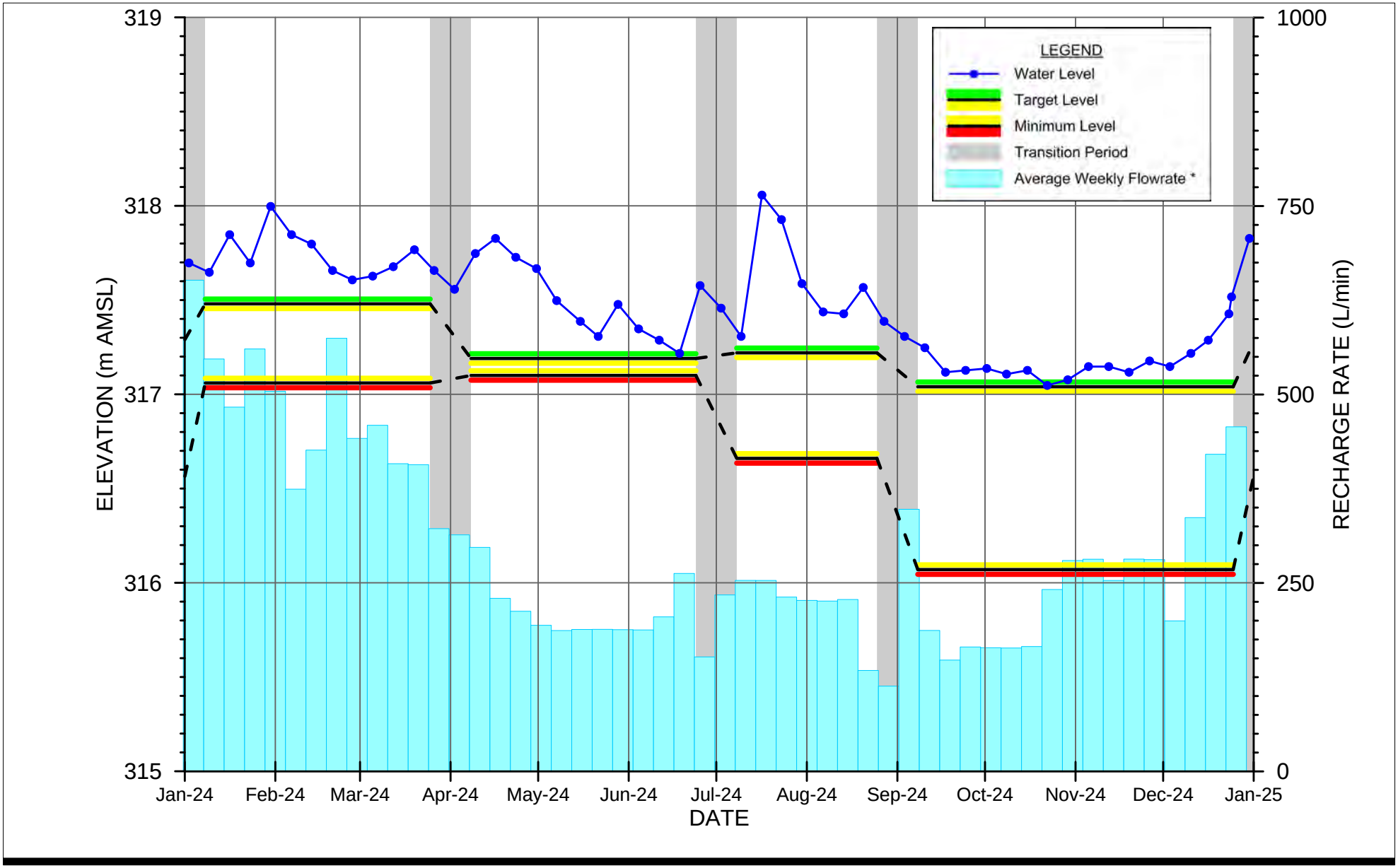

* Includes flow from MWx1-15, RW201A-09, RW201B-09, RW202A-09, RW203C-11, RW203D-11, RW204C-13, RW204D-11, and RW204D2-15.

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW27-04
WEST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.8

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\2 WC Triggers (5.8-5.19)\OW27-04.grf
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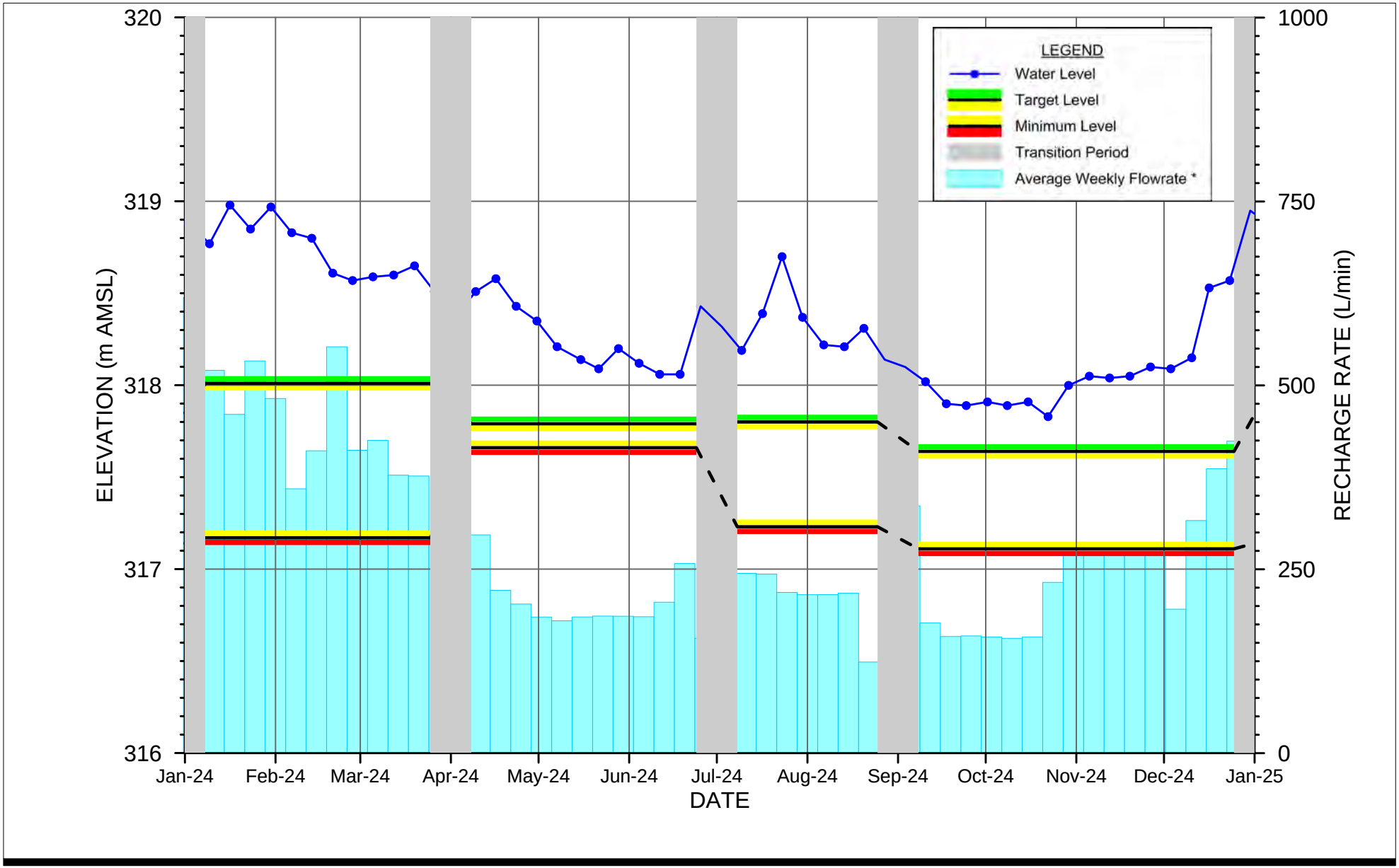

* Includes flow from RW201B-09, RW202A-09, RW203A-09, RW203C-11, RW203D-11, RW204C-13, RW204D-11, and RW204D2-15.

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW28-04
WEST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.9

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\2 WC Triggers (5.8-5.19)\OW28-04.grf
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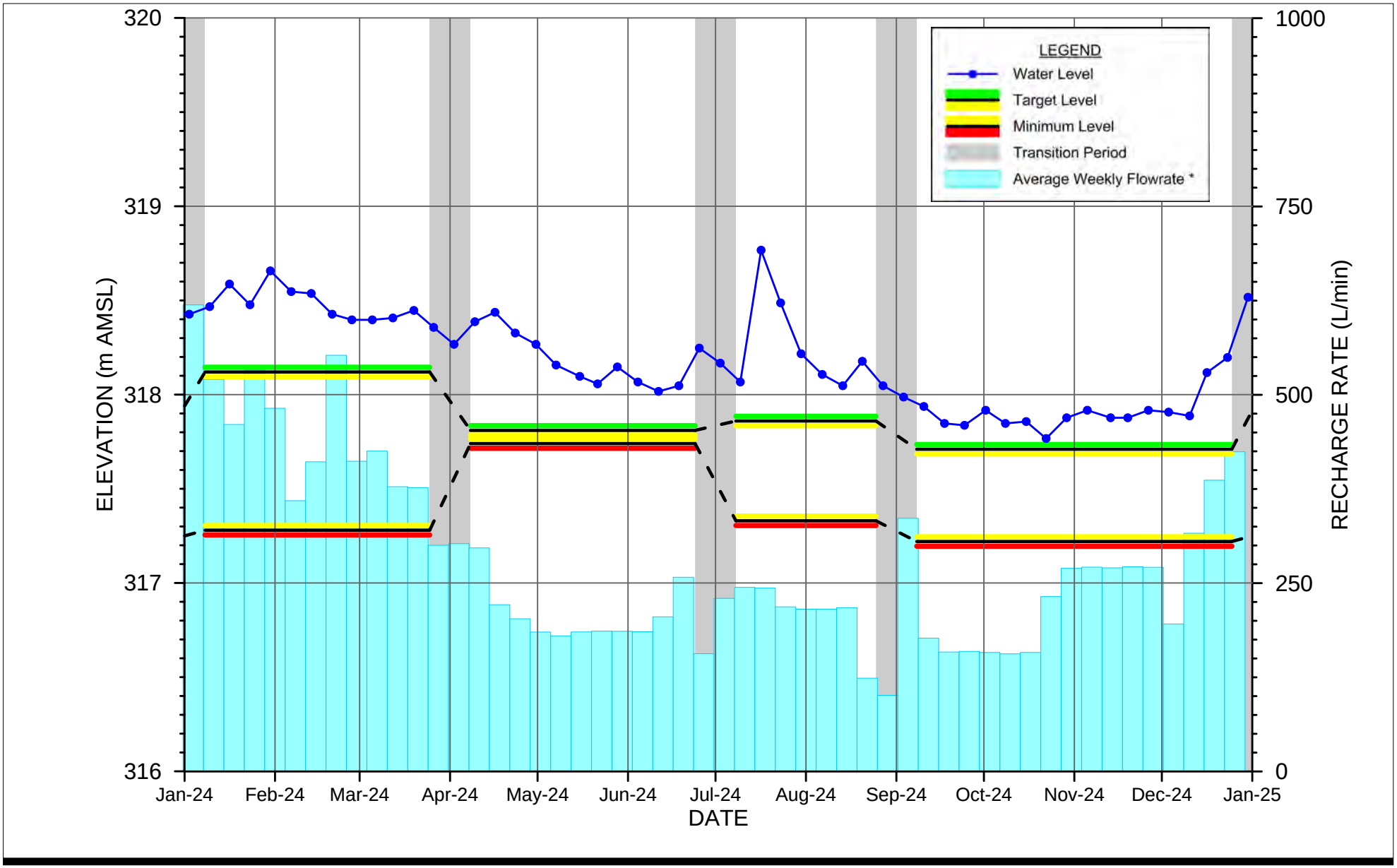

* Includes flow from RW202A-09, RW203A-09, RW203B-09, RW203C-11, RW203D-11, RW204C-13, RW204D-11, and RW204D2-15.

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW29-04
WEST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.10

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\2 WC Triggers (5.8-5.19)\OW29-04.grf
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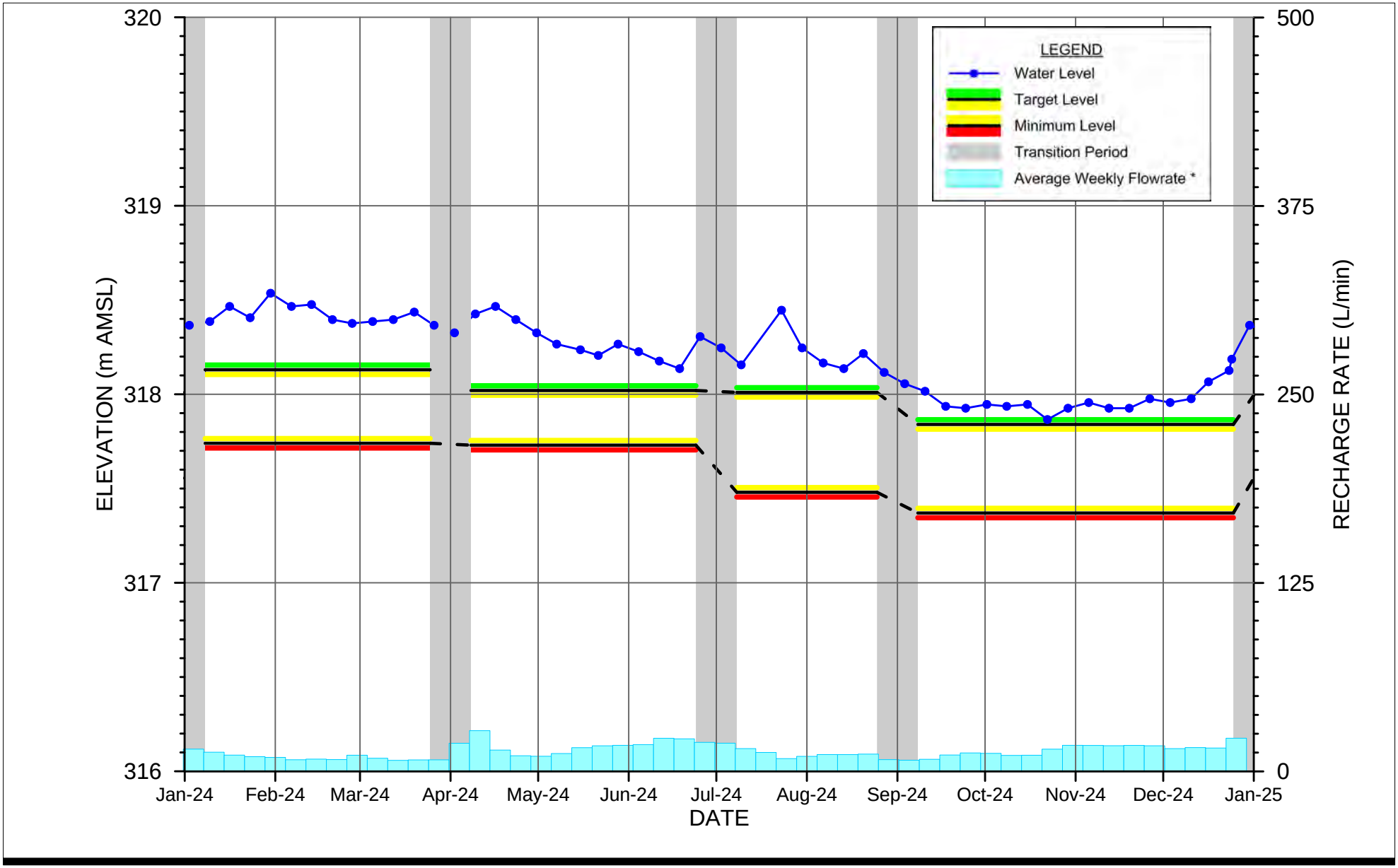


* Includes flow from RW203B-09, RW203C-11, RW204A-09, and RW204B-09.

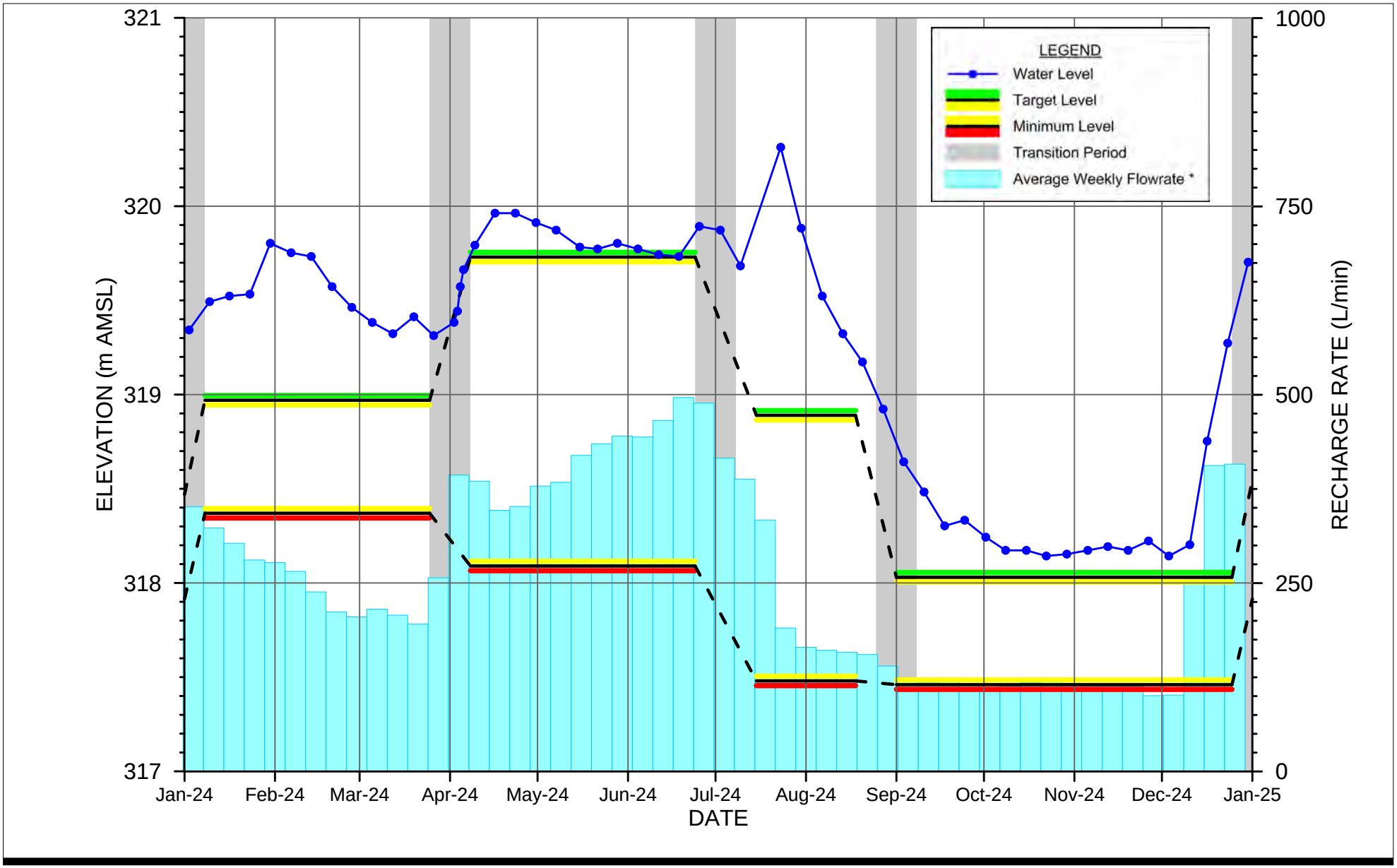
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW30-04
WEST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.11

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\2 WC Triggers (5.8-5.19)\OW30-04.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW203B-09, RW204A-09, RW204B-09, and RW205H-15.

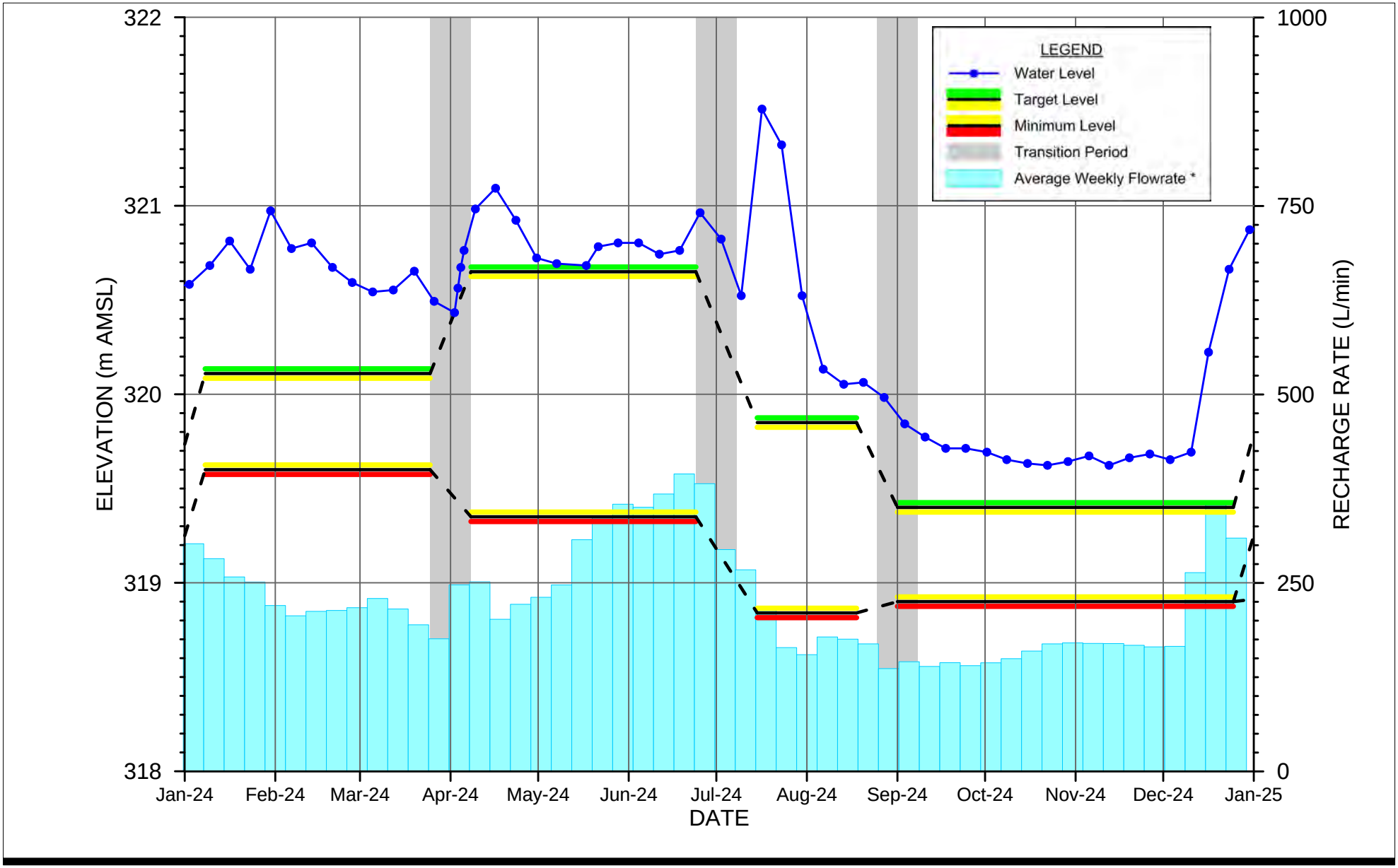
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW31-04
WEST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.12

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\2 WC Triggers (5.8-5.19)\OW31-04.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW204B-09, RW205A-09, RW205B-14, RW205C-15, RW205H-15, and RW206A-09.

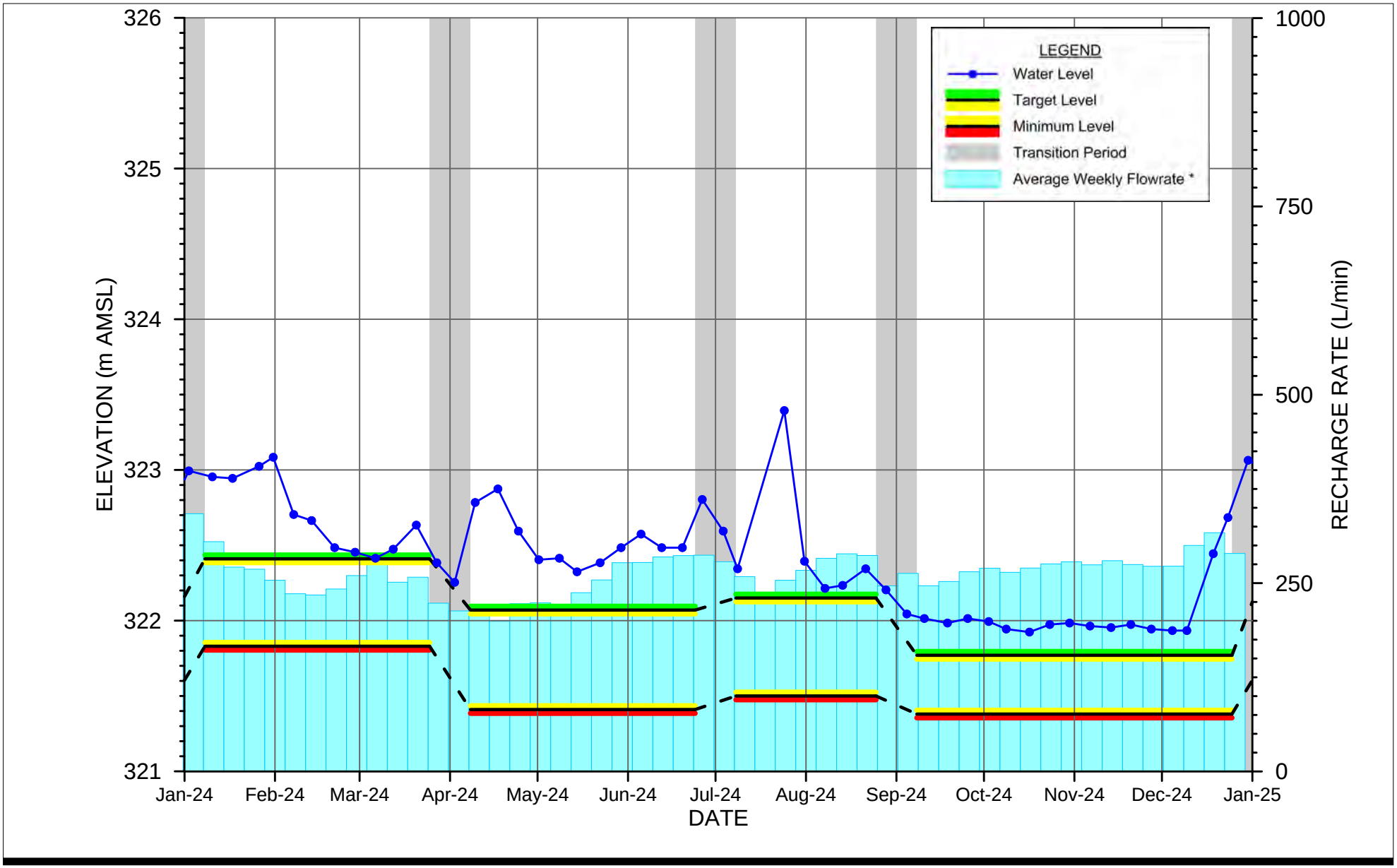
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW32-04
WEST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.13

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\2 WC Triggers (5.8-5.19)\OW32-04.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW205A-09, RW205C-15, RW206A-09, RW206B-09.

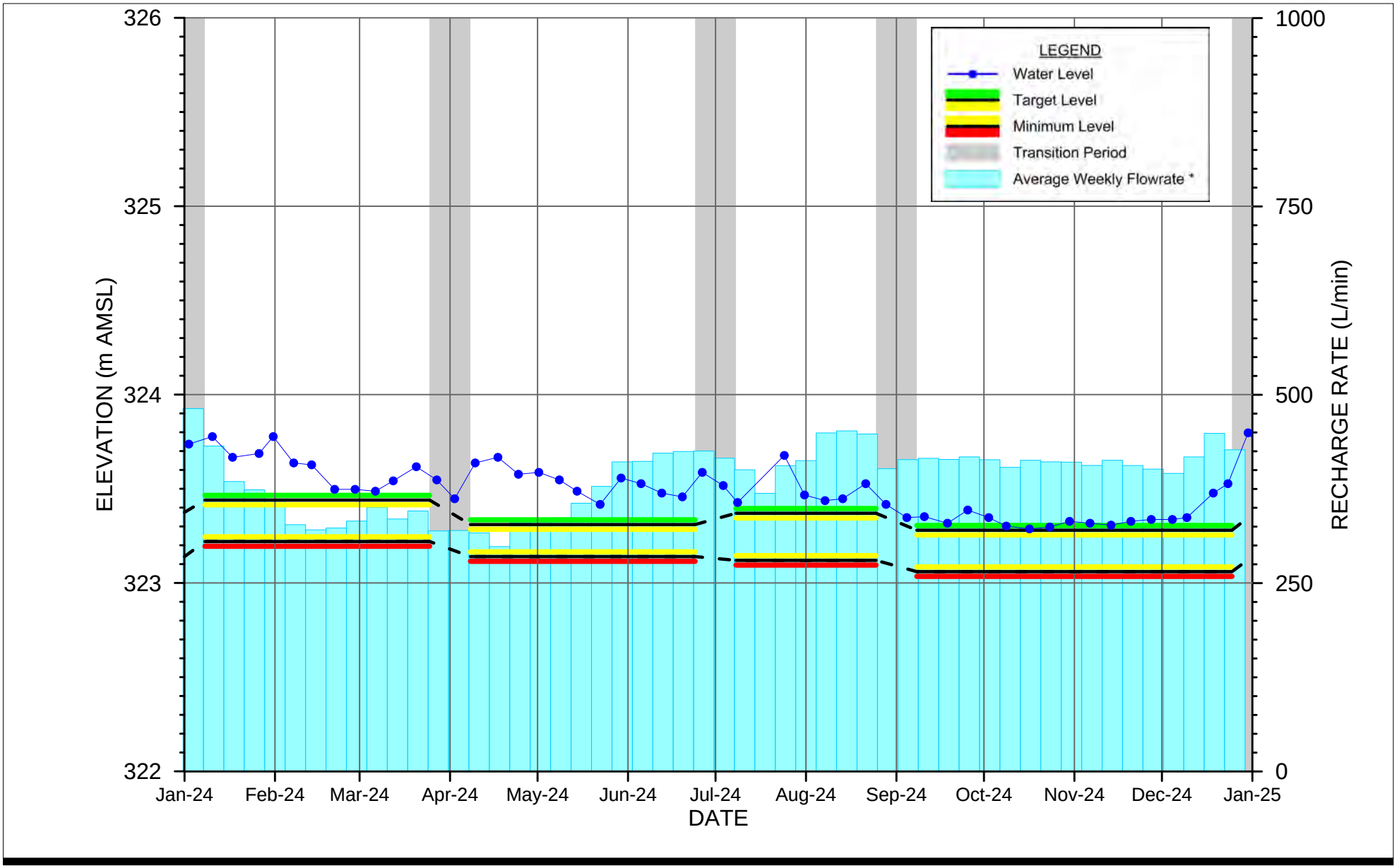
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **010978**
Date **February 04, 2025**

TRIGGER WELL - OW33-04
WEST CELL EXTENSION

FIGURE 5.14

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\2 WC Triggers (5.8-5.19)\OW33-04.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW205D-16, RW206A-09, and RW206B-09.

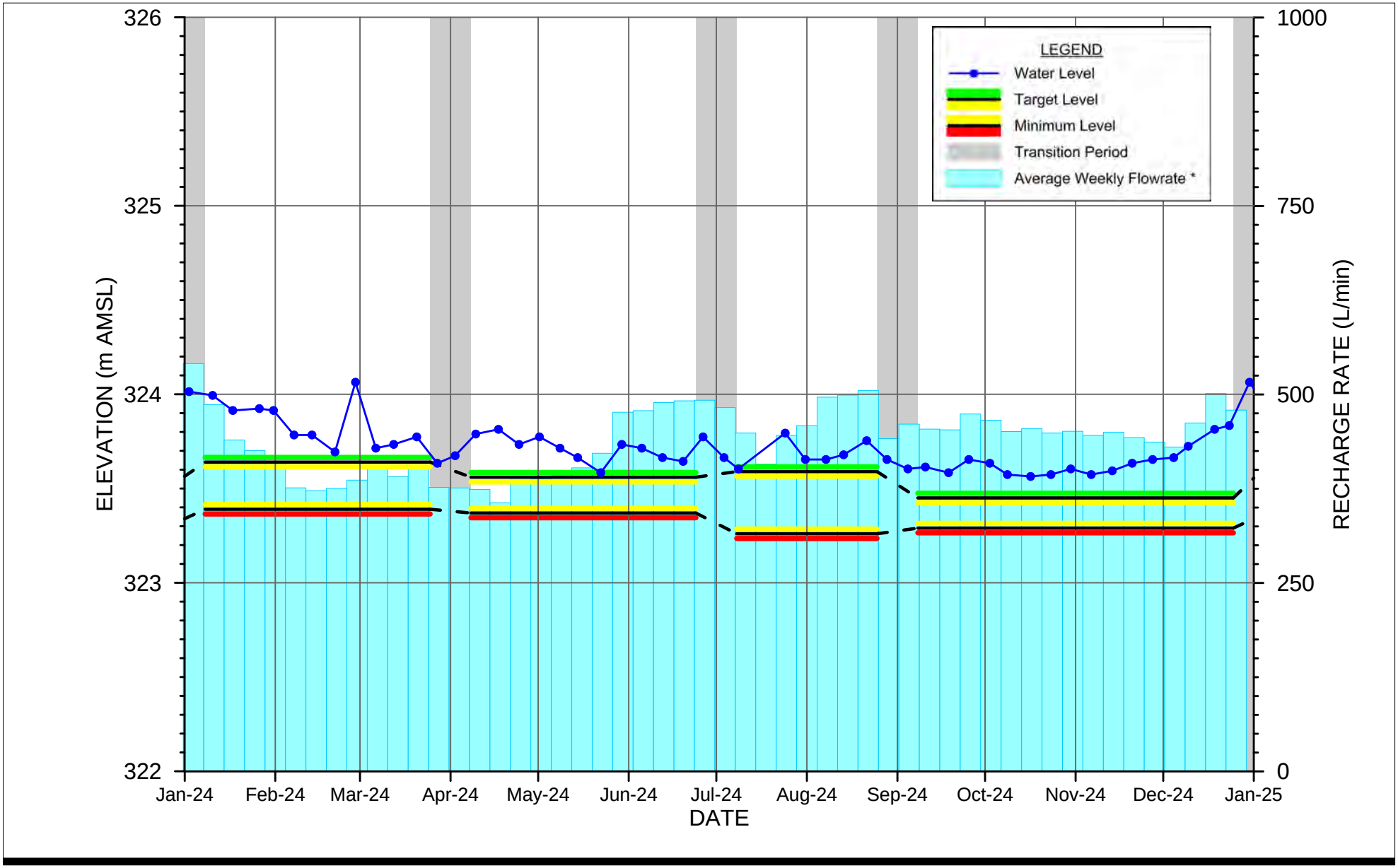
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW34-04
WEST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.15

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\2 WC Triggers (5.8-5.19)\OW34-04.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW205F-19, RW206A-09, RW206B-09, and RW206C-20.

GHD

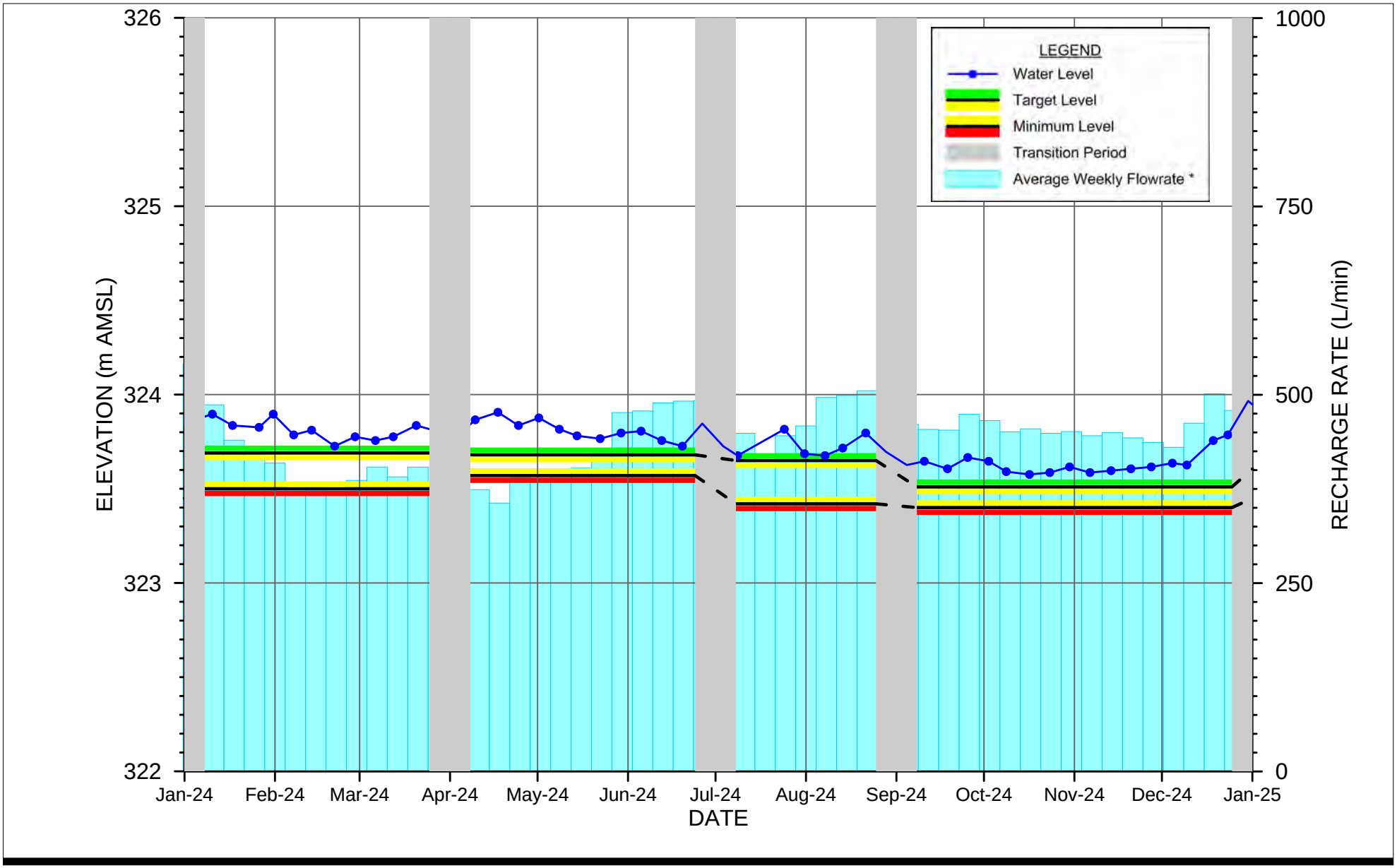
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW35-04
WEST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.16

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\2 WC Triggers (5.8-5.19)\OW35-04.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW206B-09, RW206C-14, RW206C-20, RW207A-09, RW207C-14, and RW208B-14.

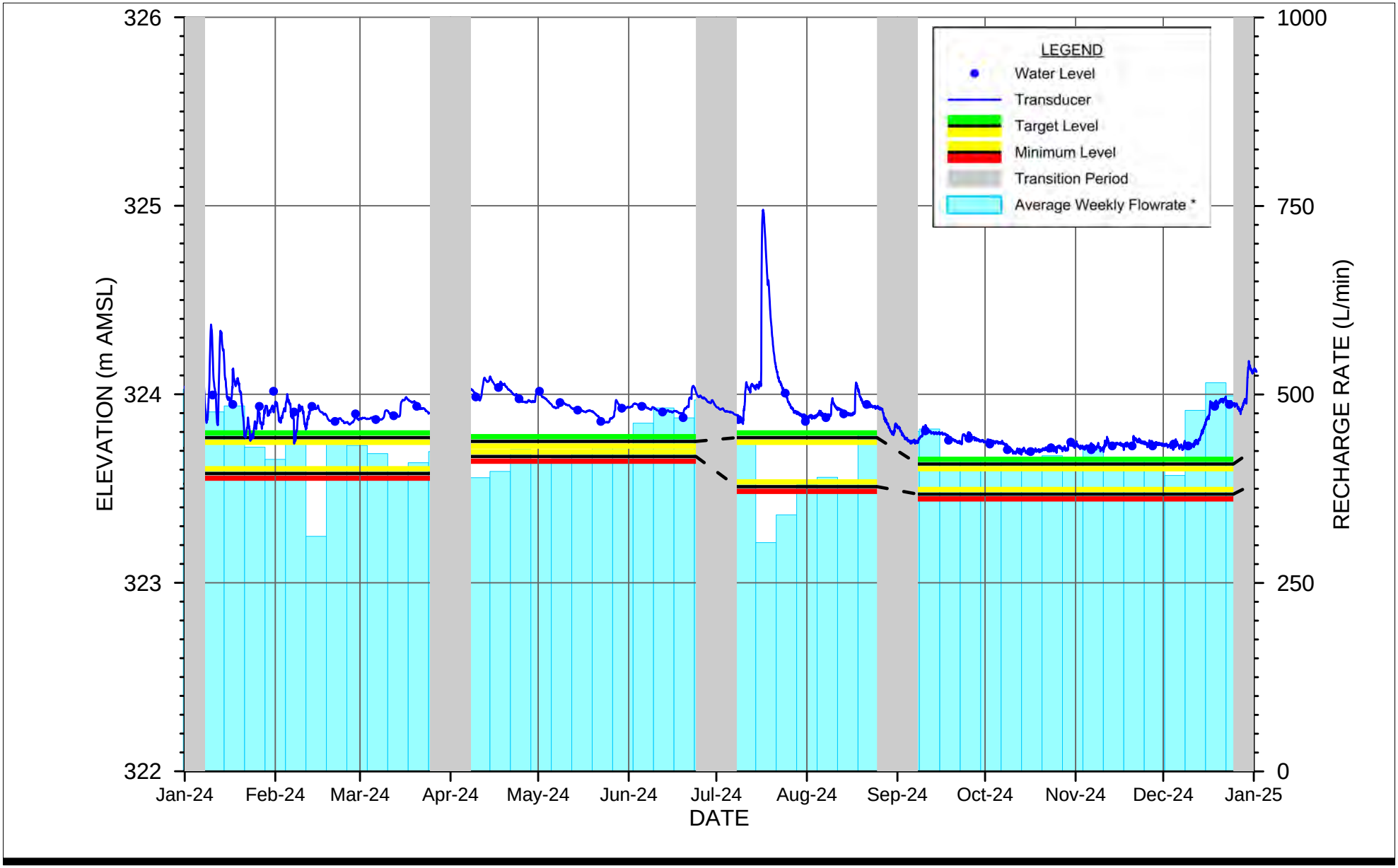
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW36-04
WEST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.17

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\2 WC Triggers (5.8-5.19)\OW36-04.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW207A-09, RW207B-09, RW208A-09, RW208B-14, RW208D-13, RW208F-97, RW209B-13, RW209C-13, and RW209C-16.

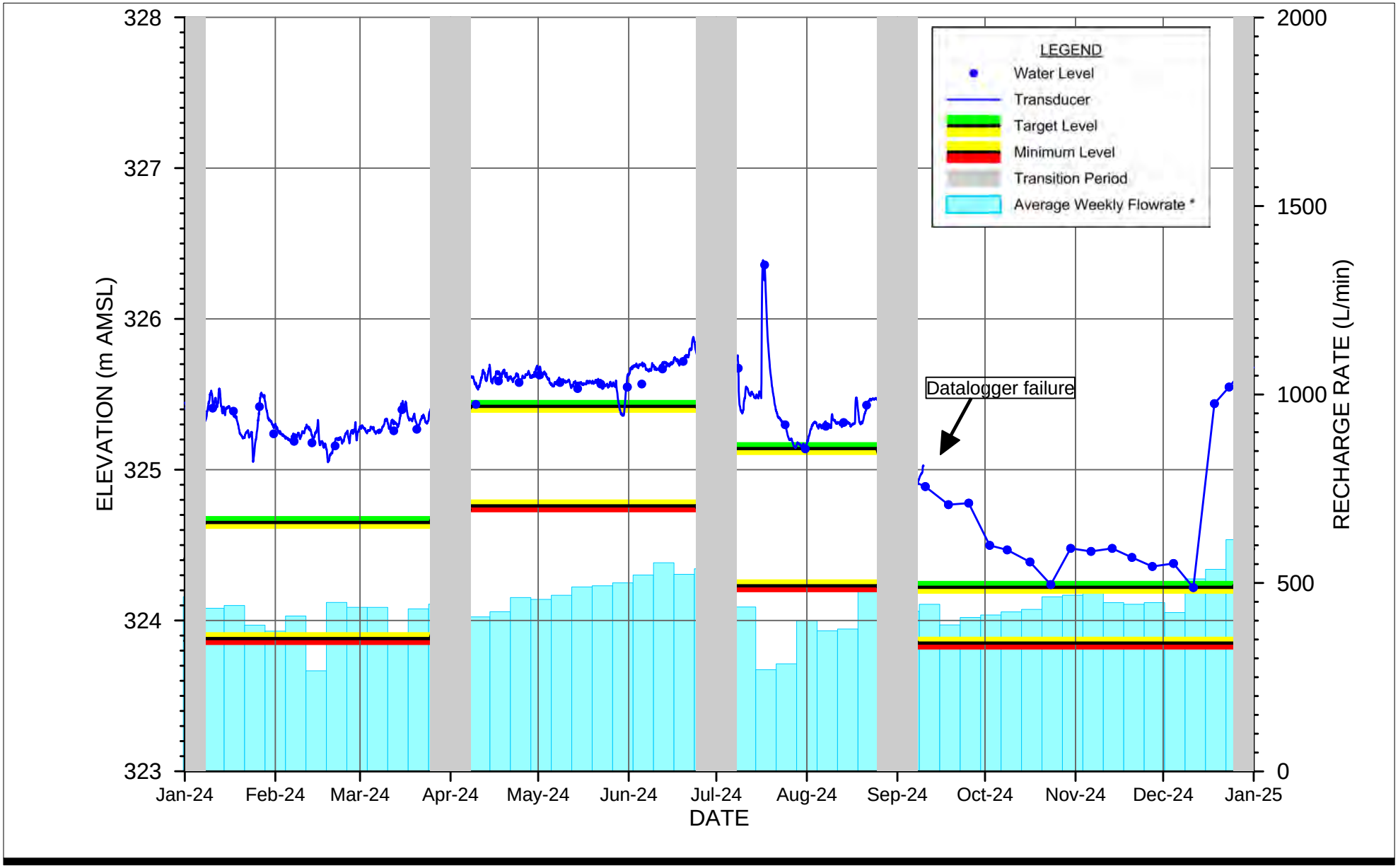
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW37-04
WEST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.18

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\2 WC Triggers (5.8-5.19)\OW37-04.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW208A-09, RW208B-14, RW208D-13, RW208F-97, RW208G-16, RW209A-09, RW209B-13, RW209C-13, RW209C-16, RW209D-13, and RW301B-14.

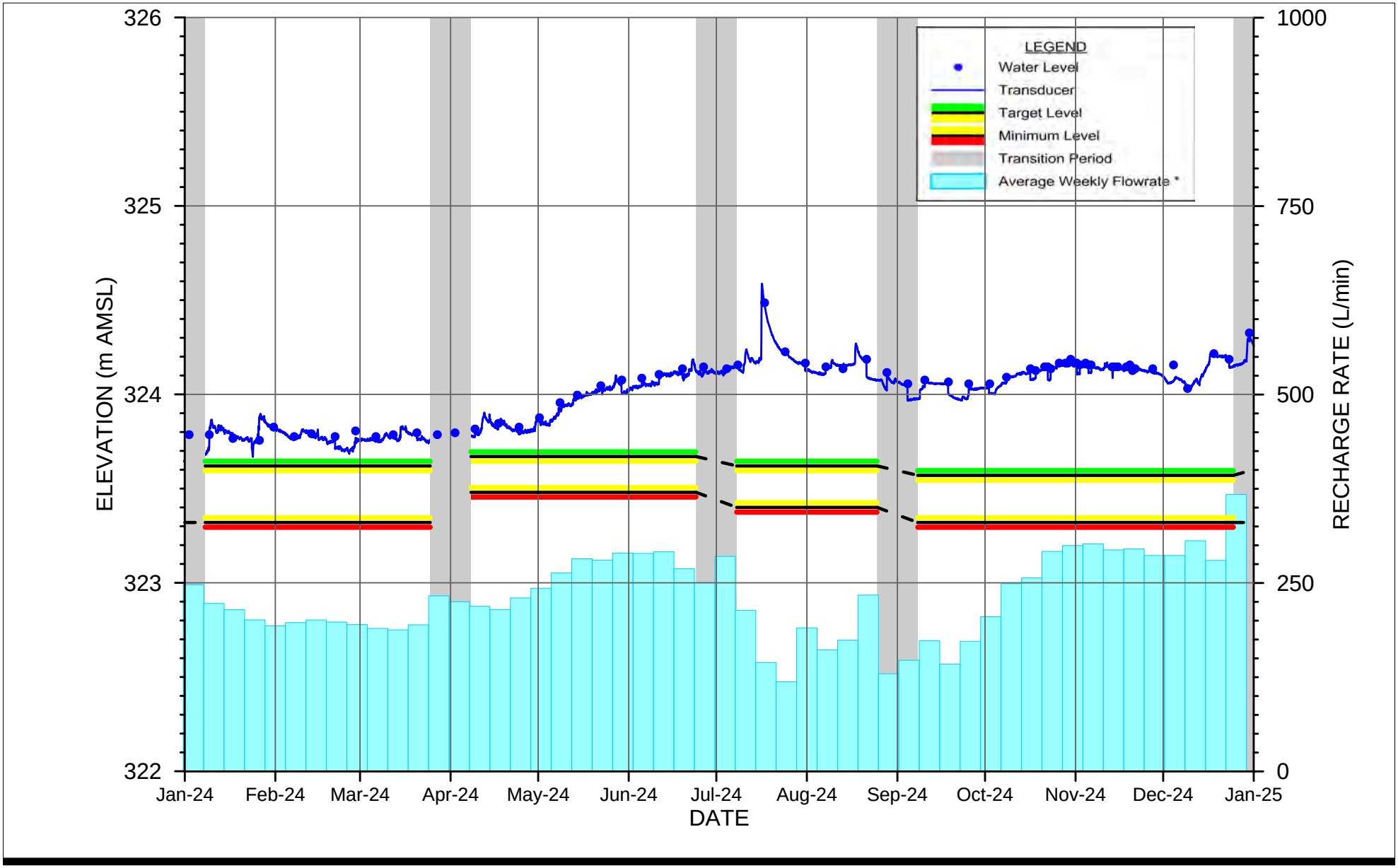
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW38-04
WEST CELL EXTENSION

Project No. **010978**
Date **February 21, 2025**

FIGURE 5.19

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\2 WC Triggers (5.8-5.19)\OW38-04.grf
Plot Date: February 25 2025 4:02 PM



* Includes flow from RW209A-09, RW209B-13, RW209D-13, RW301A-10, RW301B-14, and RW302A-10.

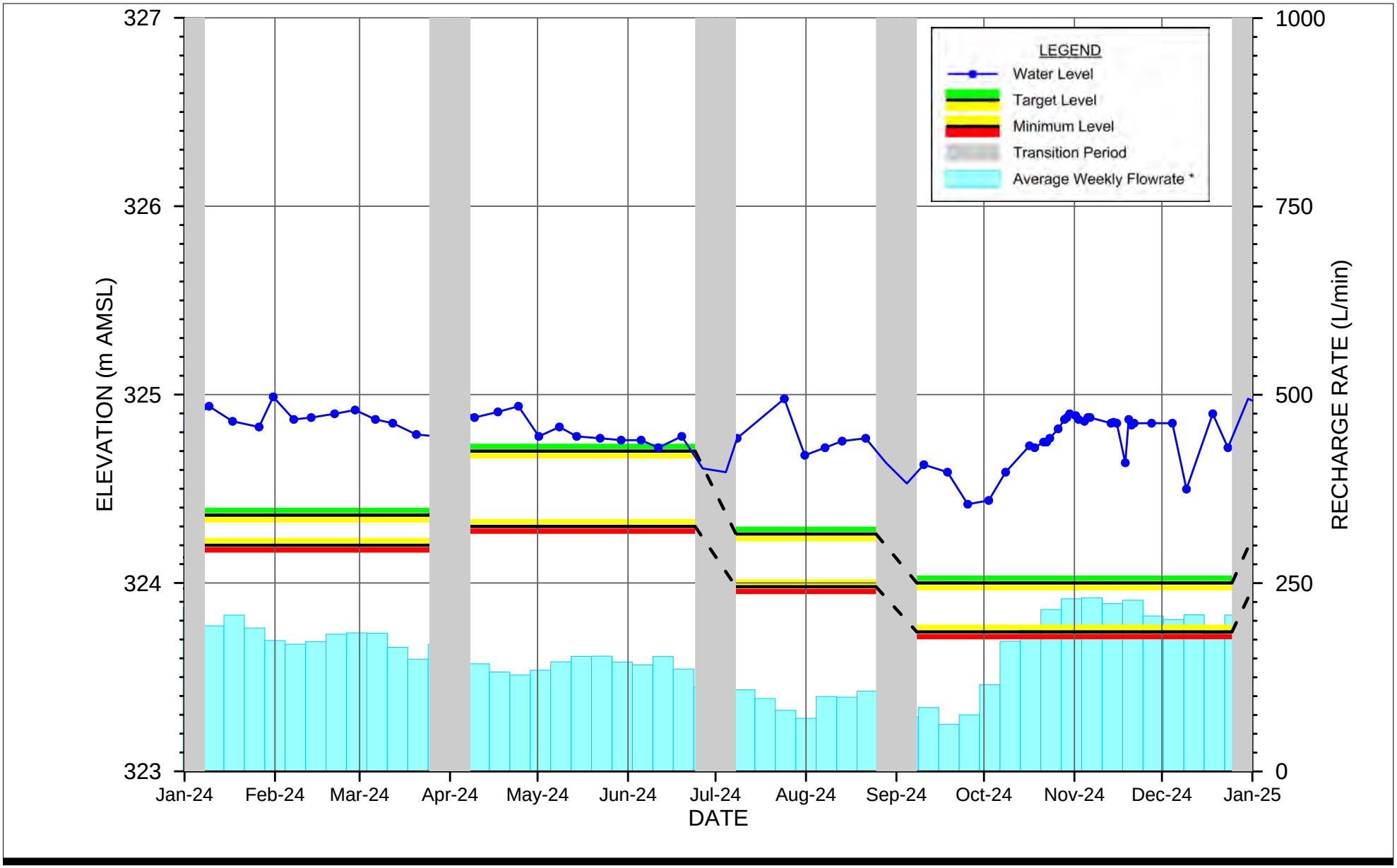
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW60-07
EAST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.20

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\3 EC Triggers (5.20-5.31)\OW60-07.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW301A-10, RW301B-14, RW302A-10, and RW302B-10.

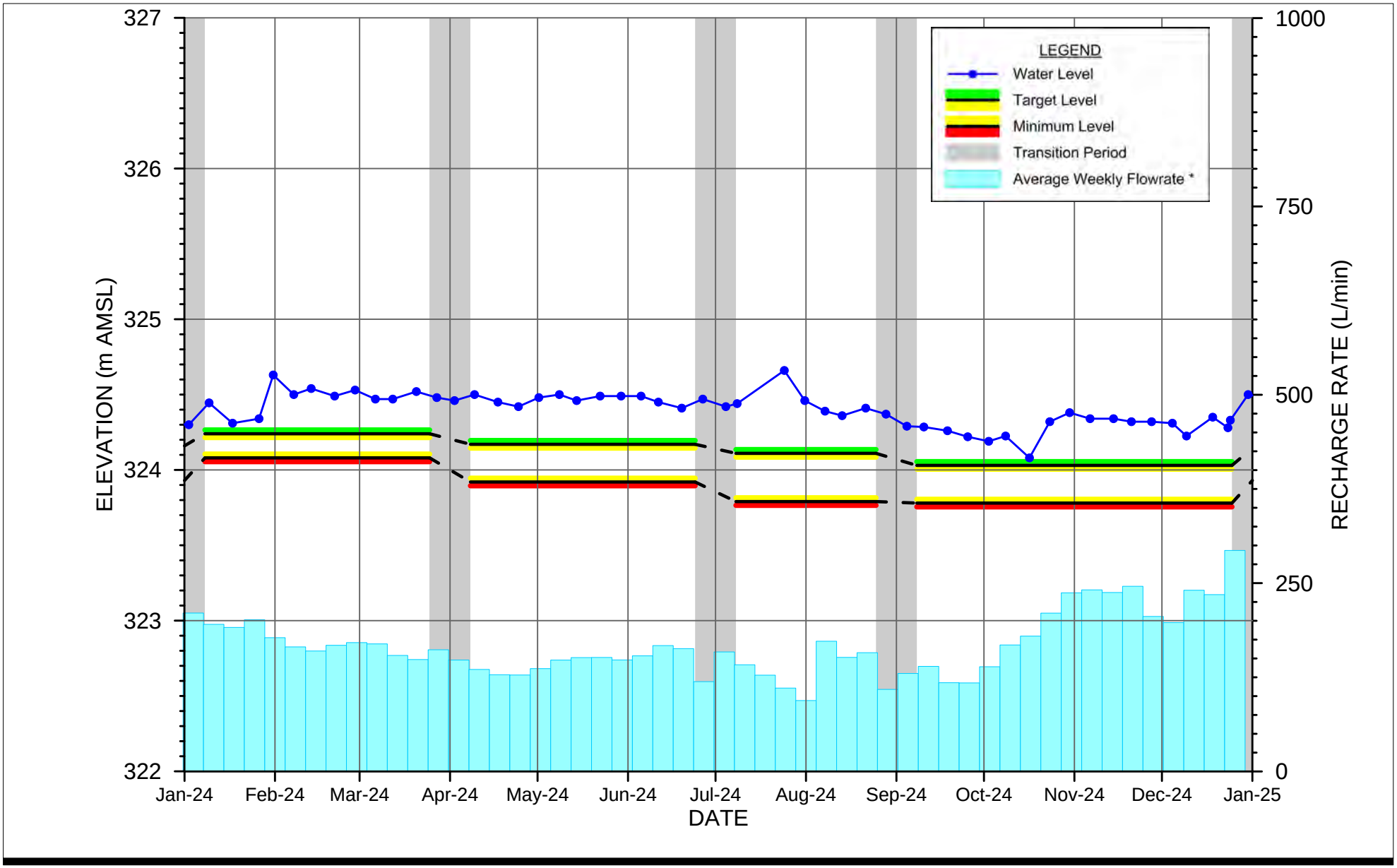
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW61-07
EAST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.21

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\3 EC Triggers (5.20-5.31)\OW61-07.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW302A-10, RW302B-10, RW302C-15, RW302D-15, RW303A-10, RW303B-10, RW304A-10, RW305A-10, and RW307A-10.

GHD

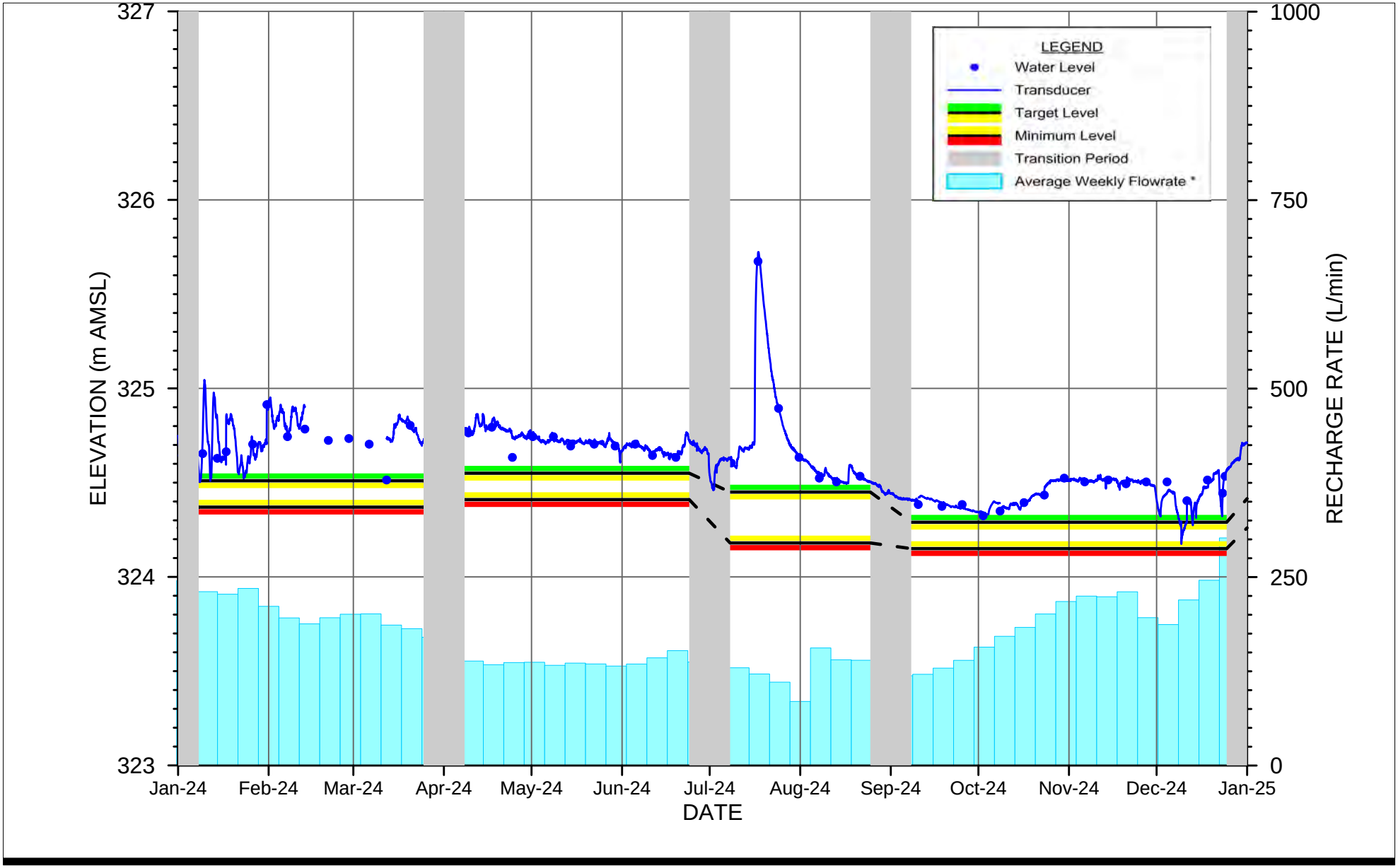
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW62-07
EAST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.22

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\3 EC Triggers (5.20-5.31)\OW62-07.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW302B-10, RW302C-15, RW302D-15, RW303A-10, RW303B-10, RW304A-10, RW305A-10, RW307A-10, and RW307B-15.

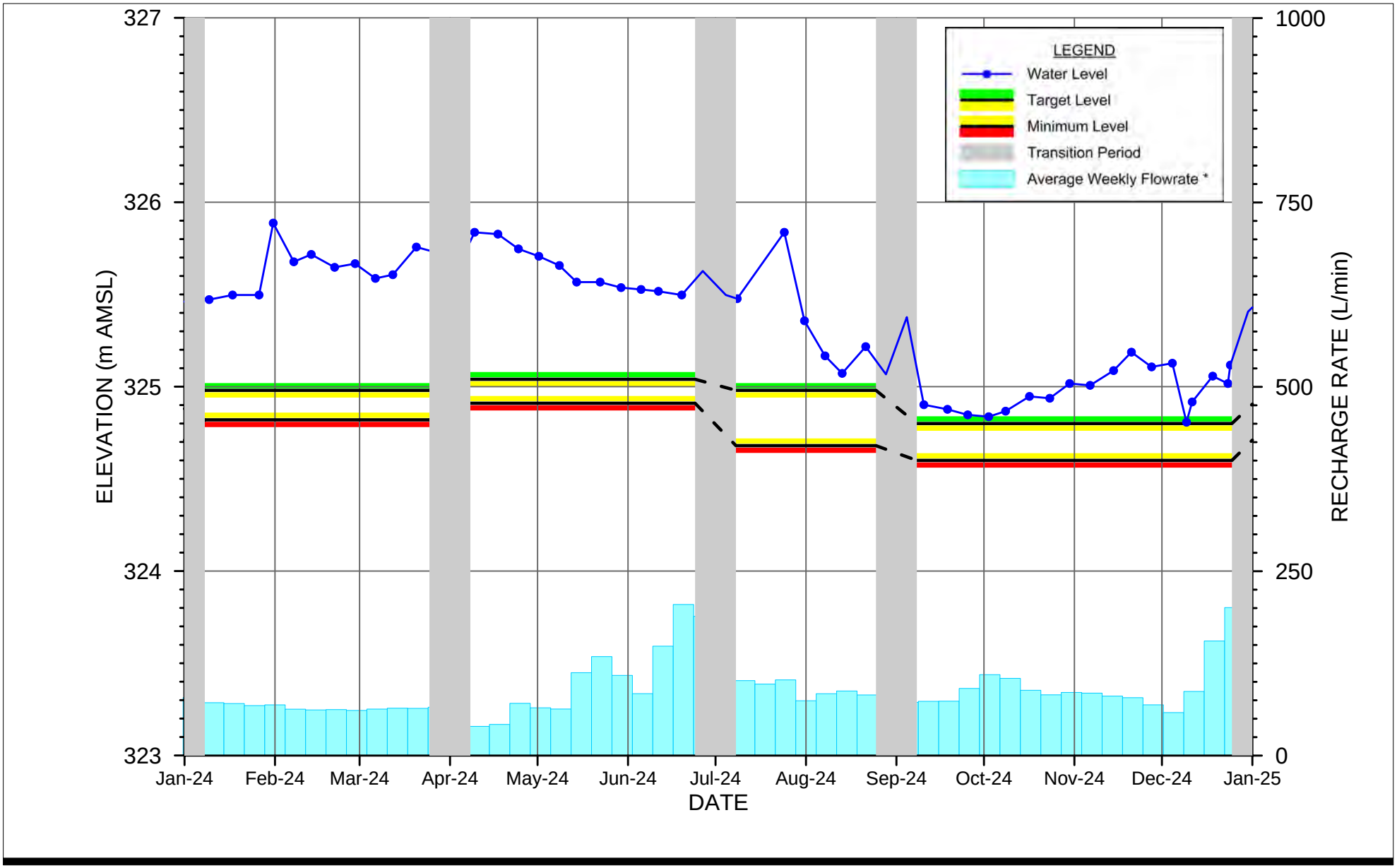
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW63-07
EAST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.23

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\3 EC Triggers (5.20-5.31)\OW63-07.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW304A-10, RW305A-10, RW307A-10, RW307B-15, and RW307D-17.

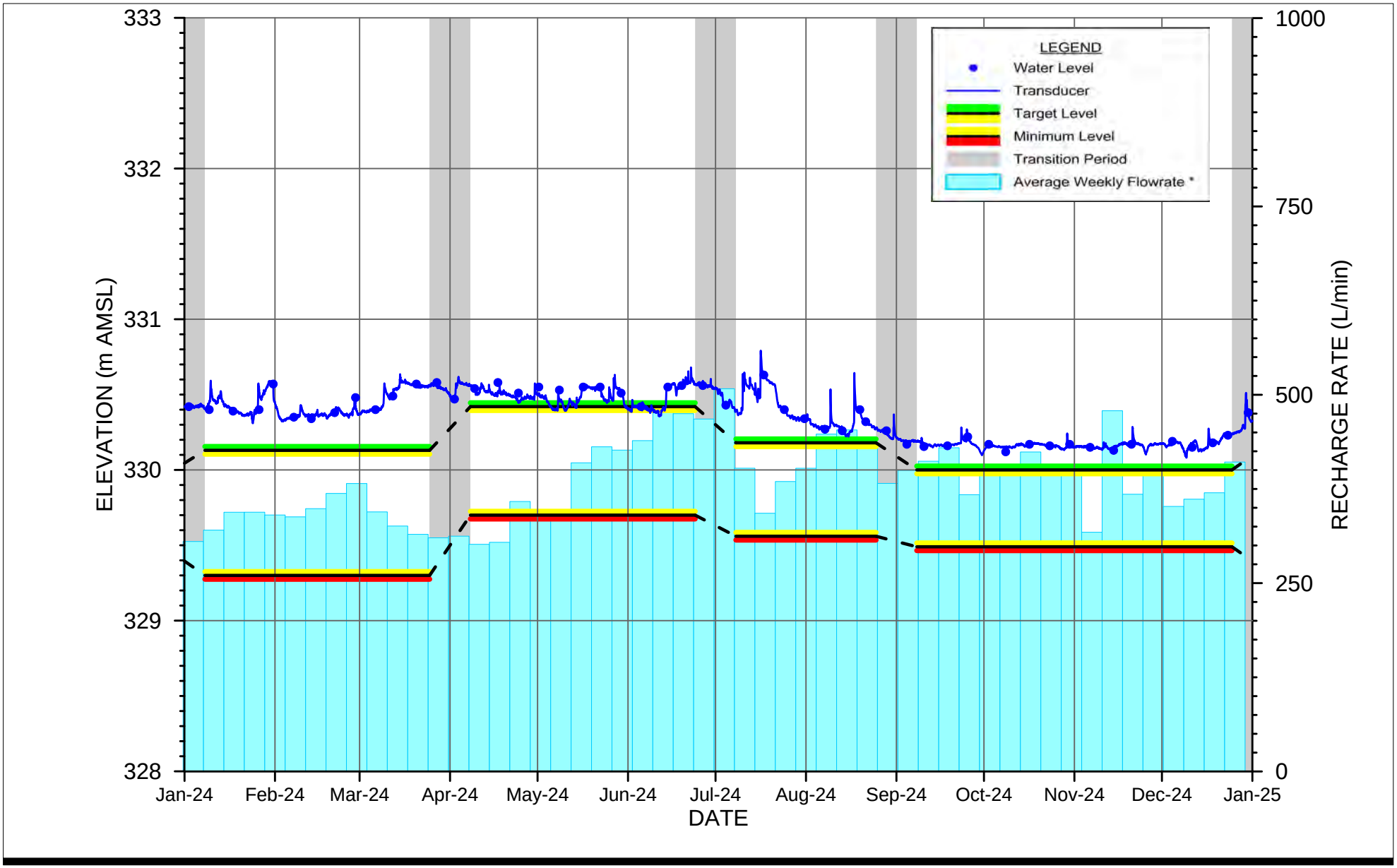
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW64-07
EAST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.24

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\3 EC Triggers (5.20-5.31)\OW64-07.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW305A-10, RW307A-10, RW308A-10, and RW308B-10.

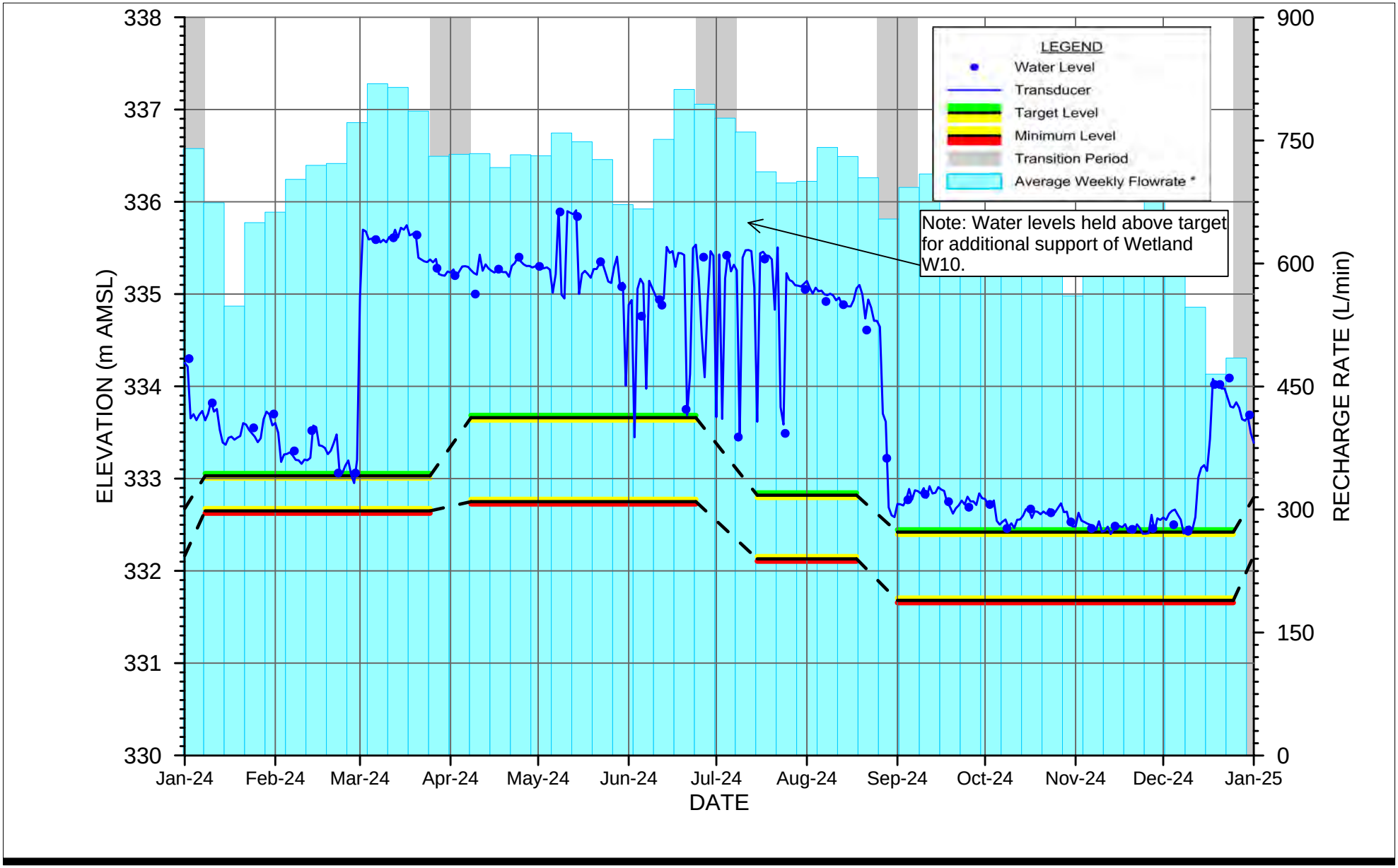
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - BH48
EAST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.25

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\3 EC Triggers (5.20-5.31)\BH48.grf
Plot Date: March 12 2025 9:03 AM



* Includes flow from RW308B-10, RW308E-20, RW308F-20, RW309A-10, RW309B-10, and RW309C-17.

GHD

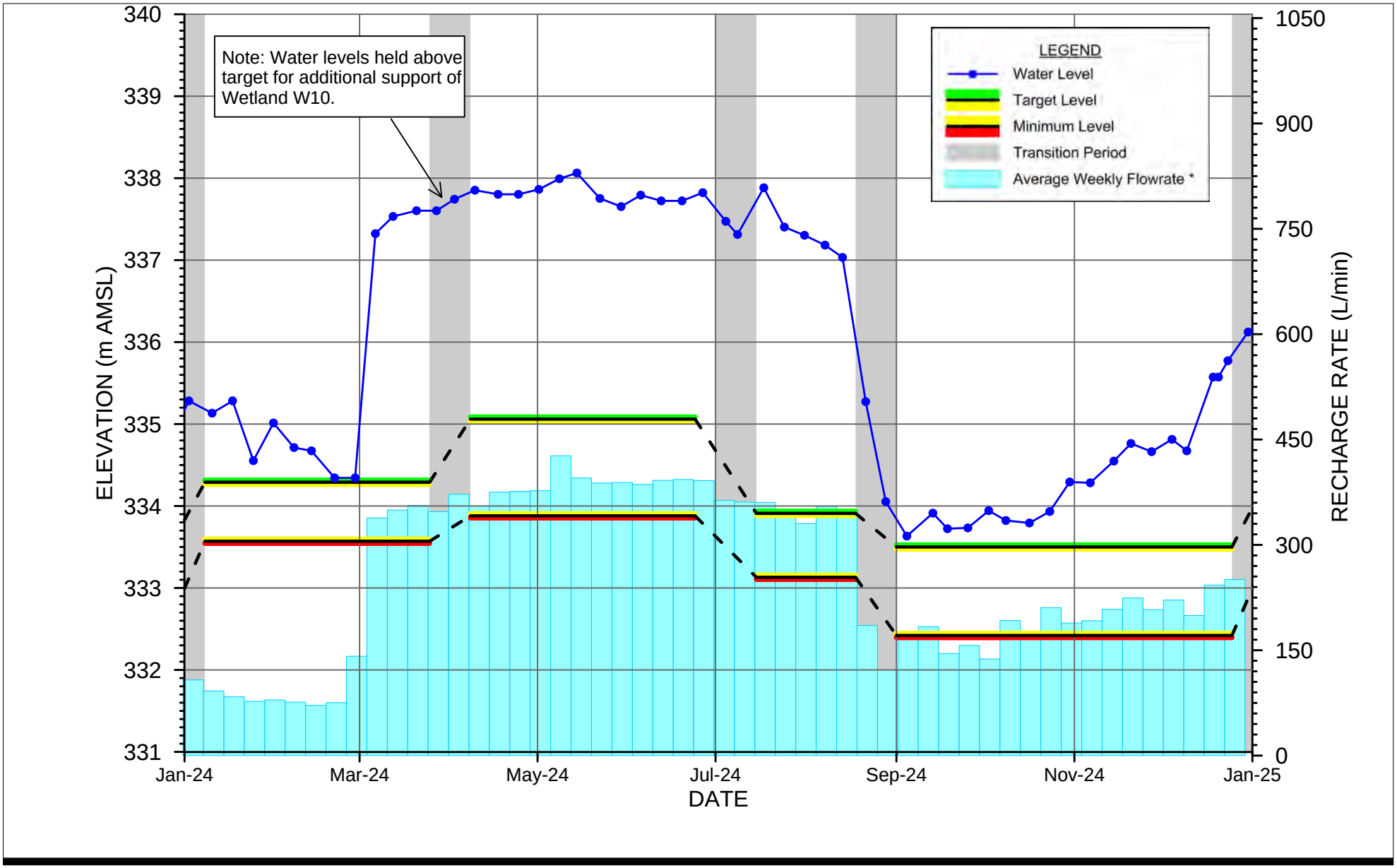
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **010978**
Date **March 26, 2025**

TRIGGER WELL - OW65-07
EAST CELL EXTENSION

FIGURE 5.26

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\3 EC Triggers (5.20-5.31)\OW65-07.grf
Plot Date: March 26 2025 11:03 AM



* Includes flow from RW309B-10, RW310A-10, RW310B-17, and RW310C-17.

GHD

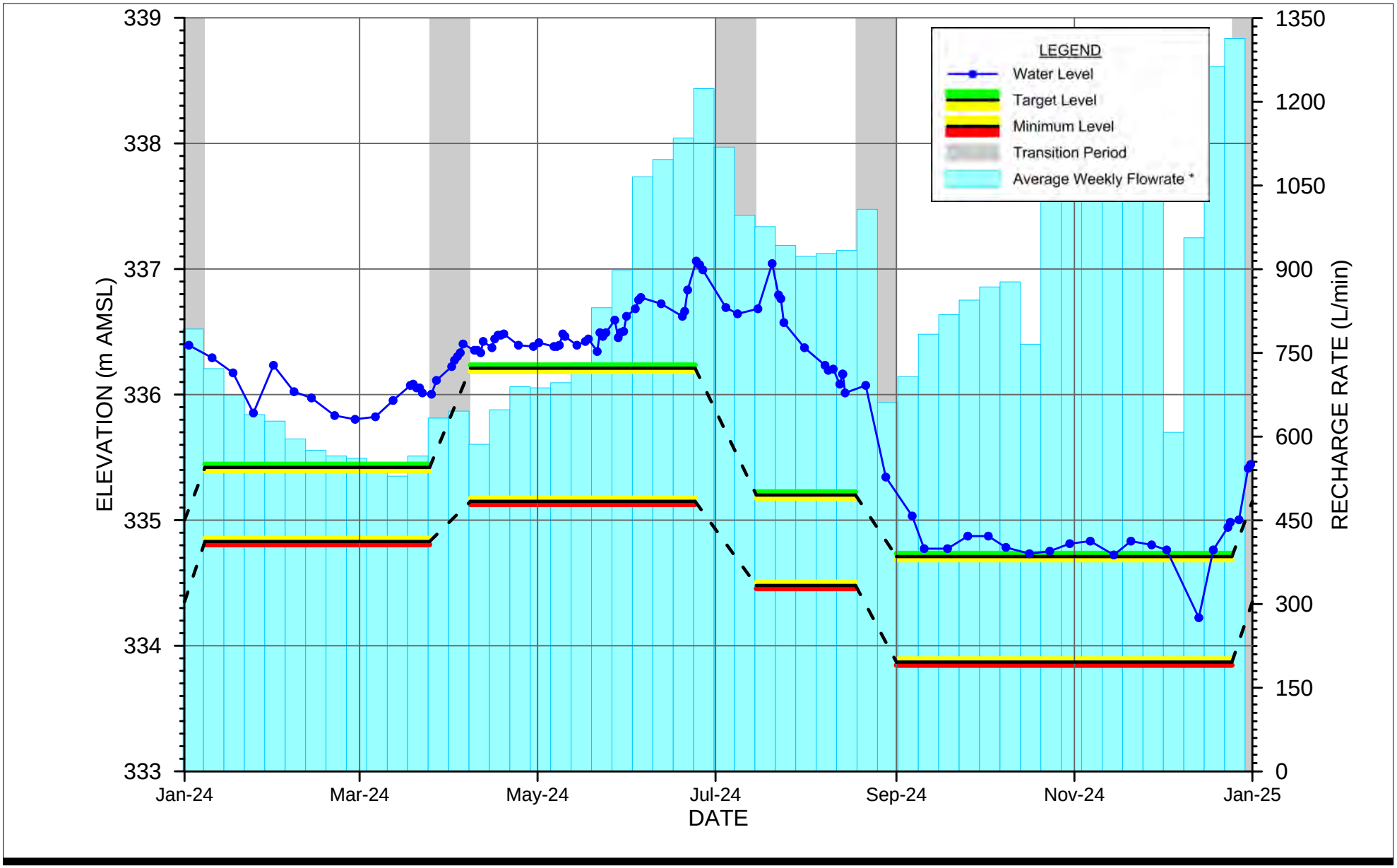
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW66-07
EAST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.27

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\3 EC Triggers (5.20-5.31)\OW66-07.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW311A-10, RW311B-18, RW311C-17, RW311D-18, RW311F-17, RW311G-17, RW311K-17, and RW312A-10.

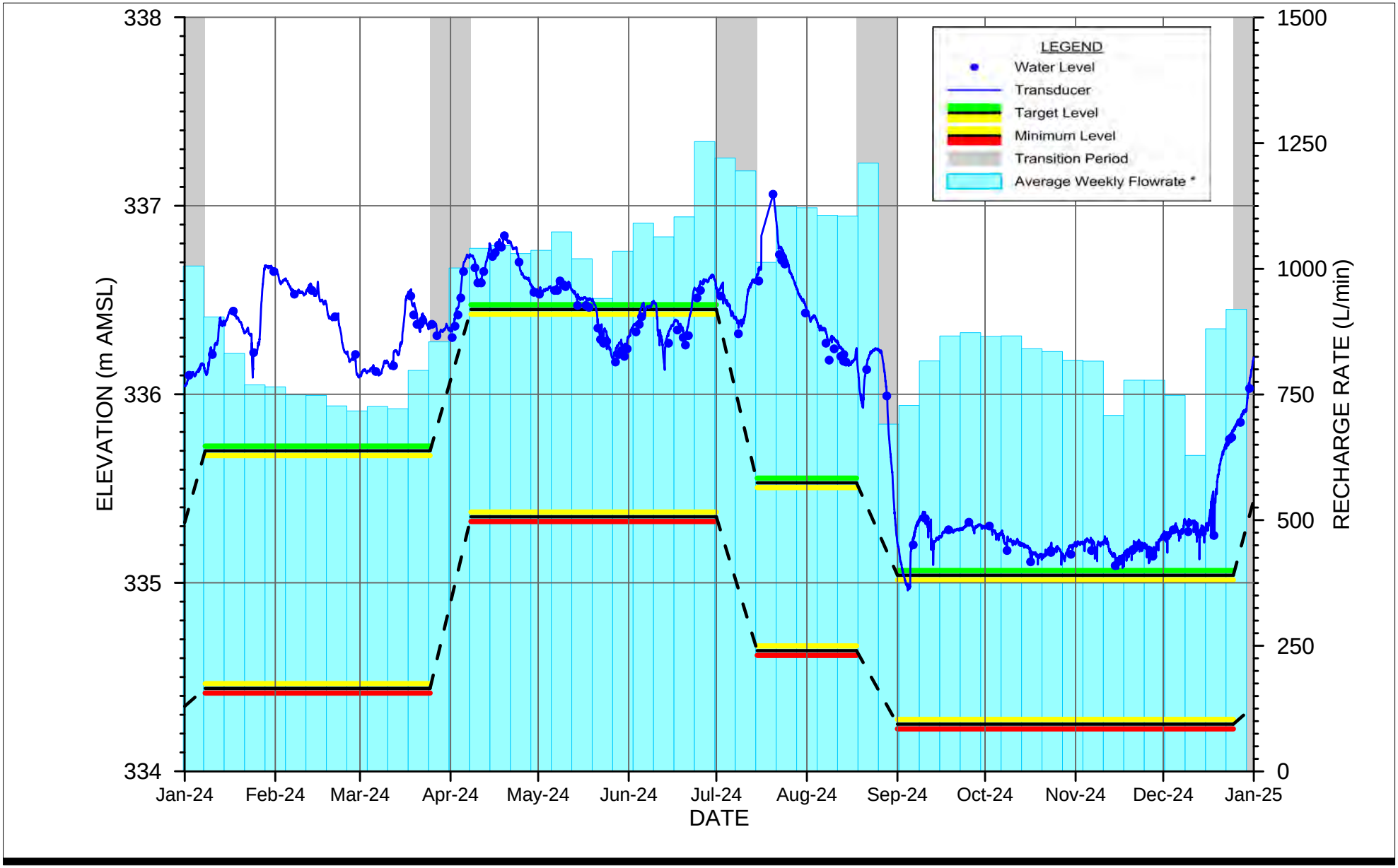
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW52-07
EAST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.28

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\3 EC Triggers (5.20-5.31)\OW52-07.grf
Plot Date: March 12 2025 9:03 AM



* Includes flow from RW312A-10, RW312C-17, RW312D-17, RW312E-17, RW312F-18, RW312I-17, RW313A-10, RW313B-14, RW313C-17, RW313D-17, RW313F-18, RW313G-18, RW313H-19, RW313I-19, and RW314C-17.

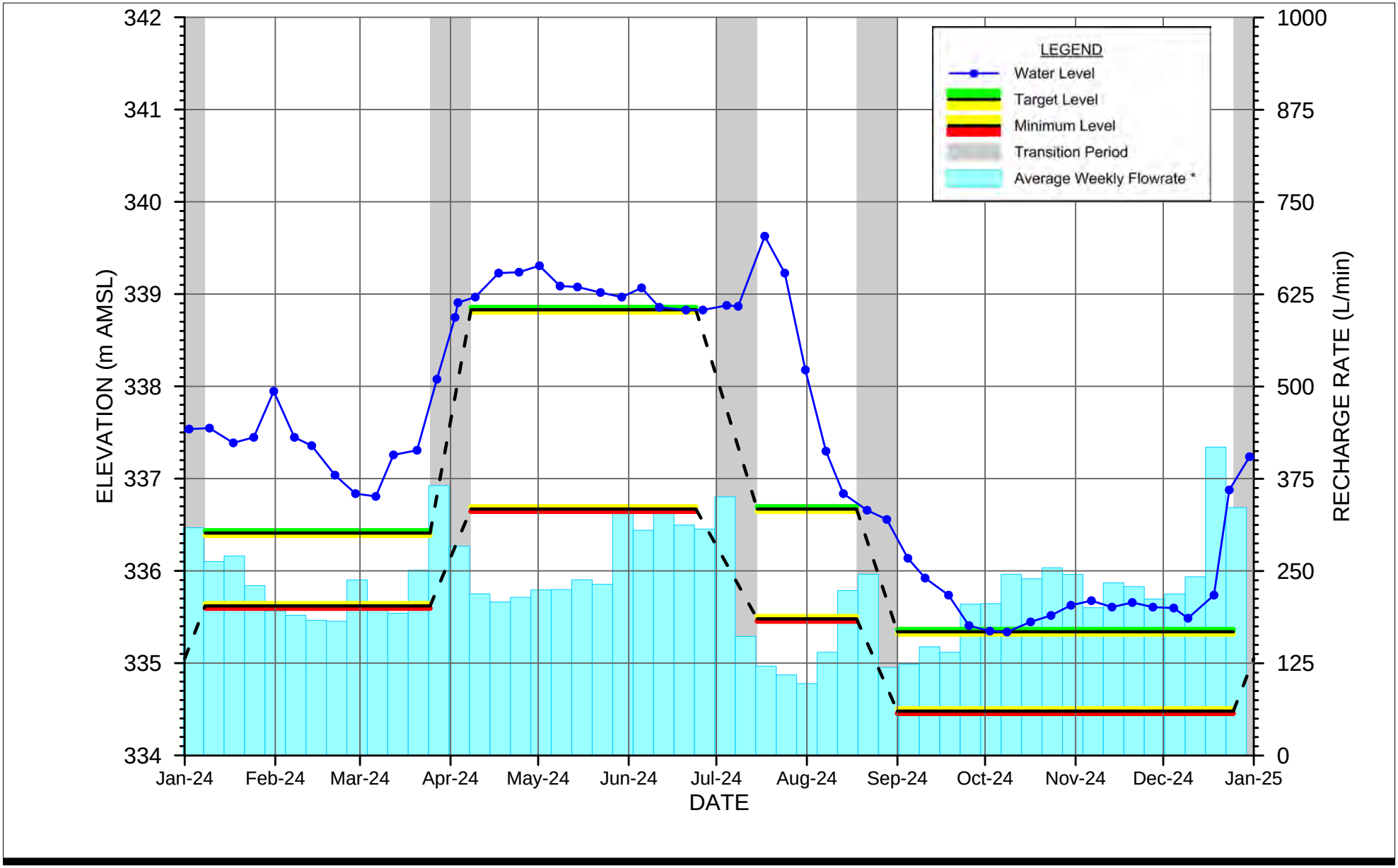
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW5-80
EAST CELL EXTENSION

Project No. **010978**
Date **March 26, 2025**

FIGURE 5.29

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\3 EC Triggers (5.20-5.31)\OW5-80.grf
Plot Date: March 26 2025 12:03 PM



* Includes flow from RW316A-16, RW316C-11, RW316C1-15, RW316H-20, RW316I-20, RW317A-16, RW317C-14, RW317D-15, RW317D1-15, and RW318C-16.

GHD

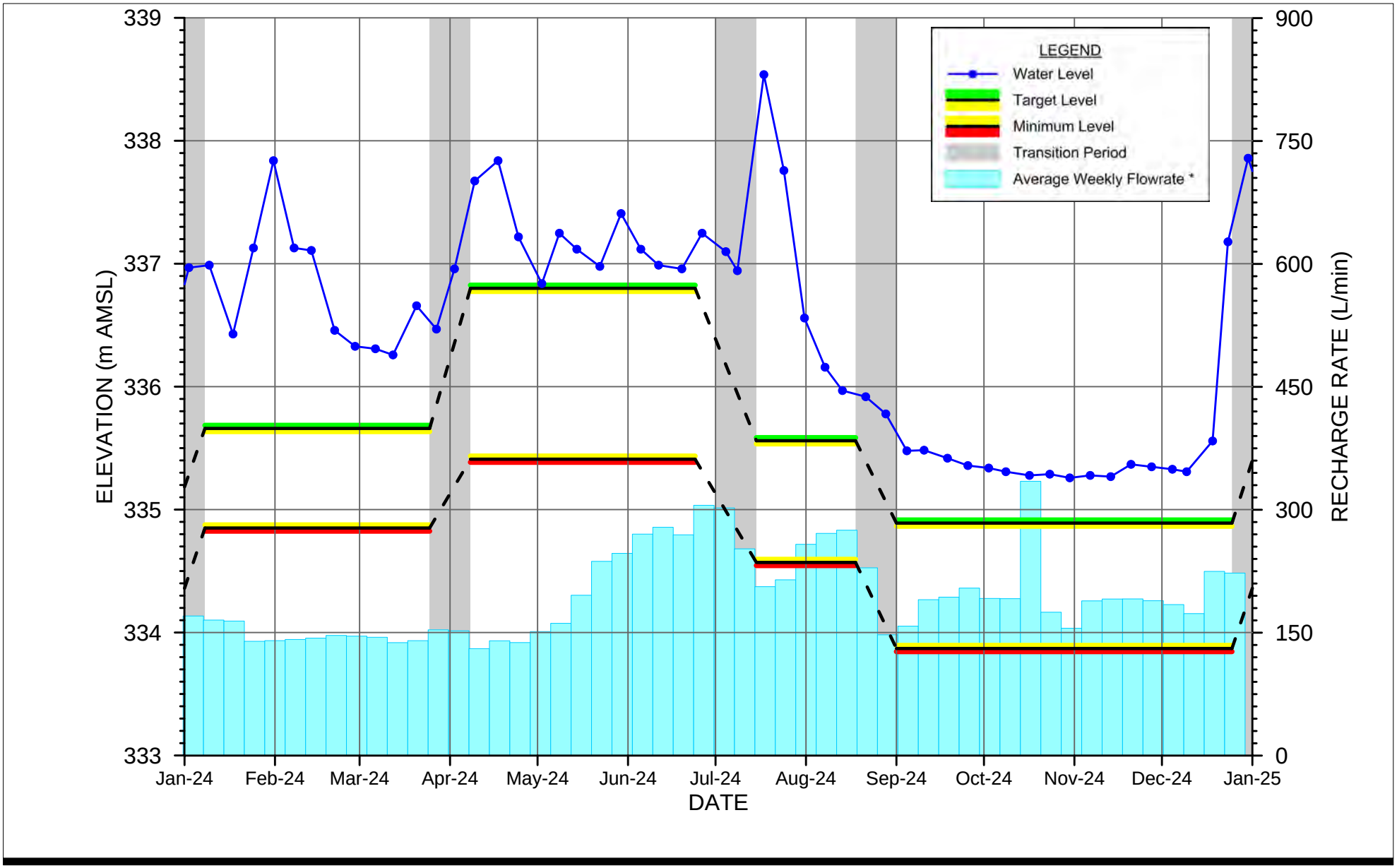
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

TRIGGER WELL - OW70-08
EAST CELL EXTENSION

Project No. **010978**
Date **February 04, 2025**

FIGURE 5.30

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\3 EC Triggers (5.20-5.31)\OW70-08.grf
Plot Date: February 04 2025 5:02 PM



* Includes flow from RW314A-10, RW315A-10, RW316B-11, RW316B-14, and RW316D-14.

GHD

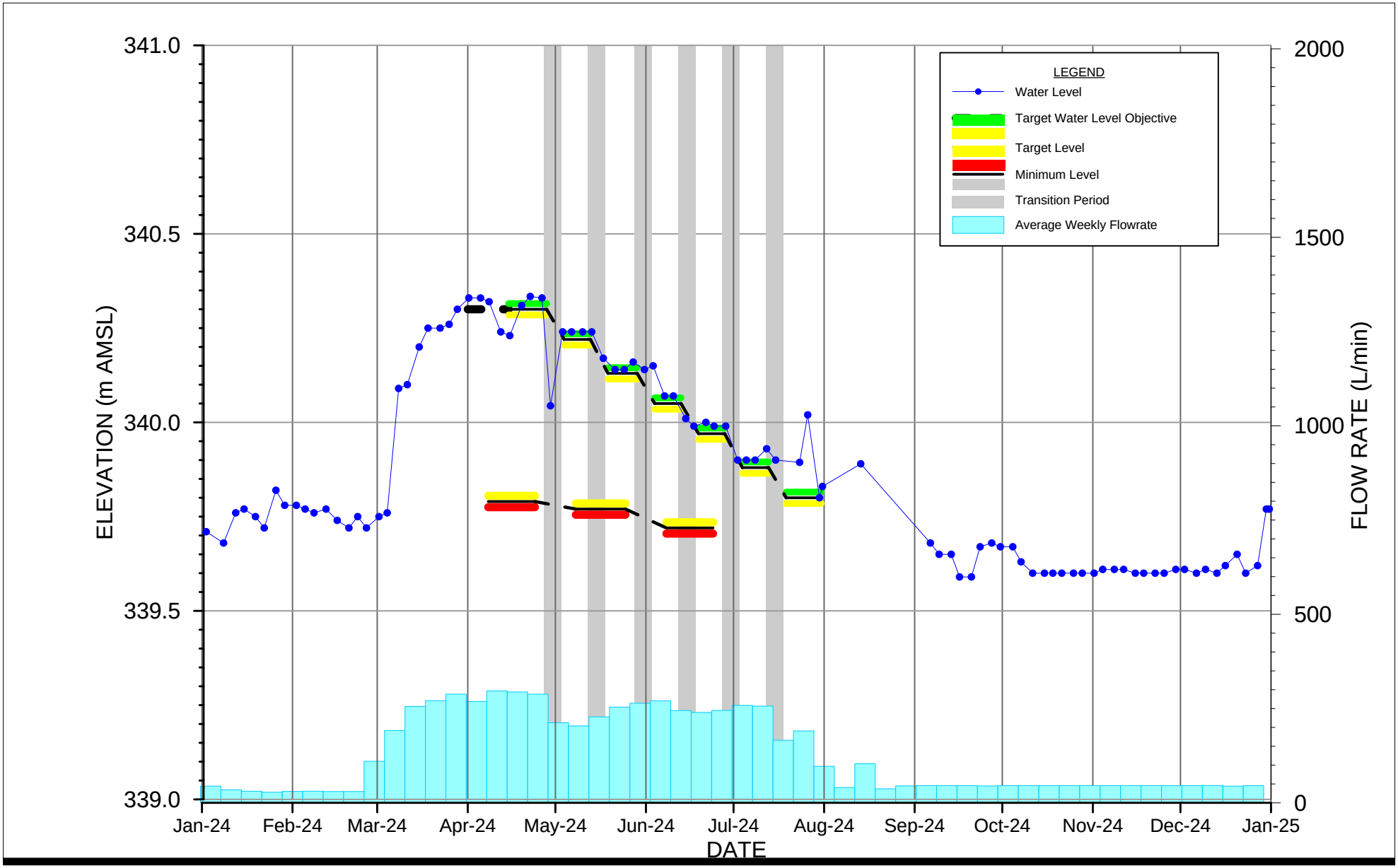
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **010978**
Date **February 04, 2025**

TRIGGER WELL - OW71-08
EAST CELL EXTENSION

FIGURE 5.31

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\3 EC Triggers (5.20-5.31)\OW71-08.grf
Plot Date: February 04 2025 5:02 PM



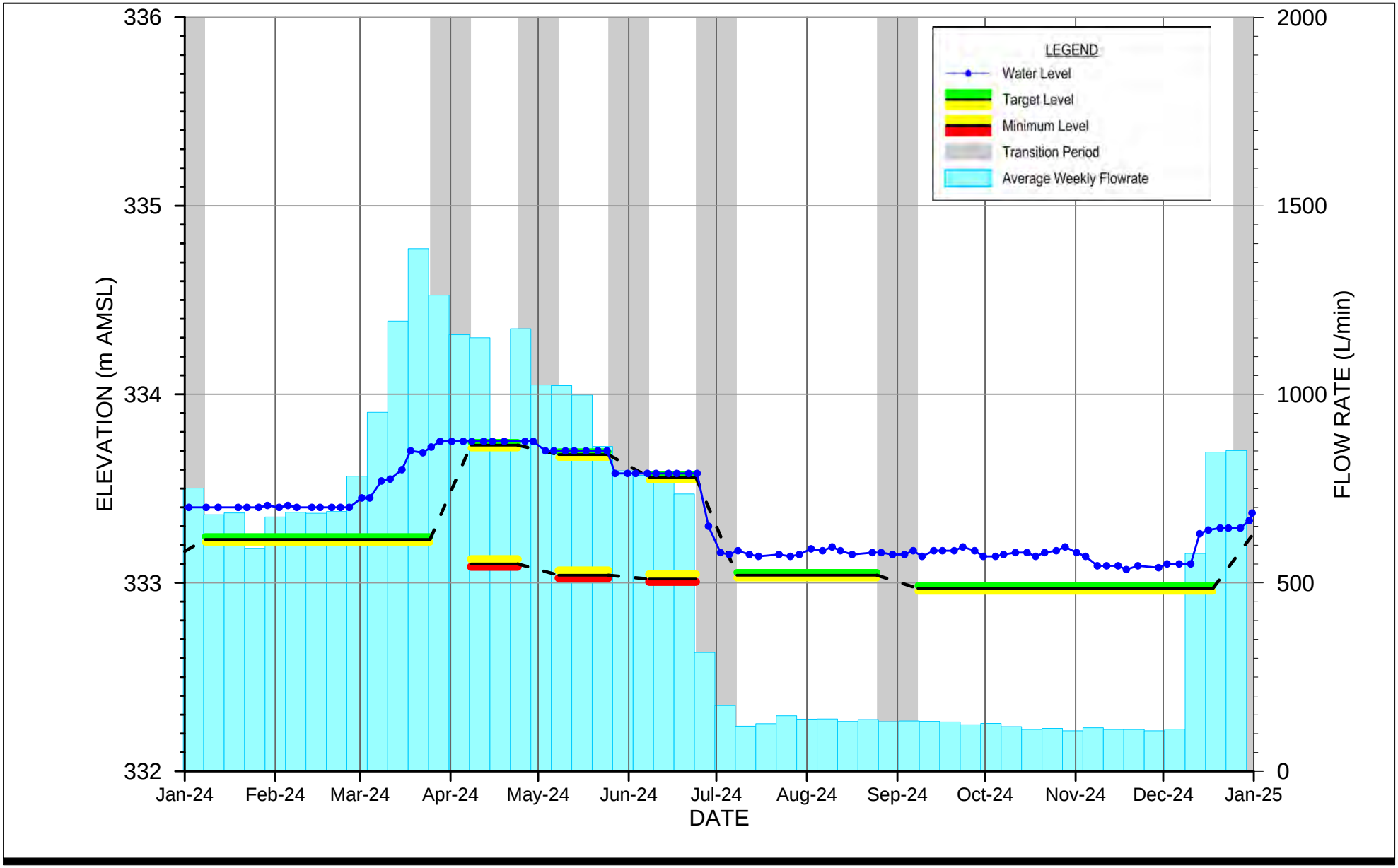
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **010978**
Date **February 04, 2025**

V2 WETLAND
EAST CELL EXTENSION

FIGURE 5.32

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\4 Wetlands (5.32-5.34)\V2 Wetland.grf
Plot Date: March 31 2025 8:03 AM



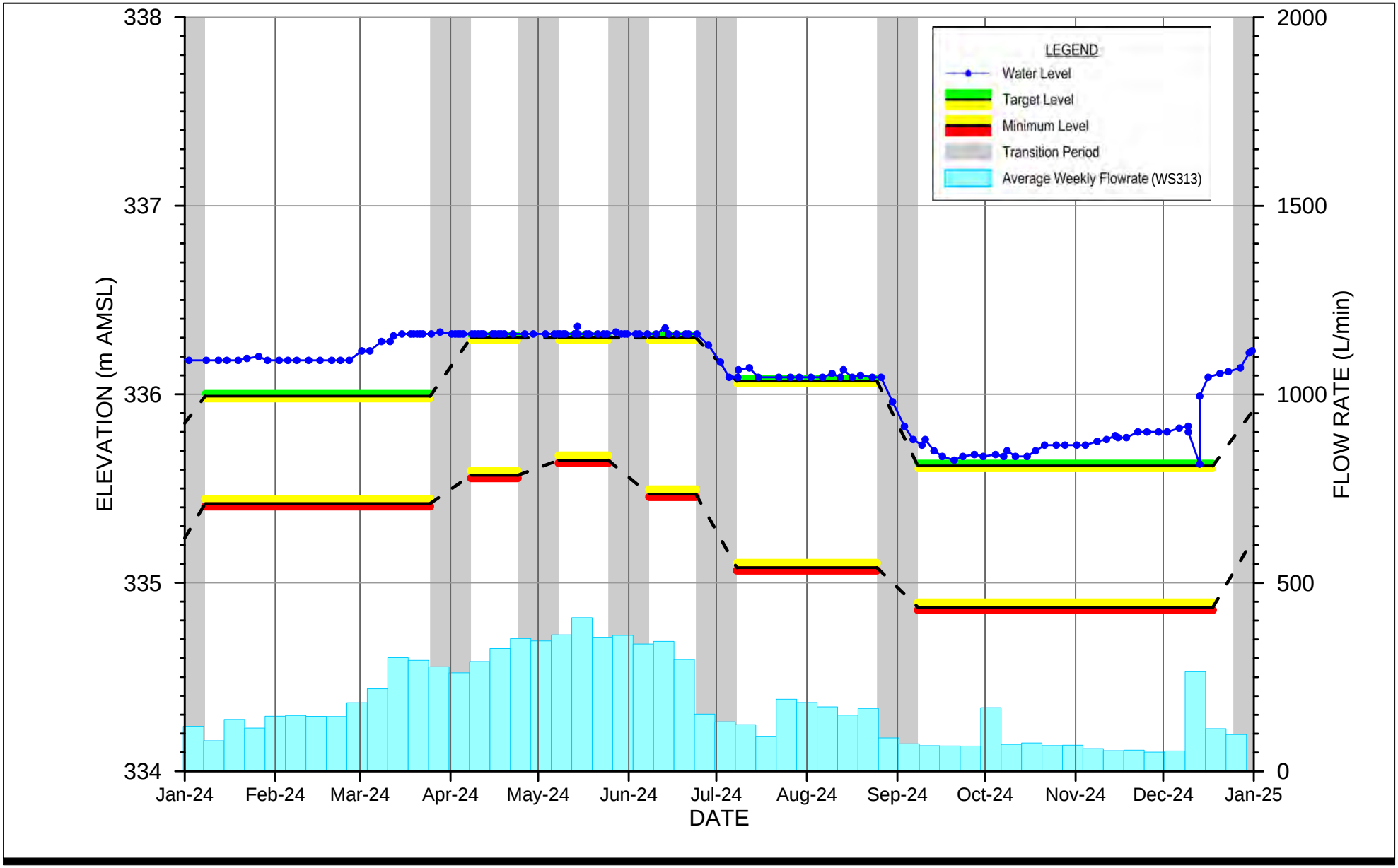
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **010978**
Date **February 04, 2025**

W7 WETLAND
EAST CELL EXTENSION

FIGURE 5.33

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\4 Wetlands (5.32-5.34)\W7 Wetland.grf
Plot Date: February 04 2025 5:02 PM



GHD

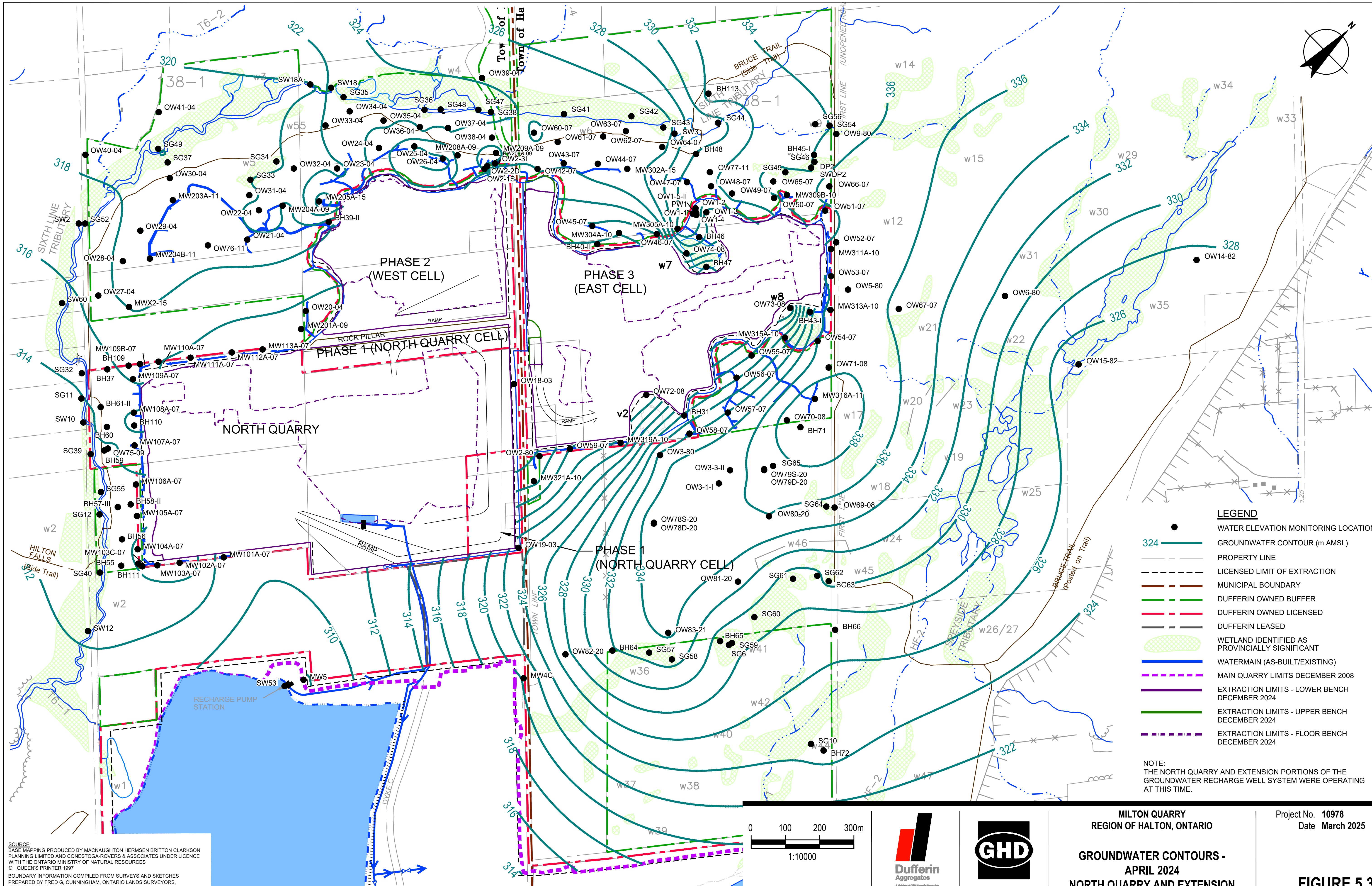
DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **010978**
Date **February 04, 2025**

W8 WETLAND
EAST CELL EXTENSION

FIGURE 5.34

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\4 Wetlands (5.32-5.34)\W8 Wetland.grf
Plot Date: March 12 2025 10:03 AM


PHASE 2
(WEST CELL)
PHASE 3
(EAST CELL)
PHASE 1 (NORTH QUARRY CELL)
NORTH QUARRY
PHASE 1
(NORTH QUARRY CELL)
ROCK PILLAR
RAMP
RECHARGE PUMP
STATION
SIXTH LINE TRIBUTARY
HILTON FALLS (Side Trail)
BRUCE TRAIL (Side Trail)
BRUCE TRAIL (Posted on Trail)
SPEYSIDE TRIBUTARY
LEGEND
WATER ELEVATION MONITORING LOCATION
324 GROUNDWATER CONTOUR (m AMSL)
PROPERTY LINE
LICENSED LIMIT OF EXTRACTION
MUNICIPAL BOUNDARY
DUFFERIN OWNED BUFFER
DUFFERIN OWNED LICENSED
DUFFERIN LEASED
WETLAND IDENTIFIED AS PROVINCIALLY SIGNIFICANT
WATERMAIN (AS-BUILT/EXISTING)
MAIN QUARRY LIMITS DECEMBER 2008
EXTRACTION LIMITS - LOWER BENCH DECEMBER 2024
EXTRACTION LIMITS - UPPER BENCH DECEMBER 2024
EXTRACTION LIMITS - FLOOR BENCH DECEMBER 2024
NOTE:
THE NORTH QUARRY AND EXTENSION PORTIONS OF THE GROUNDWATER RECHARGE WELL SYSTEM WERE OPERATING AT THIS TIME.
0 100 200 300m
1:10000
Dufferin Aggregates
GHD
MILTON QUARRY
REGION OF HALTON, ONTARIO
GROUNDWATER CONTOURS -
APRIL 2024
NORTH QUARRY AND EXTENSION
Project No. 10978
Date March 2025
FIGURE 5.35
SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES
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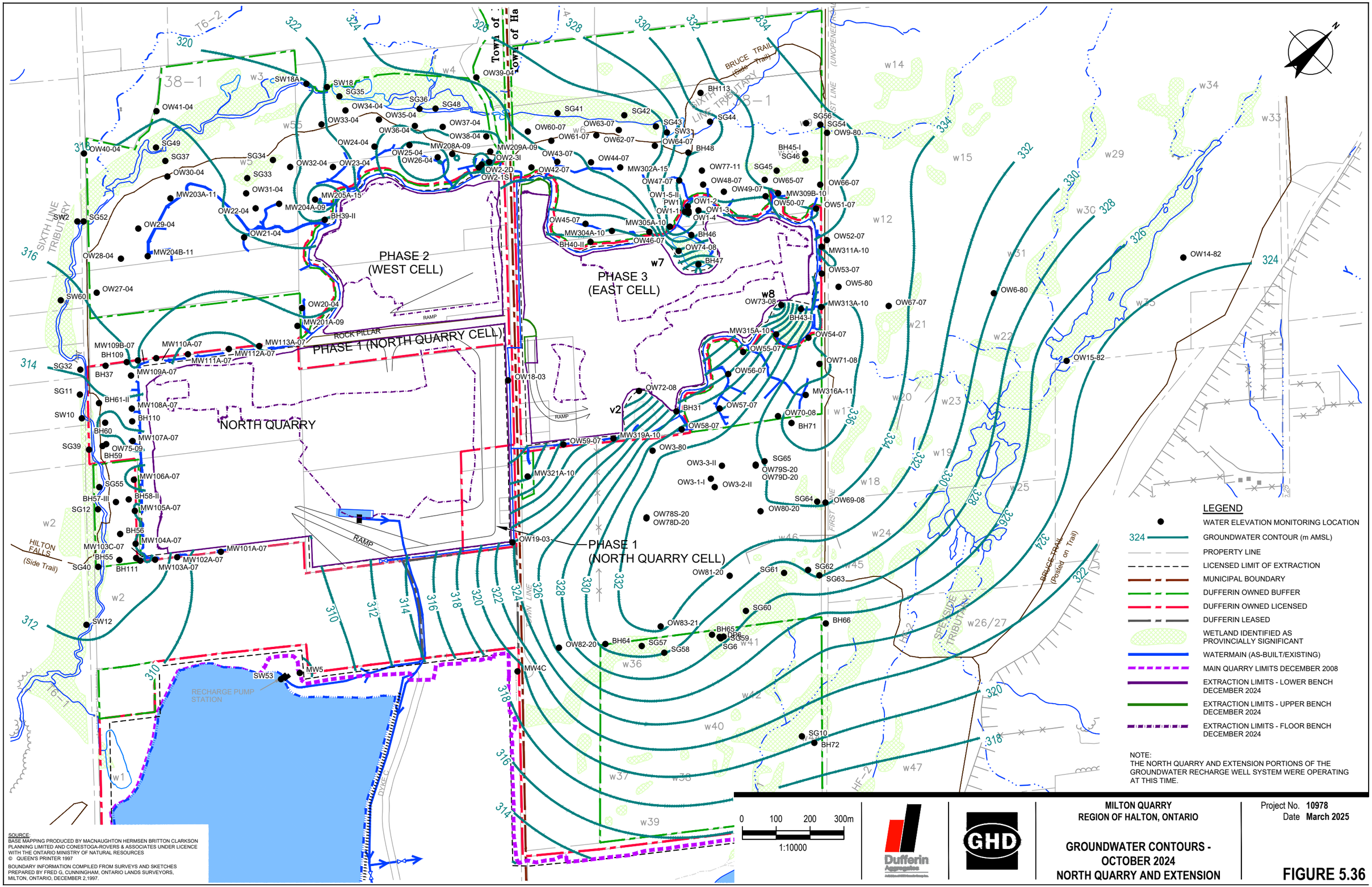

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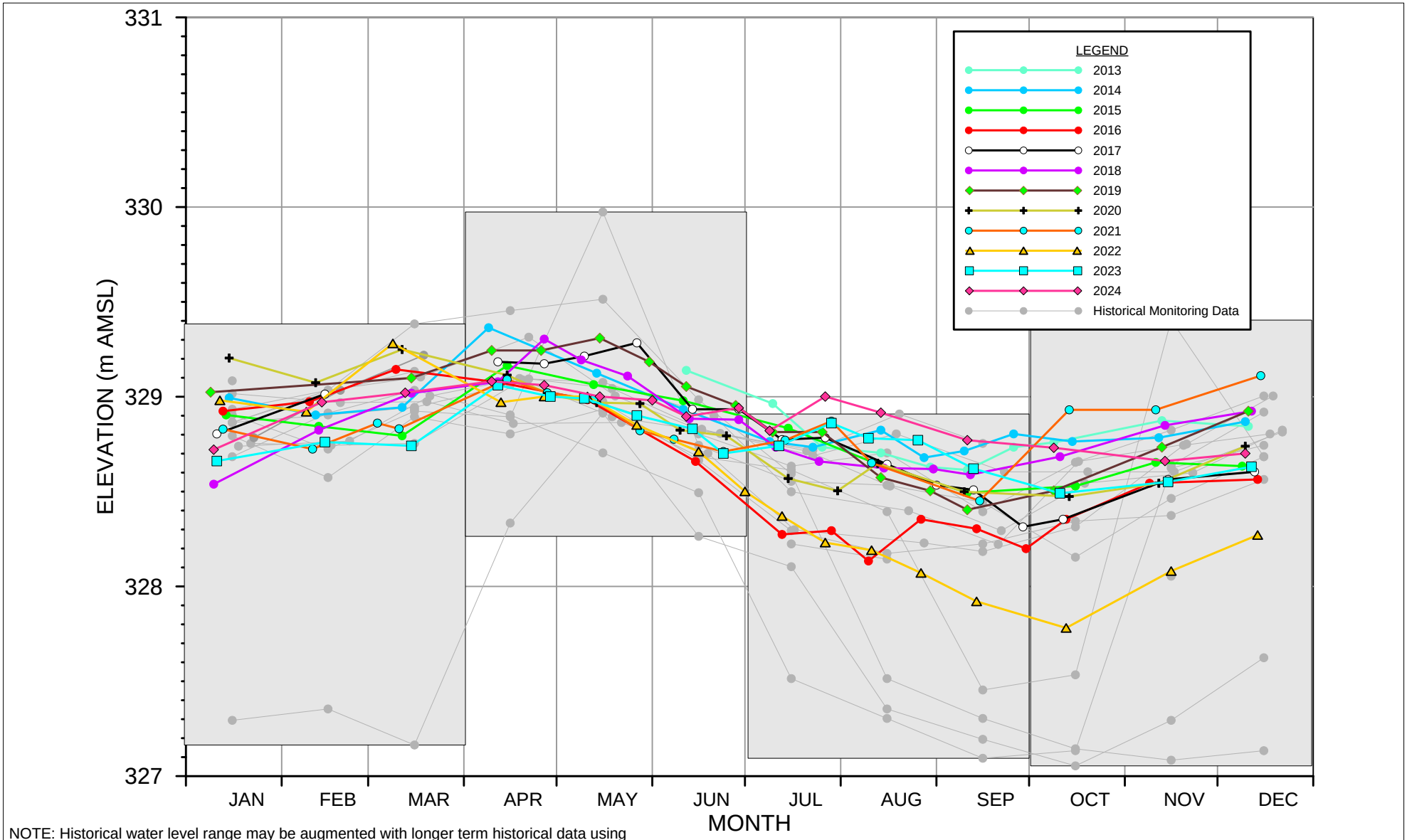

NOTE: Historical water level range may be augmented with longer term historical data using background wells and target setting approach consistent with AMP.

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **010978**
Date **February 04, 2025**

SUPPLEMENTAL MONITORING WELL GRAPH - BH65

FIGURE 5.37

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\6 Supp_Wells (5.37-5.39)\BH65.grf
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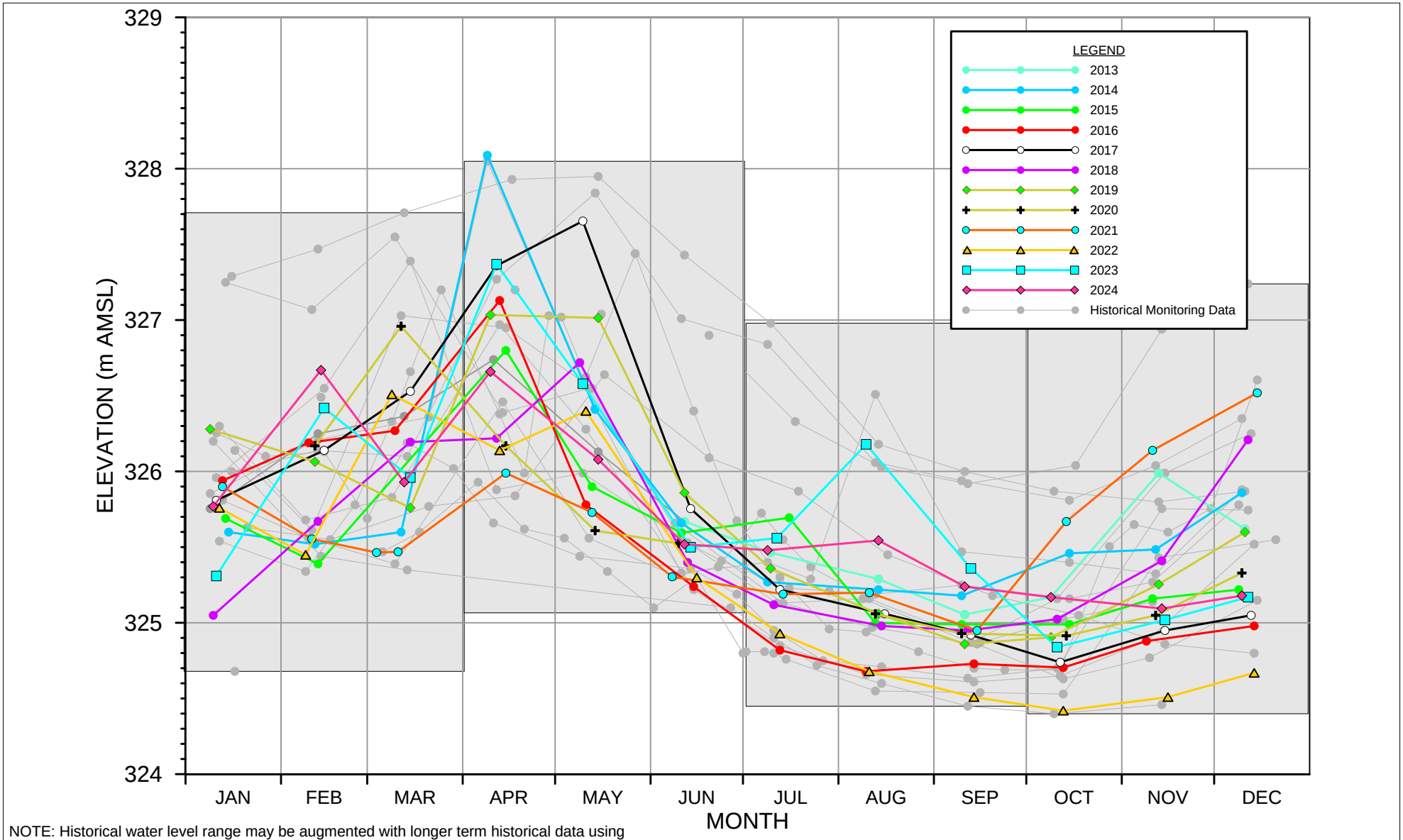

NOTE: Historical water level range may be augmented with longer term historical data using background wells and target setting approach consistent with AMP.

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **010978**
Date **February 04, 2025**

SUPPLEMENTAL MONITORING WELL GRAPH - BH66

FIGURE 5.38

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\6 Supp_Wells (5.37-5.39)\BH66.grf
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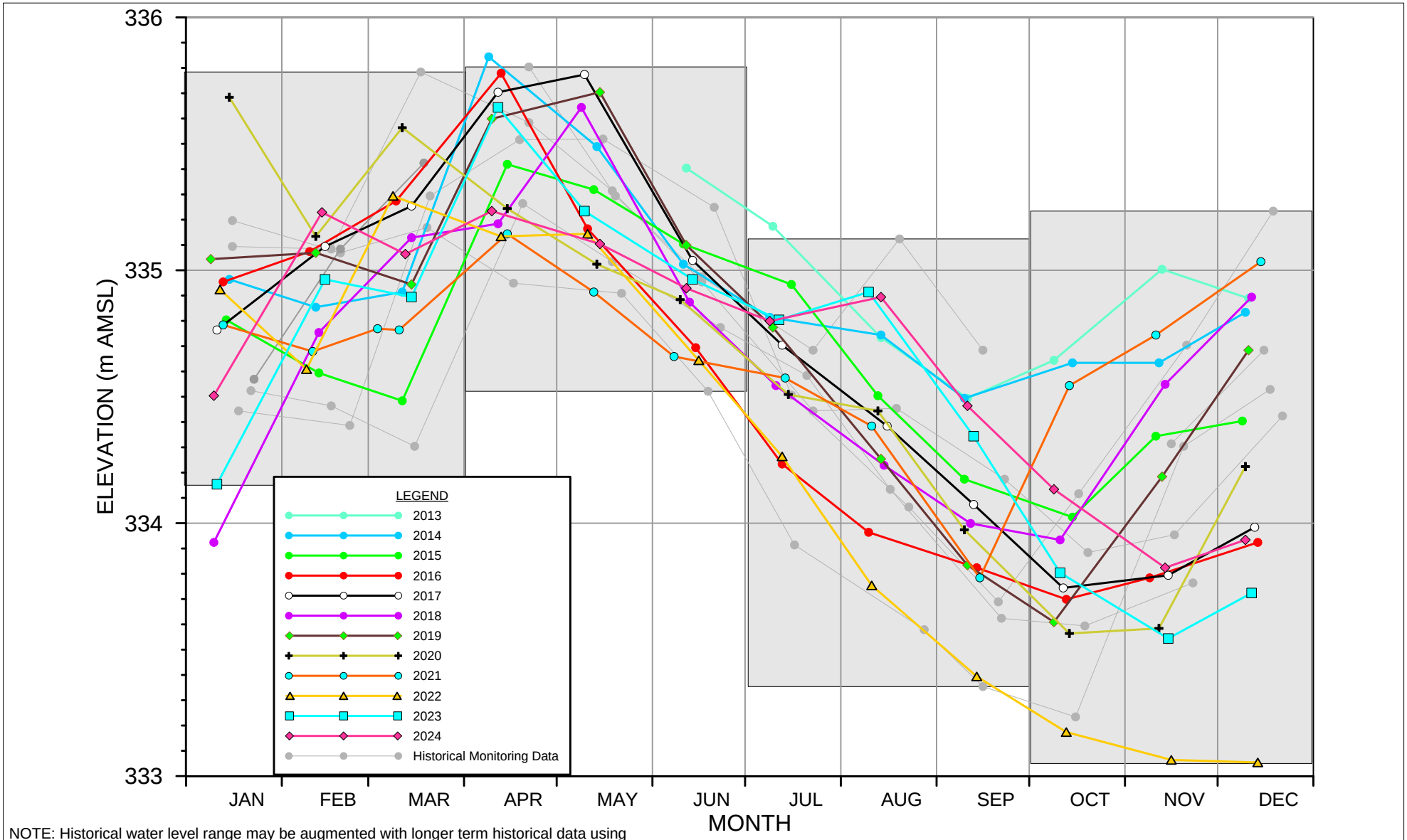

NOTE: Historical water level range may be augmented with longer term historical data using background wells and target setting approach consistent with AMP.

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **010978**
Date **February 04, 2025**

SUPPLEMENTAL MONITORING WELL GRAPH - OW69-08

FIGURE 5.39

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\6 Supp_Wells (5.37-5.39)\OW69-08.grf
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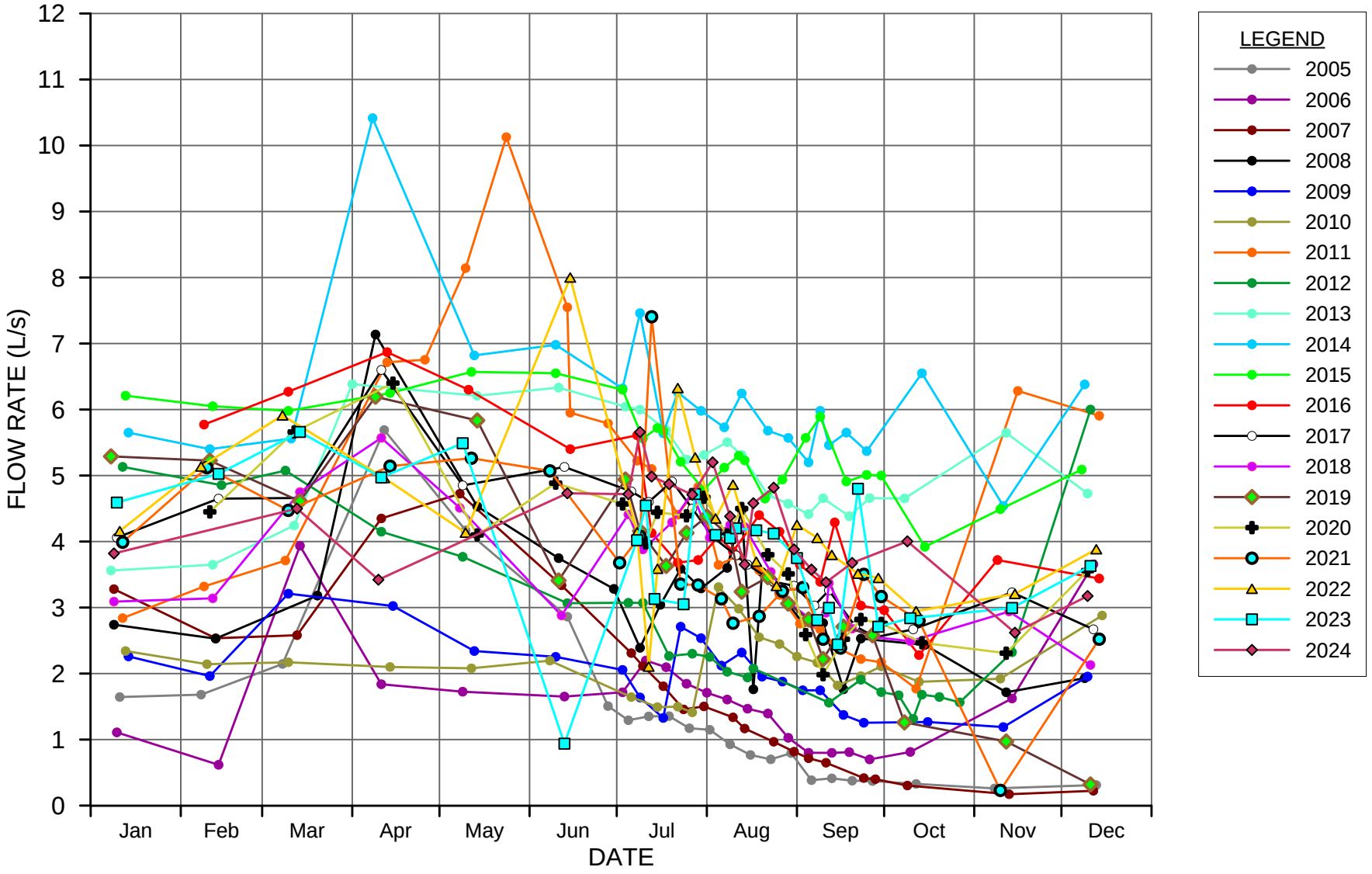

DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **010978**
Date **February 04, 2025**

FLOW DATA - SW4

FIGURE 5.40

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\7 Streamflow (5.40-5.41)\SW4.grf
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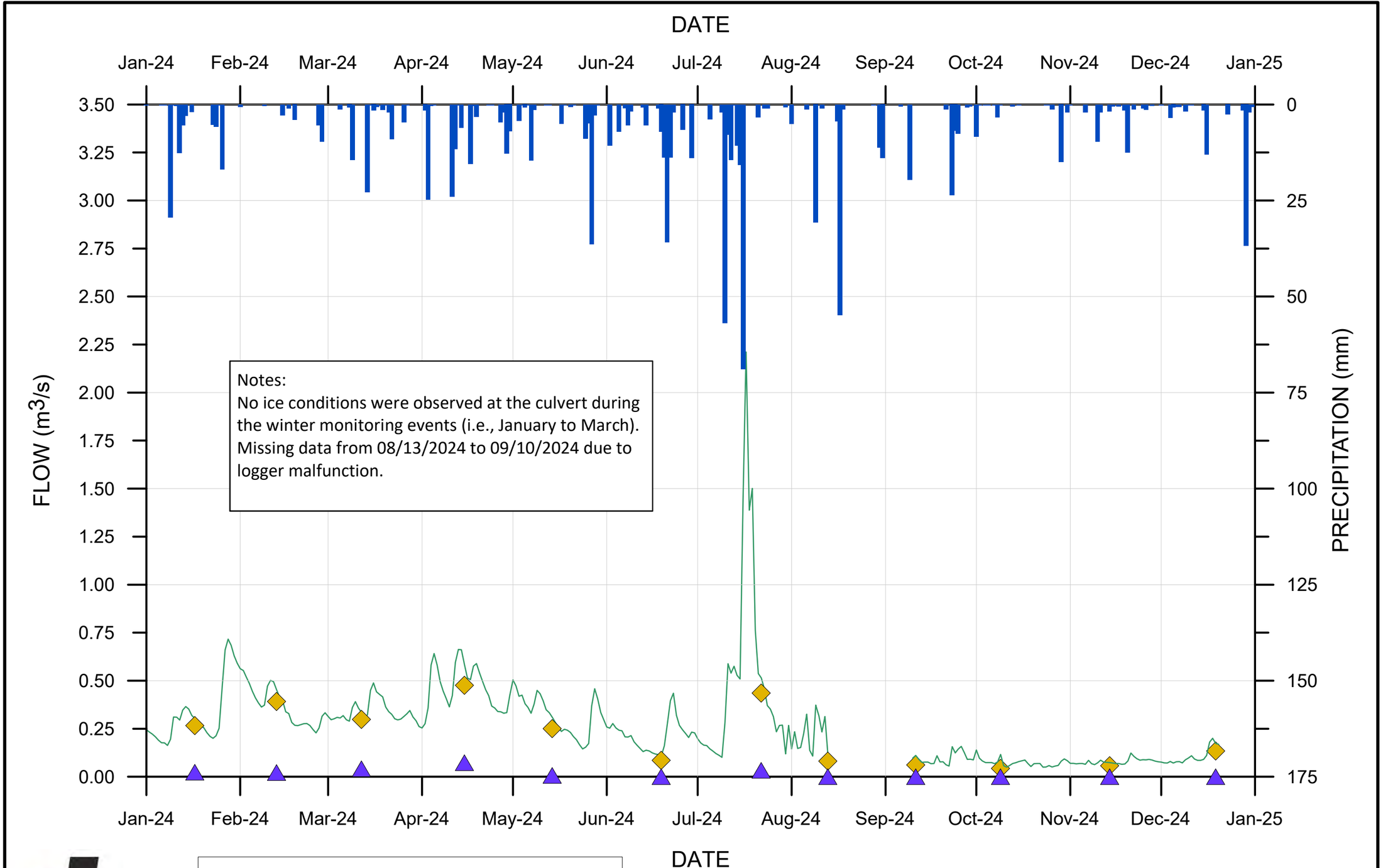
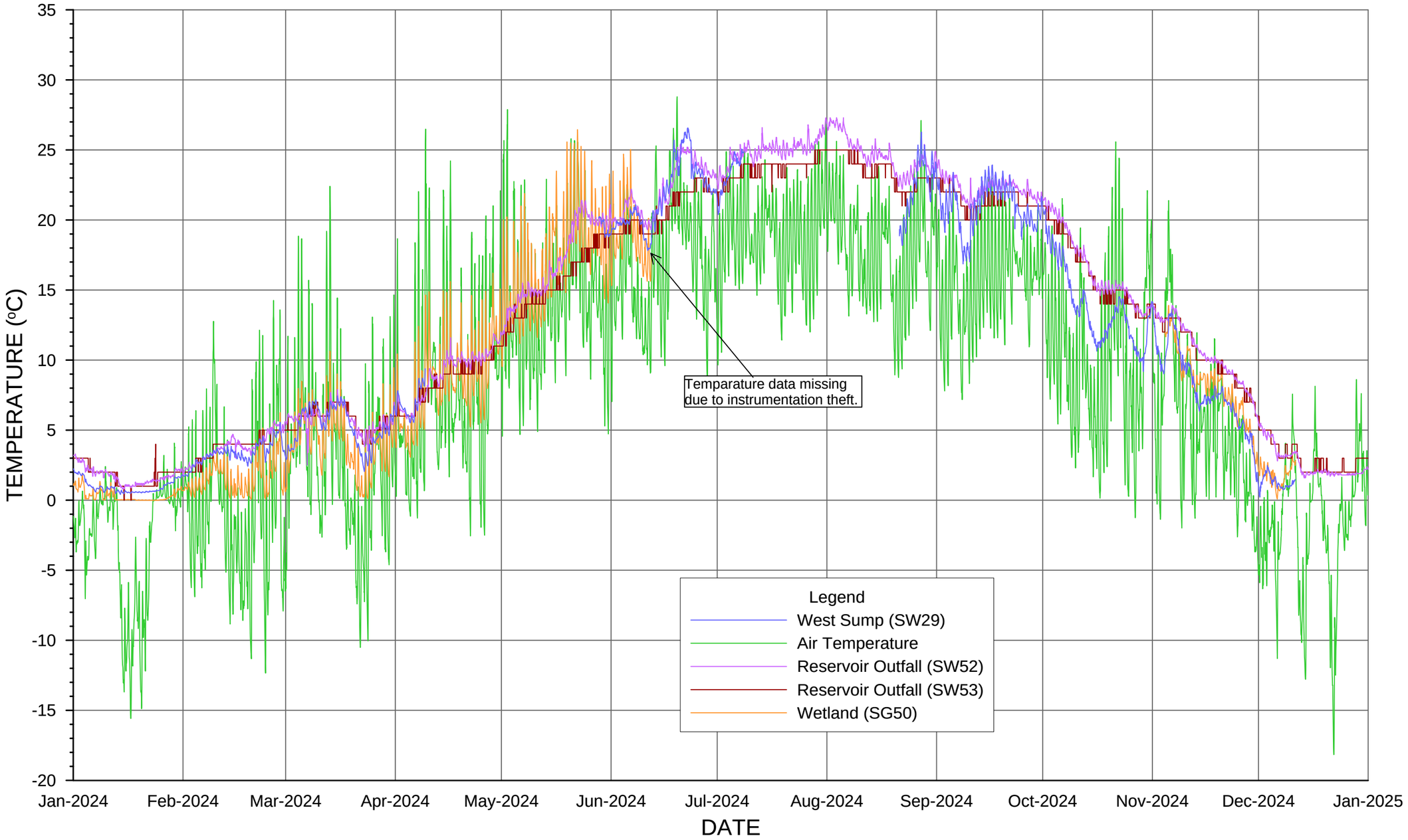


figure 5.41
STREAM FLOW DATA - SIXTH LINE TRIBUTARY (SW20)
MILTON QUARRY
Region of Halton, Ontario



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DUFFERIN AGGREGATES - MILTON QUARRY
REGION OF HALTON, ONTARIO

WATER TEMPERATURE
QUARRY DISCHARGE

Project No. **010978**
Date **February 04, 2025**

FIGURE 7.1

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\AMR\2024\Main RPT\8 Quarry Discharge Temp (7.1)\Figure 7.1.grf
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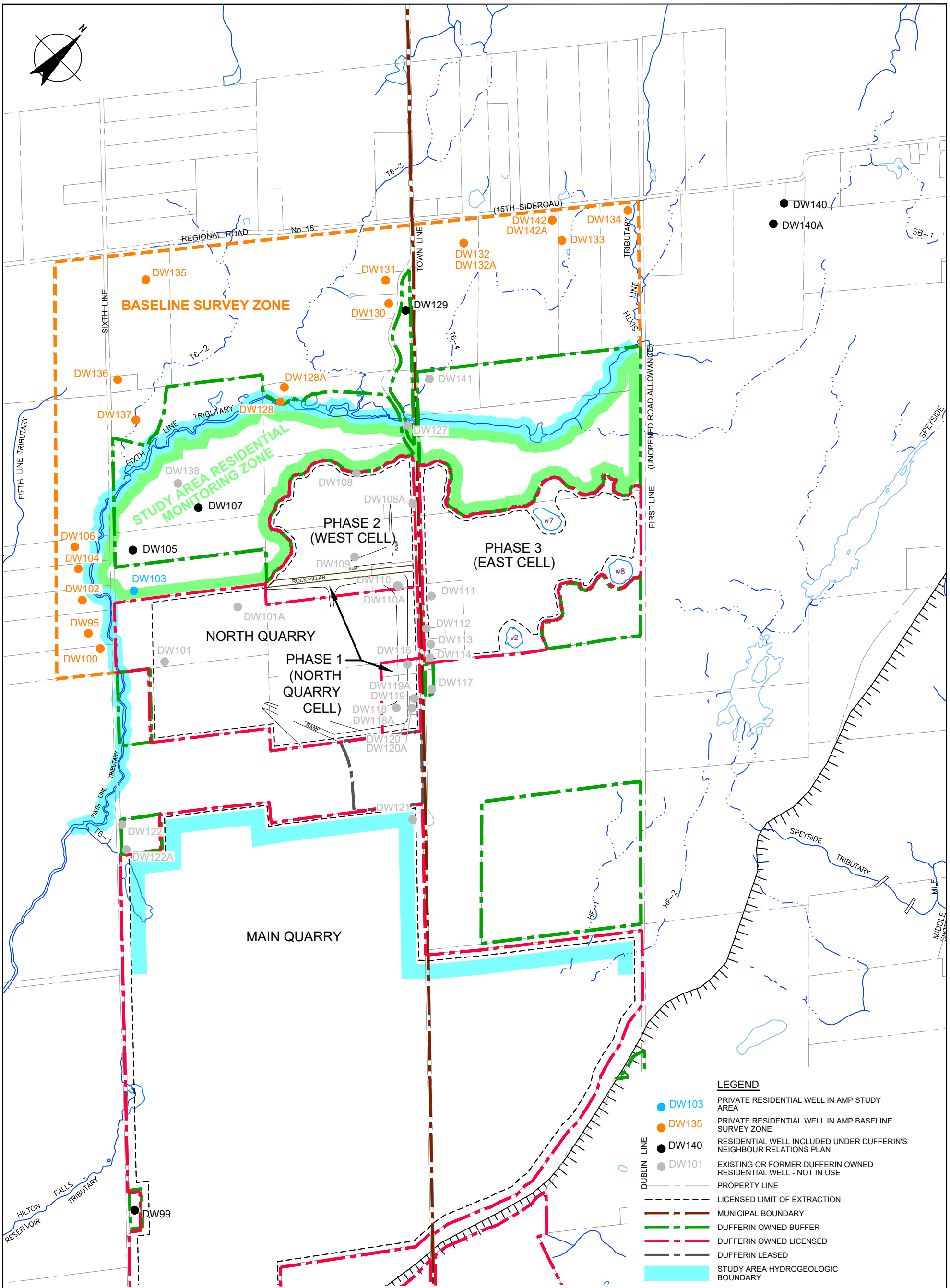

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MILTON QUARRY
REGION OF HALTON, ONTARIO

RESIDENTIAL WELL MONITORING LOCATIONS FOR MONITORING/BASELINE SURVEY

Project No. **10978**
Date **March 2025**

FIGURE 8.1

Filename: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Digital_Design\ACAD\Figures\RPT182\010978-GHD-00-00-RPT-EN-D106_WA-182.dwg
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Tables

Table 2.1

Summary of AMP Monitoring Program
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

AMP Section Reference	Description of Requirement	Minimum Frequency	Annual Monitoring Report Reference
Performance Monitoring/Response Program			
3.1	Water level monitoring at trigger wells	Monthly - Manual Measurements Daily - Automated Water Level Recorders at 5 wells	5.2, 5.3
3.1	Water level monitoring at trigger wells - After extraction proceeds below water table in adjacent phase	Bi-weekly - Manual Measurements	5.2, 5.3
3.1	Water level monitoring at trigger wells - When dewatering influence is observed at recharge alignment wells	Weekly - Manual Measurements	5.2, 5.3
3.1	Water level monitoring at select trigger wells - Recharge initiation/modification, response to extraction, extraction within 100m of recharge alignment	Day following extraction plus subsequent three business days (formerly daily for 2 weeks - Manual Measurements)	5.3.1
3.2	Water Quality monitoring of reservoir	Monthly	7.2
3.2	Water Quality monitoring of recharge pumping station	Monthly	7.3.1
3.2	Water Quality monitoring of remote location on recharge system	Monthly	7.3.2
3.2	Water Quality monitoring of inflows to reservoir	Monthly	7.4
Supplemental Monitoring Program			
4.1	Groundwater levels at selected/new groundwater monitoring well locations	Monthly	5.5
4.2	Groundwater levels at minimum of four background monitoring locations beyond the study area in the general vicinity of the Milton Quarry	Monthly - Manual Measurements Daily - Automated water level recorders	5, 5.5
4.3	Meteorological data	Milton Quarry Station - 6 Automated Readings per Day Georgetown Station - As Available Scotch Block Dam - As Available	4.0
4.4	Water levels in the reservoir at the pumping station	"Continuous" - With Automated Water Level Recorder	5.1.1
4.4	Water levels in the lake/wetland	Weekly	5.1.1
4.4	Totalized water flow at inflow/transfer/outflow points	Weekly	6.0

Table 2.1

Summary of AMP Monitoring Program
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

AMP Section Reference	Description of Requirement	Minimum Frequency	Annual Monitoring Report Reference
4.5	Surface water and groundwater levels at 5 wetland stations (W10, W15, W17, W21, and W41) plus new station at western wetland (W5)	Monthly (biweekly for April-July)	5.5
4.5	Photos at photographic stations in minimum of 6 wetlands (as above)	Seasonally (see Section 4.5 of AMP)	9.2
4.5	Jefferson Salamander egg mass and frog calling surveys in minimum of 6 wetlands (as above)	Seasonally (see Section 4.5 of AMP)	9.2
4.5	Wetland vegetation monitoring in 6 wetlands (as above)	Seasonally (see Section 4.5 of AMP)	9.2
4.5	Brook Trout redd survey in Sixth Line Tributary north of Extension Lands	Seasonally (see Section 4.5 of AMP)	9.1.1
4.5	Benthic monitoring at two stations upstream of Townline Road	Seasonally (see Section 4.5 of AMP)	9.1.2
4.5	Groundwater temperature monitoring at four trigger wells and associated creek locations and recharge system locations	Monthly - Mar, Apr, May, Jun, Oct, Nov, Dec Weekly - Jan, Feb, Jul, Aug, and Sep	7.5
4.5	Water discharge from former pumphouse (SW4)	Monthly - Jan, Feb, Mar, Apr, May, Jun, Oct, Nov, Dec Weekly - Jul, Aug, Sep	5.5.4
4.6	Residential wells in monitoring zone (Figure 4.1 of AMP)	Quarterly	8.0
On-Site Wetlands Monitoring Program			
3.1 and Appendix C	Surface water level monitoring at on-Site wetlands	Monthly	5.3.2
Appendix C	Surface water level monitoring at on-Site wetlands - Extraction proceeds below water table	Bi-weekly	5.3.2
Appendix C	Surface water level monitoring at on-Site wetlands - Water Levels below target level	Twice Weekly	5.3.2

Notes:

This monitoring program includes the monitoring required by the AMP for the pre-extraction and extraction period as extraction began in the Extension in May 2013.
There are no criteria/limits for the monitoring results during the pre-extraction period.
See Table 2.2 for monitoring requirements associated with the West Cell portion of the groundwater recharge well system.

Table 2.2

Summary of Non-AMP Monitoring Requirements
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Reference to Permit or Agreement						
ECA 3406-8U6RQ5; 6124-C42GL4	**PTTW 5256-BUUP62**	**LRIA AUR-45-03/04**	**CH Extension Quarry Agreement**	**Description of Requirement**	**Criterion/Limit**	**Annual Monitoring Report Reference**
7.4.1	NA	NA	2.14.2	Water quality monitoring of the Recharge Pond overflow effluent	TSS = 25 mg/L (arithmetic mean for month) Oil and Grease = 15 mg/L Un-ionized Ammonia = 0.02 mg/L pH = 6.0 to 9.5	NA
7.4.2	NA	NA	2.14.2	Water quality monitoring at upstream (SW10) and downstream (SW13) locations in the Sixth Line Tributary	Same as above	NA
7.4.4	NA	NA	2.14.2	Water quality monitoring of the discharge from the Recharge Pumping Station to the North Quarry Recharge System	Same as above	7.3.1
7.4.5	NA	F.4, F.5, F.6, F.7, and F.8	2.14.1(d)	Water quality monitoring from Main Quarry West Sump and/or Reservoir to the HFRT	Same as above	7.2
7.5	NA	NA	2.14.2	North Quarry Recharge Pond Overflow (flowrate and totalized flow)	NA	NA
NA	3.2	NA	2.14.2	North Quarry and Extension Dewatering (flowrate and totalized flow)	45,000 L/min; 64,800,000 L/day; 1,359,000,000 L/year [(1)]	6.2.1
9.4	3.2	NA	2.14.2	Recharge Pumping Station (flowrate and totalized flow)	36,000 L/min; 51,840,000 L/day; 18,921,600,000 L/year	6.2.2
7.5	3.7	NA	2.14.1(d)	Main Quarry Discharge, Interim Conditions (flowrate and totalized flow)	12,000 L/min; 17,280,000 L/Day; 4,464,000,000 L/year [(2)]	6.2.3
9.4	NA	NA	2.14.2	Individual Recharge Wells (flowrate and totalized flow)	NA	6.2.2
NA	4.3	NA	NA	Calculation of the overall Water Taking for the Milton Quarry	NA	6.3
NA	4.4	NA	2.14.1(b) and (c)	Water level monitoring at MW1, MW2, MW3, MW4, MW5, OW18-03, and OW19-03	NA	5.1.2, 5.5
NA	4.4	NA	2.14.2	Water level monitoring at BH37 and DW113A	NA	5.2.1, 5.5
8.1	4.4	NA	2.14.2	Water levels at Trigger Wells	NA	5.2.1, 5.3.1
8.1	4.4	NA	2.14.2	Water levels at Recharge Monitoring Wells	NA	5.2.2, 5.3.3
NA	4.4	NA	2.14.1(e)	Water levels at Background Monitoring Wells	NA	5, 5.5

Table 2.2

Summary of Non-AMP Monitoring Requirements
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Reference to Permit or Agreement						
ECA 3406-8U6RQ5; 6124-C42GL4	**PTTW 5256-BUUP62**	**LRIA AUR-45-03/04**	**CH Extension Quarry Agreement**	**Description of Requirement**	**Criterion/Limit**	**Annual Monitoring Report Reference**
NA	4.4	NA	2.14.1(b)	Water levels at W7, W8, and V2	NA	5.3.2
NA	4.4	NA	2.14.2	Water levels at wetlands W5, W10, W15, W17, W21, and W41	NA	5.5
NA	4.4	NA	2.14.1(e)	Water level monitoring at domestic wells DW108A, DW111, and DW116A	NA	NA (abandoned)
NA	4.4	NA	2.14.1(b)	Surface water level and flow at the weir on the Sixth Line Tributary (SW20)	NA	5.5.5
NA	4.4	NA	2.14.1(a)	Meteorological data, including air temperature, precipitation, and evaporation	NA	4.0
9.1, 9.2, and 9.3	NA	NA	2.14.2	Water quality monitoring at three Recharge Monitoring Wells (including the first and last recharge wells along the distribution header and the closest recharge well to DW103)	NA	7.1, 7.3.2
10.0	NA	NA	2.14.2	Ecological monitoring of Brook Trout spawning Sixth Line Tributary near the North Quarry	NA	9.1.1
NA	NA	NA	2.14.1(f)	Main Quarry Ecological Monitoring	NA	9.0
11.0	4.5	NA	2.14.1	Performance reporting	NA	entire Annual Water Monitoring Report

Note:

NA Not Applicable
(1) Annual limit is estimated from 2006 flow plus increased taking due to reduced evapotranspiration and capture runoff over additional extracted area of the North Quarry and Extension.
(2) The annual limit is less than expected given the relatively higher limits on the instantaneous and daily flows. The relatively lower annual limit has been found to be sufficient over many years of operation; therefore, Dufferin has not applied for a higher limit.

2024 Monthly Air Temperature
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Month	2024 Measured Average Monthly Air Temperature Milton Quarry [1] (^oC)	Historical Measured Average Monthly Air Temperature Milton Quarry [2] (^oC)	2024 Average Air Temperature Difference from Historical Average (^oC)
January	-3.3	-5.6	2.2
February	-0.6	-5.1	4.6
March	2.6	-0.3	2.9
April	7.7	6.0	1.7
May	15.4	13.0	2.4
June	18.9	18.4	0.5
July	21.2	20.8	0.4
August	20.1	20.1	0.0
September	17.8	16.2	1.5
October	11.4	9.6	1.8
November	5.4	3.1	2.3
December	-1.8	-2.2	0.3
Average	**9.6**	**7.8**	**1.8**

Notes:

(1) The Site weather station measures air temperature every 5 seconds and records hourly average temperatures. Previously, when air temperature measurements were not available for the Site the data was supplemented with temperature data from Acton Wastewater Treatment Plant (WWTP) located approximately 9 KM from the Site. During 2024, missing air temperature data was supplemented with newly acquired Scotch Block Dam (Conservation Halton) data located approximately 3.2km from Site.

(2) Air temperature data was collected at the quarry from 1995 to 1998 and then from 2000 to present.

Table 4.2

Monthly Precipitation Data
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Month	Measured Milton Quarry Precipitation from Weather Station [1] (mm)	Supplemented Milton Quarry Precipitation [2] (mm)	Mean Milton Quarry Precipitation [3] (mm)	Supplemented Georgetown WWTP Precipitation [4] (mm)	Mean Georgetown WWTP Precipitation [5] (mm)
January	-	81.6	70.2	103.7	64.2
February	-	23.8	53.6	36.8	57.1
March	-	59.0	59.9	72.1	62.3
April	0.3	114.6	82.3	143.2	68.8
May	83.3	80.9	79.8	93.3	74.9
June	126.0	126.0	81.5	107.2	73.6
July	186.7	186.7	81.7	187.6	77.9
August	123.9	123.9	69.5	118.8	77.6
September	60.7	60.7	72.4	56.6	70.3
October	32.5	32.5	76.5	27.1	68.5
November	32.0	34.8	69.6	44.4	70.3
December	-	66.0	63.4	70.1	64.8
Total:	645.4	990.5	860.4	1060.9	830.3

Notes:

(1) The Milton Quarry weather station was fitted for rainfall data collection (tipping bucket) from April 8, 2024 to November 15, 2024. The partial data collected in April and November are presented for completeness, but should not be compared to average values.

(2) Previously, Georgetown WWTP and Acton WWTP precipitation data were used to fill in data for the missing periods. During 2024, newly acquired Scotch Block Dam (Conservation Halton) data was used to supplement missing data. Data for Scotch Block Dam (Conservation Halton) and Acton WWTP (Credit Valley Conservation Authority) has only undergone preliminary quality checking for 2024 data.

(3) The mean is calculated for the period from 1991 onward and excluding the present year.

(4) Precipitation data was obtained for the Georgetown Wastewater Treatment Plant (WWTP). Data was ordered from the Ontario Climate Centre in January 2025. Toronto International Airport and Oakville TWN data was utilized to supplement missing Georgetown WWTP data. Data for Georgetown WWTP has only undergone preliminary quality checking by the OCC for January through December 2024.

(5) The mean is calculated for the period from 1882 to 2023 (142 year record).

Table 4.3

Monthly Evaporation
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Month	Measured Lake Evaporation [1] (mm)	Supplemented Lake Evaporation [2] (mm)	Average Lake Evaporation [3] (mm)	Supplemented and Average Evaporation (mm)
January	-	25.7	25.7	0.0
February	-	25.7	25.7	0.0
March	-	25.7	25.7	0.0
April	34.9	25.7	25.7	0.0
May	78.2	78.2	84.7	-6.6
June	83.3	83.3	105.1	-21.8
July	98.6	98.6	109.4	-10.7
August	74.6	74.6	92.6	-18.0
September	43.8	43.8	67.1	-23.3
October	35.5	35.5	45.2	-9.7
November	10.7	25.7	25.7	0.0
December	-	25.7	25.7	0.0
Total:	459.6	568.1	658.3	-90.0

Notes:

(1) Measured lake evaporation is obtained by multiplying measured pan evaporation by a 0.70 correction factor.
(2) Over-winter total evaporation is estimated to be 154 mm and is added to measured lake evaporation data from May to October as per the analysis presented in the 5-Year AMP review.
(3) Lake Evaporation average does not include 1996 to 2000 (inclusive) and 2004. Average not inclusive of present year.

Table 5.1a

Summary of 2025 Target Levels - Winter
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Location	Trigger Well	2024 Target (m AMSL)	2025 Target (m AMSL)	Difference
North Quarry	BH37	315.60	315.66	0.06
North Quarry	BH55	312.99	313.01	0.02
North Quarry	BH56	312.67	312.69	0.02
North Quarry	BH57-III	313.42	313.45	0.03
North Quarry	BH59	313.89	313.91	0.02
North Quarry	BH60	314.32	314.33	0.01
North Quarry	BH61-III	314.20	314.22	0.02
West Cell	OW27-04	317.48	317.51	0.03
West Cell	OW28-04	318.01	318.04	0.03
West Cell	OW29-04	318.09	318.12	0.03
West Cell	OW30-04	318.13	318.15	0.02
West Cell	OW31-04	318.97	319.06	0.09
West Cell	OW32-04	320.11	320.18	0.07
West Cell	OW33-04	322.41	322.48	0.07
West Cell	OW34-04	323.44	323.45	0.01
West Cell	OW35-04	323.64	323.66	0.02
West Cell	OW36-04	323.69	323.70	0.01
West Cell	OW37-04	323.77	323.78	0.01
West Cell	OW38-04	324.65	324.73	0.08
East Cell	BH48	330.13	330.19	0.06
East Cell	OW52-07	335.42	335.59	0.17
East Cell	OW5-80	335.70	335.84	0.14
East Cell	OW60-07	323.62	323.63	0.01
East Cell	OW61-07	324.36	324.48	0.12
East Cell	OW62-07	324.24	324.26	0.02
East Cell	OW63-07	324.51	324.54	0.03
East Cell	OW64-07	324.98	325.01	0.03
East Cell	OW65-07	333.03	333.17	0.14
East Cell	OW66-07	334.29	334.46	0.17
East Cell	OW70-08	336.41	336.86	0.45
East Cell	OW71-08	335.66	335.91	0.25
On-Site Wetlands	W7	333.23	333.27	0.04
On-Site Wetlands	W8	335.99	336.07	0.08
On-Site Wetlands	V2	-- [1]/340.30 [2]	-- [1]/340.30 [2]	0.00[3]

Table 5.1b

Summary of 2025 Target Levels - Spring
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Location	Trigger Well	2024 Target (m AMSL)	2025 Target (m AMSL)	Difference
North Quarry	BH37	315.41	315.54	0.13
North Quarry	BH55	312.79	312.83	0.04
North Quarry	BH56	312.52	312.55	0.03
North Quarry	BH57-III	313.35	313.40	0.05
North Quarry	BH59	313.82	313.87	0.05
North Quarry	BH60	314.13	314.17	0.04
North Quarry	BH61-III	314.04	314.08	0.04
West Cell	OW27-04	317.19	317.21	0.02
West Cell	OW28-04	317.79	317.81	0.02
West Cell	OW29-04	317.84	317.86	0.02
West Cell	OW30-04	318.02	318.04	0.02
West Cell	OW31-04	319.73	319.91	0.18
West Cell	OW32-04	320.65	320.78	0.13
West Cell	OW33-04	322.07	322.12	0.05
West Cell	OW34-04	323.31	323.32	0.01
West Cell	OW35-04	323.56	323.57	0.01
West Cell	OW36-04	323.68	323.72	0.04
West Cell	OW37-04	323.75	323.76	0.01
West Cell	OW38-04	325.42	325.60	0.18
East Cell	BH48	330.42	330.50	0.08
East Cell	OW52-07	336.21	336.43	0.22
East Cell	OW5-80	336.45	336.63	0.18
East Cell	OW60-07	323.67	323.68	0.01
East Cell	OW61-07	324.70	324.85	0.15
East Cell	OW62-07	324.17	324.19	0.02
East Cell	OW63-07	324.55	324.61	0.06
East Cell	OW64-07	325.04	325.10	0.06
East Cell	OW65-07	333.66	333.83	0.17
East Cell	OW66-07	335.06	335.28	0.22
East Cell	OW70-08	338.83	339.40	0.57
East Cell	OW71-08	336.80	337.11	0.31
On-Site Wetlands	W7	333.73 (April)	333.79 (April)	0.06
On-Site Wetlands	W7	333.68 (May)	333.70 (May)	0.02
On-Site Wetlands	W7	333.56 (June)	333.55 (June)	-0.01
On-Site Wetlands	W8	336.30 [7] (April)	336.30 [7] (April)	0.00
On-Site Wetlands	W8	336.30 [7] (May)	336.30 [7] (May)	0.00
On-Site Wetlands	W8	336.30 [7] (June)	336.30 [7] (June)	0.00
On-Site Wetlands	V2	340.30 [3] (April)	340.30 [3] (April)	0.00
On-Site Wetlands	V2	340.22 [4]/340.13 [5] (May)	340.22 [4]/340.13 [5] (May)	0.00[3]
On-Site Wetlands	V2	340.05 [4]/339.97 [5] (June)	340.05 [4]/339.97 [5] (June)	0.00[3]

Table 5.1c

Summary of 2025 Target Levels - Summer
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Location	Trigger Well	2024 Target (m AMSL)	2025 Target (m AMSL)	Difference
North Quarry	BH37	315.32	315.63	0.00
North Quarry	BH55	312.66	312.76	0.10
North Quarry	BH56	312.42	312.50	0.08
North Quarry	BH57-III	313.32	313.44	0.12
North Quarry	BH59	313.79	313.91	0.12
North Quarry	BH60	314.03	314.12	0.09
North Quarry	BH61-III	313.95	314.04	0.09
West Cell	OW27-04	317.22	317.43	0.21
West Cell	OW28-04	317.80	317.99	0.19
West Cell	OW29-04	317.86	318.04	0.18
West Cell	OW30-04	318.01	318.17	0.16
West Cell	OW31-04	318.89	319.34	0.45
West Cell	OW32-04	319.85	320.17	0.32
West Cell	OW33-04	322.15	322.64	0.49
West Cell	OW34-04	323.37	323.48	0.11
West Cell	OW35-04	323.59	323.72	0.13
West Cell	OW36-04	323.65	323.74	0.09
West Cell	OW37-04	323.77	323.90	0.13
West Cell	OW38-04	325.14	325.58	0.44
East Cell	BH48	330.18	330.35	0.17
East Cell	OW52-07	335.20	335.65	0.45
East Cell	OW5-80	335.53	335.90	0.37
East Cell	OW60-07	323.62	323.72	0.10
East Cell	OW61-07	324.26	324.59	0.33
East Cell	OW62-07	324.11	324.27	0.16
East Cell	OW63-07	324.45	324.61	0.16
East Cell	OW64-07	324.98	325.13	0.15
East Cell	OW65-07	332.82	333.19	0.37
East Cell	OW66-07	333.91	334.37	0.46
East Cell	OW70-08	336.67	337.87	1.20
East Cell	OW71-08	335.56	336.22	0.66
On-Site Wetlands	W7	333.04	333.26	0.22
On-Site Wetlands	W8	336.07	336.30	0.23
On-Site Wetlands	V2	339.88 [4]/339.80 [5] (July)	339.88 [4]/339.80 [5] (July)	0.00[3]
On-Site Wetlands	V2	--[1] (August)	--[1] (August)	0.00[3]

Table 5.1d

Summary of 2025 Target Levels - Fall
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Location	Trigger Well	2024 Target (m AMSL)	2025 Target (m AMSL)	Difference
North Quarry	BH37	314.92	314.76	-0.16
North Quarry	BH55	312.62	312.57	-0.05
North Quarry	BH56	312.39	312.35	-0.04
North Quarry	BH57-III	313.15	313.09	-0.06
North Quarry	BH59	313.64	313.59	-0.05
North Quarry	BH60	314.00	313.95	-0.05
North Quarry	BH61-III	313.89	313.85	-0.04
West Cell	OW27-04	317.04	316.97	-0.07
West Cell	OW28-04	317.64	317.57	-0.07
West Cell	OW29-04	317.71	317.65	-0.06
West Cell	OW30-04	317.84	317.79	-0.05
West Cell	OW31-04	318.03	317.79	-0.24
West Cell	OW32-04	319.40	319.23	-0.17
West Cell	OW33-04	321.77	321.61	-0.16
West Cell	OW34-04	323.28	323.25	-0.03
West Cell	OW35-04	323.45	323.41	-0.04
West Cell	OW36-04	323.51	323.46	-0.05
West Cell	OW37-04	323.63	323.58	-0.05
West Cell	OW38-04	324.22	323.99	-0.23
East Cell	BH48	330.00	329.94	-0.06
East Cell	OW52-07	334.71	334.53	-0.18
East Cell	OW5-80	335.04	334.90	-0.14
East Cell	OW60-07	323.57	323.54	-0.03
East Cell	OW61-07	324.00	323.87	-0.13
East Cell	OW62-07	324.03	323.98	-0.05
East Cell	OW63-07	324.29	324.21	-0.08
East Cell	OW64-07	324.80	324.72	-0.08
East Cell	OW65-07	332.42	332.28	-0.14
East Cell	OW66-07	333.50	333.32	-0.18
East Cell	OW70-08	335.34	334.87	-0.47
East Cell	OW71-08	334.89	334.63	-0.26
On-Site Wetlands	W7	332.97 (6)	332.90 (6)	-0.07
On-Site Wetlands	W8	335.62	335.54	-0.08
On-Site Wetlands	V2	-- (1)	-- (1)	0.00 (3)

Table 5.1e

Summary of 2024 Target Levels - Notes
2023 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Notes:

NA Not applicable.
(1) No target level to be implemented during this period.
(2) Target level to be implemented in anticipation of spring freshet based on short-term weather forecast (typically occurs in mid to late March).
(3) V2 target levels do not change as per Section 6.0 of The Establishment of Extension Target Levels and Minimum Levels (CRA, 2011b).
(4) Target level for first half of month.
(5) Target level for second half of month.
(6) Feature to be allowed to go dry for 1 to 2 months every 2 to 3 years [refer to "Establishment of Target Levels and Minimum Levels" (CRA, 2011b)], however, due to the presence of a snapping turtle discovered in September 2014, it is recommended by GEC to maintain water levels year round to support turtle use.
(7) The Target level cannot be higher than the maximum elevation of the edge/embankment surrounding the wetland (with an allowance for freeboard); therefore, calculated Target is replaced to match the maximum elevation.

Table 6.1

2024 North Quarry and Extension Dewatering
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Monthly Flow Totals(1)

Month	To Reservoir m3	To Operations m3	Total Monthly Dewatering m3
January	336,774	0	336,774
February	305,116	0	305,116
March	336,080	0	336,080
April	420,086	0	420,086
May	369,434	0	369,434
June	389,792	0	389,792
July	530,656	0	530,656
August	391,362	0	391,362
September	275,944	0	275,944
October	297,523	0	297,523
November	300,814	0	300,814
December	299,123	0	299,123
TOTAL:	4,252,704	0	4,252,704

Note:

(1) Daily flow totals based on interpolation of periodic manual flowmeter readings and information on where the flow was directed (reservoir or operations) Where Dufferin has provided the date/time/flowmeter information associated with a switch in where the flow was directed this information is used to divide the flow accordingly. Where an observation of flow direction provided by Dufferin is different from the previously noted direction it is assumed that the change in direction occurred at 0:00 hrs on the day of the different observation.

Table 6.2

Comparison of North Quarry and Extension Discharge Quantities (2001 to 2024)
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Year	Water Taking (L)[1]	Revised Water Taking[2]	Water Handling (L)[3]
2001	160,324,000	--	160,324,000
2002	441,447,000	--	441,447,000
2003	503,697,473	--	503,697,473
2004	623,782,118	--	623,782,118
2005	718,895,348	--	718,895,348
2006	735,459,903	--	735,459,903
2007	754,046,703	751,411,935	450,934,401
2008	759,866,700	756,406,935	840,326,000
2009	781,423,204	774,907,749	1,253,041,000
2010	793,295,070	785,096,750	1,018,752,000
2011	802,654,950	793,129,909	1,368,801,000
2012	840,753,841	825,828,144	1,352,396,562
2013	867,201,020	848,527,089	2,067,246,824
2014	884,193,964	863,111,157	2,274,525,873
2015	900,673,100	877,254,333	2,861,391,838
2016	941,562,480	912,347,538	2,548,292,791
2017	956,869,837	925,485,054	2,909,817,514
2018	964,528,181	932,057,808	2,729,876,399
2019	984,852,935	949,501,647	3,389,753,863
2020	1,015,899,227	976,146,975	3,862,217,944
2021	1,032,791,871	990,645,129	4,250,870,986
2022	1,032,791,871	990,645,129	4,229,100,264
2023	1,032,791,871	990,645,129	3,849,489,274
2024	1,034,905,436	992,458,980	4,252,704,318
PTTW[4]	1,359,000,000	n/a	23,652,000,000

Notes:

(1) The water taking is calculated on an annual basis starting in 2007 because the North Quarry Recharge System became operational in 2007, at which time water taking and water handling are no longer the same because of the recirculation of water from the groundwater recharge well system. Prior to 2007 the water taking is based on a 1999 pump calibration by CRA.

(2) Updates completed for the 5-Year AMP Review have resulted in revised estimates for long-term average precipitation, evapotranspiration, dry quarry evaporation, infiltration, and runoff. Annual water taking has been revised using the same methodology presented in item 2 of Schedule A to the PTTW (PTTW Report).

(3) The water handling is not a taking from the environment, but rather the handling of both water taken from the environment and recharge water that recirculates back into the quarry cells.

(4) Limits of annual water taking and water handling allowed by
- PTTW No. 0117-8BHQPL effective December 16, 2010
- PTTW No. 8575-A3BKYB effective November 23, 2015
- PTTW No. 5256-BUUP62 effective November 2, 2020

2024 Recharge System Flows
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Month	Monthly Flow Totals at Recharge Pump Station (m^3)	Monthly Sum of Recharge Well and Wetland Flow Totals (m^3)
January	378,378	398,087
February	319,452	309,123
March	402,238	359,037
April	390,349	442,626
May	414,710	370,134
June	436,682	409,805
July	457,227	388,420
August	466,523	307,786
September	286,137	321,877
October	324,515	297,175
November	321,976	289,336
December	408,048	454,437
TOTAL [(1)] :	4,606,235	4,347,841
PTTW Limit:	18,921,600	--

Note:
(1) Approximately 230,000 m³ was discharged from the Pumping Station to the West Cell. This flow is only recorded on the Pumping Station flow meter, and accounts for the majority of the discrepancy in reported total flow.

Main Quarry Discharge Summary (2024)
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Month	Lake Discharge 4' Pump (m^3)	Reservoir Discharge (m^3)	Total (m^3)	Actual Average Flow [(1)] (m^3/s)
January	19,833	17,638	37,471	0.014
February	19,796	9,749	29,545	0.012
March	21,043	13,540	34,583	0.013
April	18,774	9,642	28,416	0.011
May	19,248	9,640	28,888	0.011
June	26,102	56,024	82,126	0.032
July	34,014	279,462	313,476	0.117
August	34,672	364,102	398,774	0.149
September	33,816	100,664	134,480	0.052
October	35,361	74,346	109,707	0.041
November	9,955	49,655	59,610	0.023
December	26,224	51,554	77,778	0.029
TOTAL:	**298,837**	**1,036,016**	**1,334,853**	--

Notes:

(1) Minimum annual discharge of 700,000 m^3 (per the October 2003 Main Quarry Water Management Agreement); Minimum 464,000 m^3 uniformly distributed between July 1 and September 30 (i.e., approximately 0.058 m^3/s average daily flows; per the April 2005 Storage and Operations Optimization Study by Philips Engineering Ltd.); Minimum 236,000 m^3 uniformly distributed between October 1 and June 30 (i.e., approximately 0.010 m^3/s average daily flows; per the April 2005 Storage and Operations Optimization Study by Philips Engineering Ltd.); Not-to-exceed discharge rate of 12,000 L/min (0.2 m3/s; per Certificate of Approval No. 9119-7TSGXH and Permit to Take Water No. 0117-8BHQPL, 6445-GQZMES, 8575-A3BKYB and 5256-BUUP62).

Table 6.5

Comparison of Main Quarry Discharge Quantities (1991 to 2024)
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Month	1991	1992	1993	1994	1995	1996	1997
January	284,292,000	97,864,500	345,666,000	66,144,000	313,852,750	246,171,750	257,659,500
February	202,658,750	69,324,000	93,969,000	76,320,000	210,489,500	153,673,500	272,049,000
March	317,311,000	146,598,000	139,694,750	205,198,333	146,240,250	169,838,500	473,184,000
April	405,927,000	252,306,500	339,769,750	238,924,000	194,006,500	404,933,250	442,020,000
May	193,079,000	209,681,250	163,452,000	285,603,750	235,094,750	435,554,000	181,074,500
June	131,837,500	87,238,000	230,709,000	119,647,500	105,562,750	194,377,500	27,599,750
July	101,004,750	237,864,000	149,062,500	95,691,500	48,044,500	131,161,750	80,136,000
August	62,049,750	249,047,000	61,201,750	60,552,500	60,658,500	69,204,750	155,078,000
September	46,467,750	333,264,000	78,387,000	43,208,250	51,555,750	239,825,000	99,189,500
October	45,725,750	231,875,000	98,553,500	75,843,000	155,886,250	206,753,000	85,934,200
November	67,985,750	459,801,500	100,488,000	130,552,250	235,386,250	152,560,500	139,819,300
December	157,449,750	304,591,000	155,051,500	99,799,000	126,193,000	166,340,500	183,364,100
Total (L)	**2,015,788,750**	**2,679,454,750**	**1,956,004,750**	**1,497,484,083**	**1,882,970,750**	**2,570,394,000**	**2,397,107,850**

Table 6.5

Comparison of Main Quarry Discharge Quantities (1991 to 2024)
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Month	1998	1999	2000	2001	2002	2003	2004
January	320,597,000	139,284,000	105,122,780	34,988,610	317,925,251	64,239,400	217,825,500
February	265,106,000	237,645,900	120,730,455	234,412,200	250,571,120	61,125,600	221,380,500
March	282,596,000	144,644,400	217,760,000	315,862,630	223,426,590	125,526,310	373,956,900
April	370,894,000	180,324,900	234,693,600	225,026,680	226,518,650	227,154,800	358,357,800
May	64,395,000	134,119,200	295,458,700	219,863,940	164,961,800	216,571,000	433,116,000
June	203,149,000	112,897,500	338,757,300	111,169,430	112,964,940	219,146,500	302,220,600
July	122,218,000	46,350,000	141,425,200	70,322,710	70,893,000	219,216,400	77,334,000
August	27,030,000	21,801,600	217,525,900	86,470,260	156,273,800	48,751,900	70,319,100
September	102,290,000	109,076,130	199,620,380	80,469,500	118,369,050	194,385,200	22,827,300
October	149,725,000	124,748,700	88,253,700	12,908,000	71,687,320	235,523,500	0
November	43,513,000	111,363,640	83,422,170	55,071,470	48,097,190	151,477,600	90,775,800
December	195,093,000	176,643,740	42,174,240	378,883,288	49,654,280	180,956,400	0
Total (L)	**2,146,606,000**	**1,538,899,710**	**2,084,944,425**	**1,825,448,718**	**1,811,342,991**	**1,944,074,610**	**2,168,113,500**

Table 6.5

Comparison of Main Quarry Discharge Quantities (1991 to 2024)
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Month	2005	2006	2007	2008	2009	2010	2011
January	128,987,370	38,266,350	14,346,000	47,546,000	366,850,654	26,638,000	43,204,000
February	26,877,000	33,111,180	7,709,000	18,131,000	366,081,034	25,148,000	34,269,000
March	21,726,000	19,836,090	6,972,000	28,374,000	446,768,000	228,249,000	316,223,000
April	69,204,990	52,002,000	10,547,000	24,587,816	425,298,000	275,476,000	366,292,000
May	79,021,890	150,270,460	57,375,000	29,020,377	371,337,000	32,091,000	447,546,000
June	21,921,200	143,594,240	37,920,000	24,871,373	49,161,000	51,017,000	465,104,000
July	72,760,000	62,041,000	81,265,000	120,670,552	147,548,000	159,706,000	364,827,000
August	102,080,500	92,949,000	131,565,000	188,255,496	156,152,000	152,345,000	146,771,000
September	143,058,730	123,422,000	176,423,000	174,145,000	138,366,000	149,670,000	138,648,000
October	171,914,600	138,923,600	119,461,000	32,686,000	36,363,000	36,801,000	160,946,000
November	87,839,200	214,885,701	64,070,000	35,226,865	25,896,000	29,128,000	266,943,000
December	1,537,000	277,212,000	69,996,000	159,780,000	22,090,000	28,875,000	284,039,000
Total (L)	**926,928,480**	**1,346,513,621**	**777,649,000**	**883,294,479**	**2,551,910,687**	**1,195,144,000**	**3,034,812,000**

Table 6.5

Comparison of Main Quarry Discharge Quantities (1991 to 2024)
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Month	2012	2013	2014	2015	2016	2017	2018
January	311,865,000	64,219,571	107,936,253	39,338,542	30,665,766	34,654,285	39,156,619
February	196,619,068	236,524,425	96,052,352	42,639,269	26,196,000	30,044,926	83,605,911
March	101,448,652	333,767,724	145,468,691	45,156,880	31,069,765	31,301,134	197,609,853
April	131,075,148	203,077,936	80,836,957	32,367,553	41,096,460	97,854,839	58,366,779
May	99,278,985	118,624,401	290,640,727	32,702,918	30,335,594	434,930,642	220,019,230
June	44,635,492	71,003,343	91,655,703	22,387,864	33,672,181	295,243,811	207,786,565
July	129,648,566	188,391,102	192,276,505	125,854,205	154,826,181	212,282,638	186,233,911
August	171,263,371	198,845,318	168,172,663	143,611,461	158,030,533	165,029,387	188,588,463
September	208,081,437	177,282,512	182,734,110	147,839,211	150,915,827	164,104,077	177,653,247
October	40,247,790	71,180,400	71,755,316	30,742,677	39,449,756	39,999,539	146,046,688
November	31,815,373	142,127,398	51,119,676	28,884,000	35,483,273	32,681,700	41,900,146
December	36,161,265	123,570,286	44,037,580	28,175,929	35,560,971	36,691,182	44,380,249
Total (L)	**1,502,140,146**	**1,928,614,418**	**1,522,686,532**	**719,700,510**	**767,302,307**	**1,574,818,161**	**1,591,347,660**

Table 6.5

Comparison of Main Quarry Discharge Quantities (1991 to 2024)
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Month	2019	2020	2021	2022	2023	2024	Average (1991 - 2024)
January	91,408,970	274,885,317	31,961,282	24,364,641	31,035,000	37,471,000	135,189,225
February	130,195,452	438,910,899	33,333,323	31,083,664	28,940,000	29,545,000	128,955,060
March	224,325,604	319,152,605	31,290,573	37,147,871	29,811,000	34,583,000	173,885,856
April	326,399,884	206,249,299	34,340,894	36,038,563	31,465,783	28,416,000	195,054,451
May	510,303,271	65,516,367	35,245,431	43,571,180	38,171,733	28,888,000	186,673,973
June	331,159,762	43,363,244	35,306,708	40,180,435	35,086,626	82,126,000	130,131,583
July	202,499,213	165,036,191	158,032,752	135,431,910	128,798,686	313,476,000	143,892,051
August	172,846,236	168,208,690	156,831,521	147,085,824	149,359,953	398,774,000	138,315,595
September	162,923,506	160,795,397	144,700,940	145,680,877	187,860,693	134,480,000	144,344,688
October	32,347,962	35,927,422	34,047,408	41,261,283	37,953,389	109,707,000	88,564,081
November	30,608,411	31,567,868	25,265,027	29,096,919	30,293,666	59,610,000	93,081,078
December	79,069,085	35,034,005	18,941,649	25,080,000	29,595,463	77,778,000	108,052,896
Total (L)	**2,294,087,356**	**1,944,647,305**	**739,297,507**	**736,023,167**	**758,371,992**	**1,334,854,000**	**1,666,140,536**

Table 6.6

2024 Overall Water Taking
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Month	Main Quarry [1] Total (L)	North Quarry [3] and Extension Total (L)	Operations [4] Total (L)	Total Water Taking (L)
January	37,471,000	NA	NA	NA
February	29,545,000	NA	NA	NA
March	34,583,000	NA	NA	NA
April	28,416,000	NA	NA	NA
May	28,888,000	NA	NA	NA
June	82,126,000	NA	NA	NA
July	313,476,000	NA	NA	NA
August	398,774,000	NA	NA	NA
September	134,480,000	NA	NA	NA
October	109,707,000	NA	NA	NA
November	59,610,000	NA	NA	NA
December	77,778,000	NA	NA	NA
Total	**1,334,854,000**	**1,034,905,436**	**126,712,000**	**2,496,471,436**
PTTW [2]	**4,464,000,000**	**1,359,000,000**	--	**6,417,600,000**

Notes:

NA Not applicable.
(1) Includes discharge to the HFRT from the West Sump and the Reservoir.
(2) Limit of annual water taking allowed by the PTTW No. 8575-A3BKYB and 5256-BUUP62.
(3) This water taking is calculated on an annual basis starting in 2007 because the Groundwater Recharge Well System became operational in 2007. Monthly water takings are not available subsequent to 2006.
(4) Per Appendix J.

Table 7.1

2024 Water Quality Results - Reservoir Outfall to HFRT (SW15C)
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Analyses	Parameters	Units	ECA Criteria	PWQO Criteria	Number of Samples	Number of Detections	Number of Detections Above Effluent Limit or PWQO	Maximum Detected Concentration	Average of Detected Concentrations
General Chemistry	Oil and Grease	mg/L	15(1)	n/a	12	0	0	--	--
General Chemistry	pH (lab)	s.u.	6.0-9.5(1)	n/a	12	12	0	8.57(4)	8.362
General Chemistry	pH Field	s.u.	6.0-9.5(1)	n/a	51	51	0	8.56(5)	8.195
General Chemistry	Total Suspended Solids (TSS)	mg/L	25(1)	n/a	51	1	0	1	1.000
General Chemistry	Un-ionized Ammonia	mg/L	0.02(1)(2)	n/a	12	11	0	0.004	0.002
General Chemistry	Alkalinity, Bicarbonate	mg/L	n/a	-	12	12	0	187	169.417
General Chemistry	Alkalinity, Carbonate	mg/L	n/a	-	12	6	0	12	7.583
General Chemistry	Alkalinity, Total (As CaCO3)	mg/L	n/a	-	12	12	0	192	173.417
General Chemistry	Ammonia-N	mg/L	n/a	-	12	12	0	0.192	0.080
General Chemistry	Bromide	mg/L	n/a	-	12	7	0	0.31	0.210
General Chemistry	Chloride	mg/L	n/a	-	12	12	0	76.7	72.725
General Chemistry	Conductivity	uS/cm	n/a	-	12	12	0	713	689.833
General Chemistry	Fluoride	mg/L	n/a	-	12	12	0	0.132	0.122
General Chemistry	Hardness	mg/L	n/a	-	12	12	0	286	258.167
General Chemistry	Nitrate (as N)	mg/L	n/a	-	12	4	0	0.05	0.034
General Chemistry	Nitrite (as N)	mg/L	n/a	-	12	0	0	--	--
General Chemistry	Orthophosphate (dissolved)	mg/L	n/a	-	12	0	0	--	--
General Chemistry	Phosphorous	mg/L	n/a	0.03(2)	12	12	0	0.011	0.008
General Chemistry	Sulphate	mg/L	n/a	-	12	12	0	74.1	70.142
General Chemistry	Temperature, Field	Deg C	n/a	-	38	38	0	25.7	12.526
General Chemistry	Total Dissolved Solids (TDS)	mg/L	n/a	-	12	12	0	393	353.333
General Chemistry	Total Kjeldahl Nitrogen (TKN)	mg/L	n/a	-	12	12	0	1.1	0.883
General Chemistry	Total Organic Carbon (TOC)	mg/L	n/a	-	12	12	0	10.8	9.506
General Chemistry	Turbidity	NTU	n/a	-	12	12	0	1.03	0.654
Biological	Escherichia coli	cfu/100mL	n/a	100(2)	12	7	0	11	4.857
Biological	Total Coliform Bacteria	cfu/100mL	n/a	100(2)	11	8	4	600	233.750
Metals	Aluminum	mg/L	n/a	0.075(2)	12	10	0	0.009	0.005
Metals	Antimony	mg/L	n/a	0.02(2)	12	1	0	0.0001	0.0001
Metals	Arsenic	mg/L	n/a	0.1(2)/0.005(3)	12	12	0	0.004	0.003
Metals	Barium	mg/L	n/a	-	12	12	0	0.025	0.022
Metals	Beryllium	mg/L	n/a	1.1(2)	12	0	0	--	--
Metals	Bismuth	mg/L	n/a	-	12	0	0	--	--
Metals	Boron	mg/L	n/a	0.2(2)	12	12	0	0.071	0.065
Metals	Cadmium	mg/L	n/a	0.0002(2)/0.0005(3)	12	0	0	--	--
Metals	Calcium	mg/L	n/a	-	12	12	0	46.8	38.600
Metals	Chromium Total	mg/L	n/a	-	12	0	0	--	--
Metals	Cobalt	mg/L	n/a	0.0009(2)	12	7	0	0.0002	0.0001
Metals	Copper	mg/L	n/a	0.005(2)	12	1	0	0.0008	0.001
Metals	Iron	mg/L	n/a	0.3(2)	12	12	0	0.09	0.056
Metals	Lead	mg/L	n/a	0.025(2)/0.005(3)	12	4	0	0.00007	0.0001
Metals	Magnesium	mg/L	n/a	-	12	12	0	41.5	39.308
Metals	Manganese	mg/L	n/a	-	12	12	0	0.054	0.026
Metals	Molybdenum	mg/L	n/a	0.04(2)	12	12	0	0.0008	0.001
Metals	Nickel	mg/L	n/a	0.025(2)	12	12	0	0.0009	0.001
Metals	Potassium	mg/L	n/a	-	12	12	0	6.88	6.557
Metals	Selenium	mg/L	n/a	0.1(2)	12	7	0	0.00007	0.0001
Metals	Silicon	mg/L	n/a	-	12	10	0	0.76	0.351
Metals	Silver	mg/L	n/a	0.0001(2)	12	0	0	--	--
Metals	Sodium	mg/L	n/a	-	12	12	0	47.5	43.358
Metals	Strontium	mg/L	n/a	-	12	12	0	0.677	0.591
Metals	Thallium	mg/L	n/a	0.0003(2)	12	0	0	--	--
Metals	Tin	mg/L	n/a	-	12	0	0	--	--
Metals	Titanium	mg/L	n/a	-	12	1	0	0.0004	0.0004
Metals	Vanadium	mg/L	n/a	0.006(2)	12	0	0	--	--
Metals	Zinc	mg/L	n/a	0.03(2)/0.02(3)	12	9	0	0.013	0.007
Volatiles	Benzene	ug/L	n/a	100(2)	12	0	0	--	--
Volatiles	Ethylbenzene	ug/L	n/a	8(2)	12	0	0	--	--
Volatiles	m&p-Xylenes	ug/L	n/a	-	12	0	0	--	--
Volatiles	o-Xylene	ug/L	n/a	40(2)	12	0	0	--	--
Volatiles	Toluene	ug/L	n/a	0.8(2)	12	0	0	--	--
Volatiles	Xylenes (total)	ug/L	n/a	-	12	0	0	--	--

Notes:

Screening against Effluent Limits as per ECA requirements.
Screening against PWQOs for comparison purposes only. The ECA does not require this discharge to meet PWQOs.
n/a - Not Applicable
(1) - ECA Effluent Limit.
(2) - PWQO.
(3) - PWQO/Interim PWQO.
(4) - Minimum pH measured was 8.12.
(5) - Minimum pH measured was 7.80.

Table 7.2

2024 Water Quality Results - Reservoir Outfall to HFRT (SW52B)
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Analyses	Parameters	Units	ECA Criteria	PWQO Criteria	Number of Samples	Number of Detections	Number of Detections Above Effluent Limit or PWQO	Maximum Detected Concentration	Average of Detected Concentrations
General Chemistry	Oil and Grease	mg/L	15[1]	n/a	12	0	0	--	--
General Chemistry	pH (lab)	s.u.	6.0-9.5[1]	n/a	12	12	0	8.53[4]	8.323
General Chemistry	pH Field	s.u.	6.0-9.5[1]	n/a	54	54	0	8.47[5]	8.212
General Chemistry	Total Suspended Solids (TSS)	mg/L	25[1]	n/a	54	1	0	1.7	1.700
General Chemistry	Un-ionized Ammonia	mg/L	0.02[1][2]	n/a	12	12	0	0.008	0.004
General Chemistry	Alkalinity, Bicarbonate	mg/L	n/a	-	12	12	0	146	134.250
General Chemistry	Alkalinity, Carbonate	mg/L	n/a	-	12	6	0	6.2	4.683
General Chemistry	Alkalinity, Total (As CaCO3)	mg/L	n/a	-	12	12	0	150	136.833
General Chemistry	Ammonia-N	mg/L	n/a	-	12	12	0	0.174	0.116
General Chemistry	Bromide	mg/L	n/a	-	12	7	0	1.2	0.726
General Chemistry	Chloride	mg/L	n/a	-	12	12	0	117	106.417
General Chemistry	Conductivity	uS/cm	n/a	-	12	12	0	1080	1037.667
General Chemistry	Fluoride	mg/L	n/a	-	12	12	0	0.266	0.214
General Chemistry	Hardness	mg/L	n/a	-	12	12	0	486	448.500
General Chemistry	Nitrate (as N)	mg/L	n/a	-	12	9	0	0.214	0.131
General Chemistry	Nitrite (as N)	mg/L	n/a	-	12	0	0	--	--
General Chemistry	Orthophosphate (dissolved)	mg/L	n/a	-	12	3	0	0.002	0.001
General Chemistry	Phosphorous	mg/L	n/a	0.03[2]	12	12	0	0.004	0.003
General Chemistry	Sulphate	mg/L	n/a	-	12	12	0	271	249.583
General Chemistry	Temperature, Field	Deg C	n/a	-	39	39	0	25.2	12.221
General Chemistry	Total Dissolved Solids (TDS)	mg/L	n/a	-	12	12	0	672	637.167
General Chemistry	Total Kjeldahl Nitrogen (TKN)	mg/L	n/a	-	12	12	0	0.565	0.432
General Chemistry	Total Organic Carbon (TOC)	mg/L	n/a	-	12	12	0	4.15	3.412
General Chemistry	Turbidity	NTU	n/a	-	12	11	0	1.02	0.515
Biological	Escherichia coli	cfu/100mL	n/a	100[2]	12	4	0	6	3.500
Biological	Total Coliform Bacteria	cfu/100mL	n/a	100[2]	10	5	3	300	162.000
Metals	Aluminum	mg/L	n/a	0.075[2]	12	12	0	0.043	0.011
Metals	Antimony	mg/L	n/a	0.02[2]	12	12	0	0.0003	0.0003
Metals	Arsenic	mg/L	n/a	0.1[2]/0.005[3]	12	12	0	0.003	0.002
Metals	Barium	mg/L	n/a	-	12	12	0	0.052	0.034
Metals	Beryllium	mg/L	n/a	1.1[2]	12	0	0	--	--
Metals	Bismuth	mg/L	n/a	-	12	0	0	--	--
Metals	Boron	mg/L	n/a	0.2[2]	12	12	0	0.165	0.156
Metals	Cadmium	mg/L	n/a	0.0002[2]/0.0005[3]	12	7	0	0.000008	0.00001
Metals	Calcium	mg/L	n/a	-	12	12	0	88.1	79.583
Metals	Chromium Total	mg/L	n/a	-	12	0	0	--	--
Metals	Cobalt	mg/L	n/a	0.0009[2]	12	12	0	0.0005	0.0004
Metals	Copper	mg/L	n/a	0.005[2]	12	0	0	--	--
Metals	Iron	mg/L	n/a	0.3[2]	12	12	0	0.043	0.021
Metals	Lead	mg/L	n/a	0.025[2]/0.005[3]	12	6	0	0.00009	0.0001
Metals	Magnesium	mg/L	n/a	-	12	12	0	64.7	60.692
Metals	Manganese	mg/L	n/a	-	12	12	0	0.006	0.004
Metals	Molybdenum	mg/L	n/a	0.04[2]	12	12	0	0.011	0.010
Metals	Nickel	mg/L	n/a	0.025[2]	12	12	0	0.005	0.004
Metals	Potassium	mg/L	n/a	-	12	12	0	7.2	6.719
Metals	Selenium	mg/L	n/a	0.1[2]	12	12	0	0.0001	0.0001
Metals	Silicon	mg/L	n/a	-	12	12	0	1.52	0.879
Metals	Silver	mg/L	n/a	0.0001[2]	12	0	0	--	--
Metals	Sodium	mg/L	n/a	-	12	12	0	45.2	42.242
Metals	Strontium	mg/L	n/a	-	12	12	0	3.03	2.744
Metals	Thallium	mg/L	n/a	0.0003[2]	12	12	0	0.00007	0.0001
Metals	Tin	mg/L	n/a	-	12	0	0	--	--
Metals	Titanium	mg/L	n/a	-	12	0	0	--	--
Metals	Vanadium	mg/L	n/a	0.006[2]	12	0	0	--	--
Metals	Zinc	mg/L	n/a	0.03[2]/0.02[3]	12	8	0	0.009	0.005
Volatiles	Benzene	ug/L	n/a	100[2]	12	0	0	--	--
Volatiles	Ethylbenzene	ug/L	n/a	8[2]	12	0	0	--	--
Volatiles	m&p-Xylenes	ug/L	n/a	-	12	0	0	--	--
Volatiles	o-Xylene	ug/L	n/a	40[2]	12	0	0	--	--
Volatiles	Toluene	ug/L	n/a	0.8[2]	12	0	0	--	--
Volatiles	Xylenes (total)	ug/L	n/a	-	12	0	0	--	--

Notes:

Screening against Effluent Limits as per ECA requirements.
Screening against PWQOs for comparison purposes only. The ECA does not require this discharge to meet PWQOs.
n/a - Not Applicable
(1) - ECA Effluent Limit.
(2) - PWQO.
(3) - PWQO/Interim PWQO.
(4) - Minimum pH measured was 8.11.
(5) - Minimum pH measured was 7.60.

Table 7.3

2024 Water Quality Results - Recharge System Pumping Station (SW53)
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Analyses	Parameters	Units	ECA Criteria	Number of Samples	Number of Detections	Number of Detections Above Effluent Limit or PWQO	Maximum Detected Concentration	Average of Detected Concentrations
General Chemistry	Oil and Grease	mg/L	15[(1)]	12	0	0	--	--
General Chemistry	pH (lab)	s.u.	6.0-9.5[(1)]	12	12	0	8.39[(4)]	8.247
General Chemistry	pH Field	s.u.	6.0-9.5[(1)]	53	53	0	8.47[(5)]	8.169
General Chemistry	Total Suspended Solids (TSS)	mg/L	25[(1)]	53	0	0	--	--
General Chemistry	Un-ionized Ammonia	mg/L	0.02[(1)(2)]	12	11	0	0.006	0.004
General Chemistry	Ammonia-N	mg/L	-	12	12	0	0.179	0.116
General Chemistry	Temperature, Field	Deg C	-	38	38	0	24.6	13.489

Notes:

Screening against Effluent Limits as per ECA requirements.
(1) - ECA Effluent Limit.
(2) - PWQO.
(3) - Minimum pH measured was 8.10.
(4) - Minimum pH measured was 7.51.

Table 7.4

2024 Water Quality Results - North Quarry Recharge System Wells
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Analyses	Parameters	Units	ECA Criteria	PWQO Criteria	Number of Samples	Number of Detections	Number of Detections Above Effluent Limit or PWQO	Maximum Detected Concentration	Average of Detected Concentrations
General Chemistry	Oil and Grease	mg/L	15[1]	n/a	36	0	0	--	--
General Chemistry	pH (lab)	s.u.	6.0-9.5[1]	n/a	36	36	0	8.49[4]	8.294
General Chemistry	pH Field	s.u.	6.0-9.5[1]	n/a	36	36	0	8.32[5]	8.156
General Chemistry	Total Suspended Solids (TSS)	mg/L	25[1]	n/a	36	0	0	--	--
General Chemistry	Un-ionized Ammonia	mg/L	0.02[1][2]	n/a	36	36	0	0.005	0.003
General Chemistry	Alkalinity, Bicarbonate	mg/L	n/a	-	36	36	0	150	135.750
General Chemistry	Alkalinity, Carbonate	mg/L	n/a	-	36	14	0	6.1	3.571
General Chemistry	Alkalinity, Total (As CaCO3)	mg/L	n/a	-	36	36	0	152	137.194
General Chemistry	Ammonia-N	mg/L	n/a	-	36	36	0	0.176	0.115
General Chemistry	Bromide	mg/L	n/a	-	36	22	0	1.03	0.674
General Chemistry	Chloride	mg/L	n/a	-	36	36	0	123	105.583
General Chemistry	Conductivity	uS/cm	n/a	-	36	36	0	1080	1037.389
General Chemistry	Fluoride	mg/L	n/a	-	36	36	0	0.254	0.207
General Chemistry	Hardness	mg/L	n/a	-	36	36	0	489	450.389
General Chemistry	Nitrate (as N)	mg/L	n/a	-	36	26	0	0.2	0.131
General Chemistry	Nitrite (as N)	mg/L	n/a	-	36	0	0	--	--
General Chemistry	Orthophosphate (dissolved)	mg/L	n/a	-	36	1	0	0.001	0.001
General Chemistry	Phosphorous	mg/L	n/a	0.03[2]	36	36	0	0.005	0.003
General Chemistry	Sulphate	mg/L	n/a	-	36	36	0	282	247.306
General Chemistry	Temperature, Field	Deg C	n/a	-	36	36	0	23.7	13.003
General Chemistry	Total Dissolved Solids (TDS)	mg/L	n/a	-	36	36	0	708	636.417
General Chemistry	Total Kjeldahl Nitrogen (TKN)	mg/L	n/a	-	36	36	0	0.624	0.427
General Chemistry	Total Organic Carbon (TOC)	mg/L	n/a	-	36	36	0	5.19	3.352
General Chemistry	Turbidity	NTU	n/a	-	36	36	0	1.14	0.539
Biological	Escherichia coli	cfu/100mL	n/a	100[2]	36	13	0	5	1.846
Biological	Total Coliform Bacteria	cfu/100mL	n/a	100[2]	31	9	4	300	145.556
Metals	Aluminum	mg/L	n/a	0.075[2]	36	36	0	0.033	0.010
Metals	Antimony	mg/L	n/a	0.02[2]	36	36	0	0.0004	0.0003
Metals	Arsenic	mg/L	n/a	0.1[2]/0.005[3]	36	36	0	0.003	0.002
Metals	Barium	mg/L	n/a	-	36	36	0	0.051	0.034
Metals	Beryllium	mg/L	n/a	1.1[2]	36	0	0	--	--
Metals	Bismuth	mg/L	n/a	-	36	0	0	--	--
Metals	Boron	mg/L	n/a	0.2[2]	36	36	0	0.174	0.157
Metals	Cadmium	mg/L	n/a	0.0002[2]/0.0005[3]	36	25	0	0.000009	0.00001
Metals	Calcium	mg/L	n/a	-	36	36	0	90	79.539
Metals	Chromium Total	mg/L	n/a	-	36	1	0	0.0005	0.0005
Metals	Cobalt	mg/L	n/a	0.0009[2]	36	36	0	0.0007	0.0003
Metals	Copper	mg/L	n/a	0.005[2]	36	0	0	--	--
Metals	Iron	mg/L	n/a	0.3[2]	36	36	0	0.049	0.021
Metals	Lead	mg/L	n/a	0.025[2]/0.005[3]	36	13	0	0.00007	0.00006
Metals	Magnesium	mg/L	n/a	-	36	36	0	65.5	61.161
Metals	Manganese	mg/L	n/a	-	36	36	0	0.010	0.003
Metals	Molybdenum	mg/L	n/a	0.04[2]	36	36	0	0.011	0.010
Metals	Nickel	mg/L	n/a	0.025[2]	36	36	0	0.007	0.004
Metals	Potassium	mg/L	n/a	-	36	36	0	7.29	6.758
Metals	Selenium	mg/L	n/a	0.1[2]	36	36	0	0.0001	0.0001
Metals	Silicon	mg/L	n/a	-	36	36	0	1.57	0.895
Metals	Silver	mg/L	n/a	0.0001[2]	36	1	0	0.00003	0.00003
Metals	Sodium	mg/L	n/a	-	36	36	0	45	42.383
Metals	Strontium	mg/L	n/a	-	36	36	0	2.97	2.728
Metals	Thallium	mg/L	n/a	0.0003[2]	36	36	0	0.00007	0.0001
Metals	Tin	mg/L	n/a	-	36	0	0	--	--
Metals	Titanium	mg/L	n/a	-	36	0	0	--	--
Metals	Vanadium	mg/L	n/a	0.006[2]	36	0	0	--	--
Metals	Zinc	mg/L	n/a	0.03[2]/0.02[3]	36	20	0	0.0082	0.005
Volatiles	Benzene	ug/L	n/a	100[2]	36	0	0	--	--
Volatiles	Ethylbenzene	ug/L	n/a	8[2]	36	0	0	--	--
Volatiles	m&p-Xylenes	ug/L	n/a	-	36	0	0	--	--
Volatiles	o-Xylene	ug/L	n/a	40[2]	36	0	0	--	--
Volatiles	Toluene	ug/L	n/a	0.8[2]	36	0	0	--	--
Volatiles	Xylenes (total)	ug/L	n/a	-	36	0	0	--	--

Notes:

Screening against Effluent Limits for comparison purposes only. The ECA does not require this discharge to meet Effluent Limits.
Screening against PWQOs for comparison purposes only. The ECA does not require this discharge to meet PWQOs.
n/a - Not Applicable
(1) - ECA Effluent Limit.
(2) - PWQO.
(3) - PWQO/Interim PWQO.
(4) - Minimum pH measured was 8.11.
(5) - Minimum pH measured was 7.90.

Table 7.5

2024 Water Quality Results - North Quarry Sump (SW38)
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Analyses	Parameters	Units	ECA Criteria	PWQO Criteria	Number of Samples	Number of Detections	Number of Detections Above Effluent Limit or PWQO	Maximum Detected Concentration	Average of Detected Concentrations
General Chemistry	Oil and Grease	mg/L	15[(1)]	n/a	12	0	0	--	--
General Chemistry	pH (lab)	s.u.	6.0-9.5[(1)]	n/a	12	12	0	8.45[(4)]	8.243
General Chemistry	pH Field	s.u.	6.0-9.5[(1)]	n/a	12	12	0	8.17[(5)]	8.009
General Chemistry	Total Suspended Solids (TSS)	mg/L	25[(1)]	n/a	12	5	0	23	11.060
General Chemistry	Un-ionized Ammonia	mg/L	0.02[(1)(2)]	n/a	12	5	0	0.005	0.002
General Chemistry	Alkalinity, Bicarbonate	mg/L	n/a	-	12	12	0	171	153.583
General Chemistry	Alkalinity, Carbonate	mg/L	n/a	-	12	3	0	8.3	4.567
General Chemistry	Alkalinity, Total (As CaCO3)	mg/L	n/a	-	12	12	0	171	155.000
General Chemistry	Ammonia-N	mg/L	n/a	-	12	12	0	0.167	0.055
General Chemistry	Bromide	mg/L	n/a	-	12	4	0	0.72	0.528
General Chemistry	Chloride	mg/L	n/a	-	12	12	0	101	89.942
General Chemistry	Conductivity	uS/cm	n/a	-	12	12	0	1100	1042.333
General Chemistry	Fluoride	mg/L	n/a	-	12	12	0	0.3	0.246
General Chemistry	Hardness	mg/L	n/a	-	12	12	0	515	477.167
General Chemistry	Nitrate (as N)	mg/L	n/a	-	12	12	0	0.284	0.182
General Chemistry	Nitrite (as N)	mg/L	n/a	-	12	0	0	--	--
General Chemistry	Orthophosphate (dissolved)	mg/L	n/a	-	12	0	0	--	--
General Chemistry	Phosphorous	mg/L	n/a	0.03[(2)]	12	12	0	0.019	0.006
General Chemistry	Sulphate	mg/L	n/a	-	12	12	0	295	265.917
General Chemistry	Temperature, Field	Deg C	n/a	-	12	12	0	22.4	12.100
General Chemistry	Total Dissolved Solids (TDS)	mg/L	n/a	-	12	12	0	724	657.750
General Chemistry	Total Kjeldahl Nitrogen (TKN)	mg/L	n/a	-	12	12	0	0.318	0.204
General Chemistry	Total Organic Carbon (TOC)	mg/L	n/a	-	12	12	0	2.72	1.718
General Chemistry	Turbidity	NTU	n/a	-	12	12	0	17.2	4.731
Biological	Escherichia coli	cfu/100mL	n/a	100[(2)]	11	10	2	430	70.100
Biological	Total Coliform Bacteria	cfu/100mL	n/a	100[(2)]	12	10	7	8000	1368.000
Metals	Aluminum	mg/L	n/a	0.075[(2)]	12	12	5	0.614	0.128
Metals	Antimony	mg/L	n/a	0.02[(2)]	12	12	0	0.0007	0.0004
Metals	Arsenic	mg/L	n/a	0.1[(2)]/0.005[(3)]	12	12	0	0.004	0.002
Metals	Barium	mg/L	n/a	-	12	12	0	0.040	0.035
Metals	Beryllium	mg/L	n/a	1.1[(2)]	12	1	0	0.00003	0.00003
Metals	Bismuth	mg/L	n/a	-	12	0	0	--	--
Metals	Boron	mg/L	n/a	0.2[(2)]	12	12	5	0.246	0.187
Metals	Cadmium	mg/L	n/a	0.0002[(2)]/0.0005[(3)]	12	12	0	0.00002	0.00001
Metals	Calcium	mg/L	n/a	-	12	12	0	103	94.775
Metals	Chromium Total	mg/L	n/a	-	12	1	0	0.0009	0.001
Metals	Cobalt	mg/L	n/a	0.0009[(2)]	12	12	11	0.005	0.003
Metals	Copper	mg/L	n/a	0.005[(2)]	12	9	0	0.002	0.001
Metals	Iron	mg/L	n/a	0.3[(2)]	12	12	1	0.742	0.148
Metals	Lead	mg/L	n/a	0.025[(2)]/0.005[(3)]	12	12	0	0.002	0.0004
Metals	Magnesium	mg/L	n/a	-	12	12	0	63.8	58.392
Metals	Manganese	mg/L	n/a	-	12	12	0	0.054	0.014
Metals	Molybdenum	mg/L	n/a	0.04[(2)]	12	12	0	0.013	0.010
Metals	Nickel	mg/L	n/a	0.025[(2)]	12	12	0	0.012	0.008
Metals	Potassium	mg/L	n/a	-	12	12	0	8.18	6.838
Metals	Selenium	mg/L	n/a	0.1[(2)]	12	12	0	0.0002	0.0001
Metals	Silicon	mg/L	n/a	-	12	12	0	2.08	1.368
Metals	Silver	mg/L	n/a	0.0001[(2)]	12	0	0	--	--
Metals	Sodium	mg/L	n/a	-	12	12	0	41	36.783
Metals	Strontium	mg/L	n/a	-	12	12	0	4.2	3.551
Metals	Thallium	mg/L	n/a	0.0003[(2)]	12	12	0	0.00009	0.0001
Metals	Tin	mg/L	n/a	-	12	0	0	--	--
Metals	Titanium	mg/L	n/a	-	12	2	0	0.015	0.010
Metals	Vanadium	mg/L	n/a	0.006[(2)]	12	1	0	0.001	0.001
Metals	Zinc	mg/L	n/a	0.03[(2)]/0.02[(3)]	12	12	4	0.063	0.021
Volatiles	Benzene	ug/L	n/a	100[(2)]	12	0	0	--	--
Volatiles	Ethylbenzene	ug/L	n/a	8[(2)]	12	0	0	--	--
Volatiles	m&p-Xylenes	ug/L	n/a	-	12	0	0	--	--
Volatiles	o-Xylene	ug/L	n/a	40[(2)]	12	0	0	--	--
Volatiles	Toluene	ug/L	n/a	0.8[(2)]	12	0	0	--	--
Volatiles	Xylenes (total)	ug/L	n/a	-	12	0	0	--	--

Notes:

Screening against Effluent Limits for comparison purposes only. The ECA does not require this discharge to meet Effluent Limits.
Screening against PWQOs for comparison purposes only. The ECA does not require this discharge to meet PWQOs.
n/a - Not Applicable
(1) - ECA Effluent Limit.
(2) - PWQO.
(3) - PWQO/Interim PWQO.
(4) - Minimum pH measured was 8.07.
(5) - Minimum pH measured was 7.78.

Table 7.6

2024 Water Quality Results - Central Sump (SW51A)
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontari

Analyses	Parameters	Units	ECA Criteria	PWQO Criteria	Number of Samples	Number of Detections	Number of Detections Above Effluent Limit or PWQO	Maximum Detected Concentration	Average of Detected Concentrations
General Chemistry	Oil and Grease	mg/L	15[1]	n/a	12	0	0	--	--
General Chemistry	pH (lab)	s.u.	6.0-9.5[1]	n/a	12	12	0	8.55[4]	8.304
General Chemistry	pH Field	s.u.	6.0-9.5[1]	n/a	12	12	0	8.13[5]	7.988
General Chemistry	Total Suspended Solids (TSS)	mg/L	25[1]	n/a	12	6	0	13.3	6.300
General Chemistry	Un-ionized Ammonia	mg/L	0.02[1][2]	n/a	12	6	0	0.003	0.002
General Chemistry	Alkalinity, Bicarbonate	mg/L	n/a	-	12	12	0	228	195.167
General Chemistry	Alkalinity, Carbonate	mg/L	n/a	-	12	6	0	16.3	7.333
General Chemistry	Alkalinity, Total (As CaCO3)	mg/L	n/a	-	12	12	0	228	199.083
General Chemistry	Ammonia-N	mg/L	n/a	-	12	11	0	0.12	0.056
General Chemistry	Bromide	mg/L	n/a	-	12	8	0	1.6	1.153
General Chemistry	Chloride	mg/L	n/a	-	12	12	0	207	165.417
General Chemistry	Conductivity	uS/cm	n/a	-	12	12	0	1520	1374.167
General Chemistry	Fluoride	mg/L	n/a	-	12	12	0	0.293	0.244
General Chemistry	Hardness	mg/L	n/a	-	12	12	0	703	613.417
General Chemistry	Nitrate (as N)	mg/L	n/a	-	12	12	0	0.822	0.520
General Chemistry	Nitrite (as N)	mg/L	n/a	-	12	0	0	--	--
General Chemistry	Orthophosphate (dissolved)	mg/L	n/a	-	12	0	0	--	--
General Chemistry	Phosphorous	mg/L	n/a	0.03[2]	12	12	0	0.007	0.005
General Chemistry	Sulphate	mg/L	n/a	-	12	12	0	354	295.083
General Chemistry	Temperature, Field	Deg C	n/a	-	12	12	0	22.7	12.717
General Chemistry	Total Dissolved Solids (TDS)	mg/L	n/a	-	12	12	0	1100	864.000
General Chemistry	Total Kjeldahl Nitrogen (TKN)	mg/L	n/a	-	12	12	0	0.561	0.309
General Chemistry	Total Organic Carbon (TOC)	mg/L	n/a	-	12	12	0	4.4	2.859
General Chemistry	Turbidity	NTU	n/a	-	12	12	0	8.29	2.823
Biological	Escherichia coli	cfu/100mL	n/a	100[2]	12	8	1	160	25.500
Biological	Total Coliform Bacteria	cfu/100mL	n/a	100[2]	12	8	5	1100	345.000
Metals	Aluminum	mg/L	n/a	0.075[2]	12	12	0	0.073	0.034
Metals	Antimony	mg/L	n/a	0.02[2]	12	12	0	0.0006	0.0004
Metals	Arsenic	mg/L	n/a	0.1[2]/0.005[3]	12	12	0	0.001	0.001
Metals	Barium	mg/L	n/a	-	12	12	0	0.031	0.028
Metals	Beryllium	mg/L	n/a	1.1[2]	12	0	0	--	--
Metals	Bismuth	mg/L	n/a	-	12	0	0	--	--
Metals	Boron	mg/L	n/a	0.2[2]	12	12	0	0.189	0.141
Metals	Cadmium	mg/L	n/a	0.0002[2]/0.0005[3]	12	12	0	0.00006	0.00003
Metals	Calcium	mg/L	n/a	-	12	12	0	110	97.625
Metals	Chromium Total	mg/L	n/a	-	12	0	0	--	--
Metals	Cobalt	mg/L	n/a	0.0009[2]	12	12	0	0.0004	0.0003
Metals	Copper	mg/L	n/a	0.005[2]	12	10	0	0.002	0.001
Metals	Iron	mg/L	n/a	0.3[2]	12	12	0	0.1	0.046
Metals	Lead	mg/L	n/a	0.025[2]/0.005[3]	12	12	1	0.007	0.001
Metals	Magnesium	mg/L	n/a	-	12	12	0	104	89.758
Metals	Manganese	mg/L	n/a	-	12	12	0	0.018	0.009
Metals	Molybdenum	mg/L	n/a	0.04[2]	12	12	0	0.022	0.014
Metals	Nickel	mg/L	n/a	0.025[2]	12	12	0	0.004	0.003
Metals	Potassium	mg/L	n/a	-	12	12	0	10.5	8.953
Metals	Selenium	mg/L	n/a	0.1[2]	12	12	0	0.0002	0.0001
Metals	Silicon	mg/L	n/a	-	12	12	0	1.6	1.197
Metals	Silver	mg/L	n/a	0.0001[2]	12	0	0	--	--
Metals	Sodium	mg/L	n/a	-	12	12	0	74	61.792
Metals	Strontium	mg/L	n/a	-	12	12	0	2.69	2.132
Metals	Thallium	mg/L	n/a	0.0003[2]	12	12	0	0.0002	0.0001
Metals	Tin	mg/L	n/a	-	12	0	0	--	--
Metals	Titanium	mg/L	n/a	-	12	0	0	--	--
Metals	Vanadium	mg/L	n/a	0.006[2]	12	0	0	--	--
Metals	Zinc	mg/L	n/a	0.03[2]/0.02[3]	12	12	6	0.19	0.040
Volatiles	Benzene	ug/L	n/a	100[2]	12	0	0	--	--
Volatiles	Ethylbenzene	ug/L	n/a	8[2]	12	0	0	--	--
Volatiles	m&p-Xylenes	ug/L	n/a	-	12	0	0	--	--
Volatiles	o-Xylene	ug/L	n/a	40[2]	12	0	0	--	--
Volatiles	Toluene	ug/L	n/a	0.8[2]	12	0	0	--	--
Volatiles	Xylenes (total)	ug/L	n/a	-	12	0	0	--	--

Notes:

Screening against Effluent Limits for comparison purposes only. The ECA does not require this discharge to meet Effluent Limits.
Screening against PWQOs for comparison purposes only. The ECA does not require this discharge to meet PWQOs.
n/a - Not Applicable
(1) - ECA Effluent Limit.
(2) - PWQO.
(3) - PWQO/Interim PWQO.
(4) - Minimum pH measured was 8.12.
(5) - Minimum pH measured was 7.70.

Table 8.1

Residential Well Water Level Data
2024 Annual Monitoring Report
Dufferin Milton Quarry
Region of Halton, Ontario

Sample Location	Sample Date	Measuring Point Elevation (m AMSL)	Depth to Water (m bref)	Water Elevation (m AMSL)	Remark
DW99	3/25/2024	312.83	7.53	305.30	--
DW99	6/19/2024	312.83	8.34	304.49	--
DW99	9/25/2024	312.83	8.64	304.19	--
DW100	3/25/2024	319.38	5.48	313.90	--
DW100	6/19/2024	319.38	5.89	313.49	--
DW100	9/25/2024	319.38	5.95	313.43	--
DW103	3/28/2024	319.35	3.50	315.85	--
DW103	6/28/2024	319.35	3.54	315.81	--
DW103	9/25/2024	319.35	4.13	315.22	--
DW104	3/25/2024	320.67	4.90	315.77	--
DW104	6/19/2024	320.67	5.20	315.47	--
DW104	9/25/2024	320.67	5.21	315.46	--
DW130	3/27/2024	333.01	2.98	330.03	--
DW130	6/19/2024	333.01	3.20	329.81	--
DW130	9/26/2024	333.01	4.06	328.95	--
DW132A	3/15/2024	343.57	6.28	337.29	--
DW132A	6/27/2024	343.57	6.70	336.87	--
DW132A	9/26/2024	343.57	6.90	336.67	--
DW133	3/27/2024	344.51	4.55	339.96	--
DW133	6/27/2024	344.51	4.67	339.84	--
DW133	9/26/2024	344.51	5.44	339.07	--
DW136	3/26/2024	325.41	3.14	322.27	--
DW136	6/27/2024	325.41	3.13	322.28	--
DW136	9/27/2024	325.41	3.25	322.16	--
DW137	3/25/2024	322.35	2.04	320.31	--
DW137	6/19/2024	322.35	3.12	319.23	--
DW137	9/27/2024	322.35	2.31	320.04	--
DW140	3/27/2024	351.40	7.91	343.49	--
DW140	6/27/2024	351.40	8.64	342.76	--
DW140	9/25/2024	351.40	9.22	342.18	--
DW140A	3/27/2024	350.32	6.78	343.54	--
DW140A	6/27/2024	350.32	7.53	342.79	--
DW140A	9/25/2024	350.32	8.12	342.20	--
DW142A	3/26/2024	341.81	1.30	340.51	--
DW142A	6/27/2024	341.81	1.52	340.29	--
DW142A	9/26/2024	341.81	2.10	339.71	--
DW142A	10/30/2024	341.81	2.44	339.37	--

Note:

Measuring point elevations based on GHD survey data.
m bref - meters below reference elevation.

Table 8.2

Analytical Results Summary
Residential Wells
2024 Milton Annual Monitoring Report

		Sample Location:	DW100	DW103	DW103	DW103
		Sample ID:	GW-10978-262-47-121124-RC103	GW-10978-262-47-032824-RC105	GW-10978-262-47-062824-RC105	GW-10978-262-47-092524-RC105
		Sample Date:	12/11/2024	3/28/2024	6/28/2024	9/25/2024
Analyses	**Parameters**	**Units**				
Metals	Aluminum	mg/L	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)
Metals	Antimony	mg/L	ND (0.00010)	ND (0.00010)	0.00011	ND (0.00010)
Metals	Arsenic	mg/L	0.00011	0.00010	0.00010	ND (0.00010)
Metals	Barium	mg/L	0.00621	0.0185	0.0243	0.0225
Metals	Beryllium	mg/L	ND (0.000020)	ND (0.000020)	ND (0.000020)	ND (0.000020)
Metals	Bismuth	mg/L	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)
Metals	Boron	mg/L	0.014	0.057	0.097	0.086
Metals	Cadmium	mg/L	0.0000485	0.0000576	0.0000522	0.0000540
Metals	Caesium	mg/L	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)
Metals	Calcium	mg/L	89.6	86.4	86.5	87.3
Metals	Chromium Total	mg/L	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Metals	Cobalt	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Metals	Copper	mg/L	0.0200	0.00798	0.00404	0.00508
Metals	Iron	mg/L	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Metals	Lead	mg/L	0.000296	0.000964	0.000604	0.000522
Metals	Lithium	mg/L	ND (0.0010)	0.0051	0.0094	0.0068
Metals	Magnesium	mg/L	45.8	57.5	57.3	52.3
Metals	Manganese	mg/L	0.00012	0.00012	0.00011	ND (0.00010)
Metals	Molybdenum	mg/L	0.000163	0.00112	0.00302	0.00158
Metals	Nickel	mg/L	ND (0.00050)	0.00080	0.00062	0.00056
Metals	Phosphorous	mg/L	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Metals	Potassium	mg/L	0.436	2.63	4.24	3.06
Metals	Rubidium	mg/L	0.00046	0.00132	0.00178	0.00160
Metals	Selenium	mg/L	0.000125	0.000075	0.000053	ND (0.000050)
Metals	Silicon	mg/L	1.68	1.96	1.49	1.68
Metals	Silver	mg/L	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)
Metals	Sodium	mg/L	8.76	19.3	**29.1**	**25.0**
Metals	Strontium	mg/L	0.0587	0.892	1.58	1.18
Metals	Sulphur	mg/L	7.44	37.8	59.8	53.2
Metals	Tellurium	mg/L	ND (0.00020)	ND (0.00020)	0.00023	ND (0.00020)
Metals	Thallium	mg/L	ND (0.000010)	0.000032	0.000051	0.000044
Metals	Thorium	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Metals	Tin	mg/L	ND (0.00010)	0.00059	ND (0.00010)	ND (0.00010)
Metals	Titanium	mg/L	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)
Metals	Tungsten	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Metals	Uranium	mg/L	0.000152	0.000398	0.000586	0.000436
Metals	Vanadium	mg/L	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Metals	Zinc	mg/L	0.0247	0.0523	0.0553	0.0472
Metals	Zirconium	mg/L	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)
Biological	Escherichia coli	cfu/100mL	ND (1)	ND (1)	ND (1)	ND (1) PEHT
Biological	Total Coliform Bacteria	cfu/100mL	ND (1)	ND (1)	7	ND (1) PEHT
General Chemistry	Alkalinity, Bicarbonate	mg/L	401	320	235	243
General Chemistry	Alkalinity, Carbonate	mg/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
General Chemistry	Alkalinity, Hydroxide	mg/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
General Chemistry	Alkalinity, Phenolphthalein	mg/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
General Chemistry	Alkalinity, Total (As CaCO3)	mg/L	401	320	235	243
General Chemistry	Ammonia-N	mg/L	ND (0.0050)	ND (0.0050)	ND (0.0050)	0.0924
General Chemistry	Bromide	mg/L	ND (0.10)	0.24	0.75	0.30
General Chemistry	Chloride (Dissolved)	mg/L	13.6	43.4	71.6	65.8

Table 8.2

Analytical Results Summary
Residential Wells
2024 Milton Annual Monitoring Report

		Sample Location:	DW100	DW103	DW103	DW103
		Sample ID:	GW-10978-262-47-121124-RC103	GW-10978-262-47-032824-RC105	GW-10978-262-47-062824-RC105	GW-10978-262-47-092524-RC105
		Sample Date:	12/11/2024	3/28/2024	6/28/2024	9/25/2024
Analyses	**Parameters**	**Units**				
General Chemistry	Conductivity	uS/cm	772	877	936	942
General Chemistry	Fluoride	mg/L	0.073	0.080	0.092	0.088
General Chemistry	Hardness Calculation	mg/L	412	452	452	433
General Chemistry	Nitrate (as N)	mg/L	0.722	0.134	0.288	0.256
General Chemistry	Nitrite (as N)	mg/L	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
General Chemistry	Orthophosphate (dissolved)	mg/L	0.0014	0.0012	0.0013	0.0010
General Chemistry	pH (lab)	s.u.	7.91	8.14	7.94	8.13
General Chemistry	Phosphorous	mg/L	ND (0.0020)	ND (0.0020)	0.0028	ND (0.0020)
General Chemistry	Sulphate (Dissolved)	mg/L	20.3	95.3	165	149
General Chemistry	Total Dissolved Solids (TDS)	mg/L	387 DLDS	481 DLDS	554 DLDS	587 DLDS
General Chemistry	Total Kjeldahl Nitrogen (TKN)	mg/L	0.132	0.052	0.066	0.176
General Chemistry	Total Organic Carbon (TOC)	mg/L	0.83	1.29	1.11	1.02
General Chemistry	Total Suspended Solids (TSS)	mg/L	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)
General Chemistry	Turbidity	NTU	ND (0.10)	ND (0.10)	ND (0.10)	0.14

Notes:
DLDS - Detection limit raised: Dilution required due to high Dissolved Solids/Electrical Conductivity.
DLM - Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
ND - Not detected at the associated reporting limit.
PEHT - Parameter Exceeded Recommended Holding Time Prior to Analysis.
TKNI - TKN result is likely biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Criteria Notes:
(1) Ministry of the Environment (MOE), Ontario Drinking Water Standards (ODWS), August 2000, revised January 2001 and June 2003, where applicable.
(2) Sodium is a non-health based standard, but maybe of concern to individuals with sodium reduced diets.
(3)The local guidance for Total Coliform Bacteria is 5 or less in samples 1 to 3 weeks apart.

Table 8.2

Analytical Results Summary
Residential Wells
2024 Milton Annual Monitoring Report

	Sample Location:	DW103	DW104	DW105	DW106	DW107
	Sample ID:	GW-10978-262-47-120924-RC105	GW-10978-262-47-120924-RC106	GW-10978-262-47-112024-RC107	GW-10978-262-47-112024-RC108	GW-10978-262-47-121024-RC109
	Sample Date:	12/9/2024	12/9/2024	11/20/2024	11/20/2024	12/10/2024
Parameters	**Units**					
Aluminum	mg/L	0.0034	ND (0.0030)	ND (0.0030)	ND (0.0030)	0.0068
Antimony	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Arsenic	mg/L	0.00012	0.00014	0.00012	0.00014	0.00013
Barium	mg/L	0.0329	0.0398	0.0221	0.00722	0.0441
Beryllium	mg/L	ND (0.000020)	ND (0.000020)	ND (0.000020)	ND (0.000020)	ND (0.000020)
Bismuth	mg/L	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)
Boron	mg/L	0.119	ND (0.010)	0.123	0.021	0.069
Cadmium	mg/L	0.0000515	0.0000237	0.0000221	0.0000542	0.0000528
Caesium	mg/L	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)
Calcium	mg/L	89.5	77.1	88.3	92.3	96.2
Chromium Total	mg/L	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Cobalt	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Copper	mg/L	0.00363	0.0102	0.0133	0.00961	0.00670
Iron	mg/L	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Lead	mg/L	0.000529	0.000176	0.00134	0.000298	0.000284
Lithium	mg/L	0.0107	ND (0.0010)	0.0044	ND (0.0010)	0.0033
Magnesium	mg/L	56.2	36.9	54.4	49.2	49.1
Manganese	mg/L	0.00019	ND (0.00010)	0.00079	ND (0.00010)	0.00020
Molybdenum	mg/L	0.00189	0.000615	0.00216	0.000316	0.00119
Nickel	mg/L	0.00051	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Phosphorous	mg/L	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Potassium	mg/L	4.72	0.636	7.52	0.594	2.03
Rubidium	mg/L	0.00217	0.00061	0.00109	0.00034	0.00214
Selenium	mg/L	ND (0.000050)	0.000085	ND (0.000050)	0.000111	ND (0.000050)
Silicon	mg/L	1.57	2.86	1.80	1.86	2.32
Silver	mg/L	0.000022	ND (0.000010)	ND (0.000010)	0.000012	0.000012
Sodium	mg/L	**34.7**	10.4	**60.1**	**43.8**	**24.8**
Strontium	mg/L	1.67	0.260	1.09	0.0510	0.732
Sulphur	mg/L	75.8	6.83	78.0	3.63	52.2
Tellurium	mg/L	0.00026	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)
Thallium	mg/L	0.000065	ND (0.000010)	0.000017	ND (0.000010)	0.000068
Thorium	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Tin	mg/L	ND (0.00010)	ND (0.00010)	0.00013	ND (0.00010)	ND (0.00010)
Titanium	mg/L	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)
Tungsten	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Uranium	mg/L	0.000458	0.000258	0.000475	0.000172	0.000469
Vanadium	mg/L	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Zinc	mg/L	0.0416	0.0143	0.0316	0.0292	0.0464
Zirconium	mg/L	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)
Escherichia coli	cfu/100mL	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Total Coliform Bacteria	cfu/100mL	ND (1)	ND (1)	140 DLM	ND (2) DLM	ND (1)
Alkalinity, Bicarbonate	mg/L	193	320	214	362	264
Alkalinity, Carbonate	mg/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Alkalinity, Hydroxide	mg/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Alkalinity, Phenolphthalein	mg/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Alkalinity, Total (As CaCO3)	mg/L	193	320	214	362	264
Ammonia-N	mg/L	0.0079	ND (0.0050)	0.0071	0.0398	0.0821
Bromide	mg/L	0.46 DLDS	ND (0.10)	ND (0.50) DLM	ND (0.50) DLM	0.27
Chloride (Dissolved)	mg/L	89.4 DLDS	19.4	94.7 DLM	102 DLM	59.8

Table 8.2

Analytical Results Summary
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	Sample Location:	DW103	DW104	DW105	DW106	DW107
	Sample ID:	GW-10978-262-47-120924-RC105	GW-10978-262-47-120924-RC106	GW-10978-262-47-112024-RC107	GW-10978-262-47-112024-RC108	GW-10978-262-47-121024-RC109
	Sample Date:	12/9/2024	12/9/2024	11/20/2024	11/20/2024	12/10/2024
Parameters	**Units**					
Conductivity	uS/cm	996	653	1090	990	889
Fluoride	mg/L	0.108 DLDS	0.064	0.107 DLM	ND (0.100) DLM	0.069
Hardness Calculation	mg/L	455	344	444	433	442
Nitrate (as N)	mg/L	0.329 DLDS	0.170	0.262 DLM	1.42 DLM	0.096
Nitrite (as N)	mg/L	ND (0.020) DLDS	ND (0.010)	ND (0.050) DLM	ND (0.050) DLM	ND (0.010)
Orthophosphate (dissolved)	mg/L	ND (0.0010)	0.0013	0.0013	0.0014	ND (0.0010)
pH (lab)	s.u.	8.05	7.98	8.02	7.84	7.97
Phosphorous	mg/L	0.0026	ND (0.0020)	ND (0.0020)	ND (0.0020)	0.0024
Sulphate (Dissolved)	mg/L	210 DLDS	18.7	220 DLM	8.90 DLM	134
Total Dissolved Solids (TDS)	mg/L	664 DLDS	364 DLDS	621 DLDS	468 DLDS	554 DLDS
Total Kjeldahl Nitrogen (TKN)	mg/L	0.089	0.085	0.067	0.288	0.150
Total Organic Carbon (TOC)	mg/L	0.59	0.53	0.62	0.92	0.67
Total Suspended Solids (TSS)	mg/L	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)
Turbidity	NTU	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	0.19

Notes:
DLDS - Detection limit raised: Dilution requir
Dissolved Solids/Electrical Conductivity.
DLM - Detection Limit Adjusted due to sampl
effects (e.g. chemical interference, colo
ND - Not detected at the associated reporting
PEHT - Parameter Exceeded Recommended
Holding Time Prior to Analysis.
TKNI - TKN result is likely biased low due to N
Nitrate-N is > 10x TKN.

Criteria Notes:
(1) Ministry of the Environment (MOE), Ontari
Standards (ODWS), August 2000, revised Ja
and June 2003, where applicable.
(2) Sodium is a non-health based standard, b
concern to individuals with sodium reduced d
(3)The local guidance for Total Coliform Bact
less in samples 1 to 3 weeks apart.

Table 8.2

Analytical Results Summary
Residential Wells
2024 Milton Annual Monitoring Report

	Sample Location:	DW128	DW128A	DW129	DW132A	DW132A
	Sample ID:	GW-10978-262-47-121024-RC114	GW-10978-262-47-121024-RC115	GW-10978-262-47-112024-RC116	GW-10978-262-2024-47-031524-RC120	GW-10978-262-47-120924-RC120
	Sample Date:	12/10/2024	12/10/2024	11/20/2024	3/15/2024	12/9/2024
Parameters	**Units**					
Aluminum	mg/L	0.0034	ND (0.0030)	ND (0.0030)	0.0104	0.0096
Antimony	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	0.00010	0.00016
Arsenic	mg/L	0.00021	0.00020	0.00013	0.00018	0.00026
Barium	mg/L	0.00027	0.133	0.0241	0.0525	0.0789
Beryllium	mg/L	ND (0.000020)	ND (0.000020)	ND (0.000020)	ND (0.000020)	ND (0.000020)
Bismuth	mg/L	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)
Boron	mg/L	0.071	0.014	0.012	0.011	ND (0.010)
Cadmium	mg/L	ND (0.0000050)	0.0000271	0.000141	0.000161	0.000152
Caesium	mg/L	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)
Calcium	mg/L	0.334	72.2	80.7	106	91.5
Chromium Total	mg/L	ND (0.00050)	ND (0.00050)	ND (0.00050)	0.00132	0.00267
Cobalt	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Copper	mg/L	0.00739	0.00223	0.00551	0.0176	0.00790
Iron	mg/L	ND (0.010)	ND (0.010)	ND (0.010)	0.103	0.298
Lead	mg/L	0.000582	0.000129	0.000670	0.00168	0.00237
Lithium	mg/L	0.0145	0.0016	ND (0.0010)	ND (0.0010)	ND (0.0010)
Magnesium	mg/L	0.161	30.9	43.5	36.1	37.0
Manganese	mg/L	0.00014	0.150	ND (0.00010)	0.00480	0.00810
Molybdenum	mg/L	0.00120	0.00182	0.00140	0.00264	0.00512
Nickel	mg/L	0.00166	0.00181	0.00122	0.00248	0.00460
Phosphorous	mg/L	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Potassium	mg/L	0.159	0.686	0.422	1.37	0.713
Rubidium	mg/L	ND (0.00020)	0.00075	0.00049	0.00045	0.00072
Selenium	mg/L	ND (0.000050)	ND (0.000050)	0.000099	0.000180	0.000103
Silicon	mg/L	2.82	3.37	1.78	2.24	2.38
Silver	mg/L	ND (0.000010)	ND (0.000010)	ND (0.000010)	0.000065	0.000053
Sodium	mg/L	**203**	7.09	2.60	**117**	**74.3**
Strontium	mg/L	0.00452	0.567	0.0523	0.143	0.0900
Sulphur	mg/L	42.2	7.42	3.56	6.34	6.21
Tellurium	mg/L	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)
Thallium	mg/L	ND (0.000010)	0.000013	0.000021	0.000028	0.000057
Thorium	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Tin	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	0.00029	0.00030
Titanium	mg/L	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)
Tungsten	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Uranium	mg/L	0.000327	0.000138	0.000414	0.000776	0.00120
Vanadium	mg/L	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Zinc	mg/L	ND (0.0030)	0.0094	0.192	0.108	0.210
Zirconium	mg/L	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)
Escherichia coli	cfu/100mL	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Total Coliform Bacteria	cfu/100mL	ND (1)	1	ND (2) DLM	ND (1)	ND (1)
Alkalinity, Bicarbonate	mg/L	252	285	366	315	339
Alkalinity, Carbonate	mg/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Alkalinity, Hydroxide	mg/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Alkalinity, Phenolphthalein	mg/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Alkalinity, Total (As CaCO3)	mg/L	252	285	366	315	339
Ammonia-N	mg/L	0.0206	0.0276	0.0121	ND (0.0050)	0.0219
Bromide	mg/L	0.24	ND (0.10)	ND (0.10)	ND (0.50) DLDS	ND (0.10)
Chloride (Dissolved)	mg/L	56.6	11.6	4.57	244 DLDS	130

Table 8.2

Analytical Results Summary
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	Sample Location:	DW128	DW128A	DW129	DW132A	DW132A
	Sample ID:	GW-10978-262-47-121024-RC114	GW-10978-262-47-121024-RC115	GW-10978-262-47-112024-RC116	GW-10978-262-2024-47-031524-RC120	GW-10978-262-47-120924-RC120
	Sample Date:	12/10/2024	12/10/2024	11/20/2024	3/15/2024	12/9/2024
Parameters	**Units**					
Conductivity	uS/cm	903	579	683	1360	1030
Fluoride	mg/L	0.108	0.080	0.074	ND (0.100) DLDS	0.058
Hardness Calculation	mg/L	1.50	308	381	413	381
Nitrate (as N)	mg/L	0.026	ND (0.020)	0.708	1.58 DLDS	0.235
Nitrite (as N)	mg/L	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.050) DLDS	ND (0.010)
Orthophosphate (dissolved)	mg/L	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
pH (lab)	s.u.	8.05	8.07	7.91	7.82	8.09
Phosphorous	mg/L	0.0028	0.0022	ND (0.0020)	0.0021	0.0021
Sulphate (Dissolved)	mg/L	116	19.6	9.30	15.4 DLDS	17.0
Total Dissolved Solids (TDS)	mg/L	544 DLDS	325 DLDS	328 DLDS	682 DLDS	557 DLDS
Total Kjeldahl Nitrogen (TKN)	mg/L	0.088	0.100	0.168	0.294	0.102
Total Organic Carbon (TOC)	mg/L	1.09	1.45	0.74	1.16	0.70
Total Suspended Solids (TSS)	mg/L	ND (3.0)	ND (3.0)	ND (3.0)	6.1	7.8
Turbidity	NTU	ND (0.10)	ND (0.10)	0.10	1.58	0.96

Notes:
DLDS - Detection limit raised: Dilution requir
Dissolved Solids/Electrical Conductivity.
DLM - Detection Limit Adjusted due to sampl
effects (e.g. chemical interference, colo
ND - Not detected at the associated reporting
PEHT - Parameter Exceeded Recommended
Holding Time Prior to Analysis.
TKNI - TKN result is likely biased low due to N
Nitrate-N is > 10x TKN.

Criteria Notes:
(1) Ministry of the Environment (MOE), Ontari
Standards (ODWS), August 2000, revised Ja
and June 2003, where applicable.
(2) Sodium is a non-health based standard, b
concern to individuals with sodium reduced d
(3)The local guidance for Total Coliform Bact
less in samples 1 to 3 weeks apart.

Table 8.2

Analytical Results Summary
Residential Wells
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	Sample Location:	DW136	DW137	DW140	DW140A	DW142A
	Sample ID:	GW-10978-262-47-121024-RC110	GW-10978-262-47-120924-RC111	GW-10978-262-47-092524-RC125	GW-10978-262-47-092524-RC126	GW-10978-262-47-103024-RC127
	Sample Date:	12/10/2024	12/9/2024	9/25/2024	9/25/2024	10/30/2024
Parameters	**Units**					
Aluminum	mg/L	0.0047	ND (0.0030)	ND (0.0030)	0.0033	0.0056
Antimony	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	0.00014
Arsenic	mg/L	0.00029	0.00024	0.00026	0.00012	**0.0152**
Barium	mg/L	0.0738	0.0858	0.0151	0.0172	0.105
Beryllium	mg/L	ND (0.000020)	ND (0.000020)	ND (0.000020)	ND (0.000020)	ND (0.000020)
Bismuth	mg/L	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)
Boron	mg/L	0.020	0.017	0.048	0.020	ND (0.010)
Cadmium	mg/L	0.0000435	0.0000563	0.000267	0.000157	ND (0.0000050)
Caesium	mg/L	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)
Calcium	mg/L	90.5	91.9	99.6	84.2	89.9
Chromium Total	mg/L	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Cobalt	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	0.00043
Copper	mg/L	0.0201	0.0158	0.00719	0.00395	0.00366
Iron	mg/L	0.149	0.047	ND (0.010)	ND (0.010)	3.08
Lead	mg/L	0.000821	0.000328	0.000624	0.000770	0.000180
Lithium	mg/L	0.0020	0.0026	ND (0.0010)	ND (0.0010)	ND (0.0010)
Magnesium	mg/L	34.0	34.9	30.8	20.6	37.6
Manganese	mg/L	0.00680	0.00117	0.00020	ND (0.00010)	0.0390
Molybdenum	mg/L	0.00118	0.00176	0.000494	0.000169	0.00458
Nickel	mg/L	0.00061	0.00084	0.00171	0.00130	0.00345
Phosphorous	mg/L	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Potassium	mg/L	3.12	2.62	5.80	6.40	0.562
Rubidium	mg/L	0.00156	0.00204	0.00079	0.00123	0.00110
Selenium	mg/L	0.000255	0.000271	0.00114	0.000571	0.000084
Silicon	mg/L	4.63	5.08	3.82	3.15	3.33
Silver	mg/L	0.000012	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)
Sodium	mg/L	**94.0**	**70.4**	8.07	8.77	**67.9**
Strontium	mg/L	0.223	0.344	0.100	0.123	0.0808
Sulphur	mg/L	10.8	14.3	3.61	4.90	7.72
Tellurium	mg/L	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)
Thallium	mg/L	0.000059	0.000091	0.000069	0.000063	0.000042
Thorium	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Tin	mg/L	ND (0.00010)	ND (0.00010)	0.00010	ND (0.00010)	ND (0.00010)
Titanium	mg/L	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)
Tungsten	mg/L	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Uranium	mg/L	0.000610	0.000833	0.000284	0.000181	0.000119
Vanadium	mg/L	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Zinc	mg/L	0.0249	0.0441	0.270	0.215	0.0260
Zirconium	mg/L	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	0.00131
Escherichia coli	cfu/100mL	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Total Coliform Bacteria	cfu/100mL	30 DLM	ND (1)	16	ND (1)	ND (10) DLM
Alkalinity, Bicarbonate	mg/L	314	314	349	274	358
Alkalinity, Carbonate	mg/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Alkalinity, Hydroxide	mg/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Alkalinity, Phenolphthalein	mg/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Alkalinity, Total (As CaCO3)	mg/L	314	314	349	274	358
Ammonia-N	mg/L	0.0175	ND (0.0050)	0.0299	0.0281	0.229
Bromide	mg/L	ND (0.50) DLDS	ND (0.20) DLDS	ND (0.10)	ND (0.10)	ND (0.50) DLDS
Chloride (Dissolved)	mg/L	151 DLDS	118 DLDS	10.2	9.21	117 DLDS

Table 8.2

Analytical Results Summary
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	Sample Location:	DW136	DW137	DW140	DW140A	DW142A
	Sample ID:	GW-10978-262-47-121024-RC110	GW-10978-262-47-120924-RC111	GW-10978-262-47-092524-RC125	GW-10978-262-47-092524-RC126	GW-10978-262-47-103024-RC127
	Sample Date:	12/10/2024	12/9/2024	9/25/2024	9/25/2024	10/30/2024
Parameters	**Units**					
Conductivity	uS/cm	1120	1030	773	634	1040
Fluoride	mg/L	ND (0.100) DLDS	0.070 DLDS	0.067	0.087	ND (0.100) DLDS
Hardness Calculation	mg/L	366	373	376	295	379
Nitrate (as N)	mg/L	4.00 DLDS	3.02 DLDS	9.61	7.17	ND (0.100) DLDS
Nitrite (as N)	mg/L	ND (0.050) DLDS	ND (0.020) DLDS	ND (0.010)	ND (0.010)	ND (0.050) DLDS
Orthophosphate (dissolved)	mg/L	0.0011	ND (0.0010)	0.0030	ND (0.0010)	ND (0.0010)
pH (lab)	s.u.	7.98	7.94	8.04	8.06	7.67
Phosphorous	mg/L	0.0031	ND (0.0020)	0.0033	ND (0.0020)	0.0048
Sulphate (Dissolved)	mg/L	28.7 DLDS	39.9 DLDS	9.61	13.0	20.4 DLDS
Total Dissolved Solids (TDS)	mg/L	625 DLDS	570 DLDS	435 DLDS	357 DLDS	563 DLDS
Total Kjeldahl Nitrogen (TKN)	mg/L	0.381 TKNI	0.369	0.488 TKNI	0.410 TKNI	0.536
Total Organic Carbon (TOC)	mg/L	0.98	1.40	1.85	1.12	7.72
Total Suspended Solids (TSS)	mg/L	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)
Turbidity	NTU	0.97	ND (0.10)	ND (0.10)	ND (0.10)	8.35

Notes:
DLDS - Detection limit raised: Dilution requir
Dissolved Solids/Electrical Conductivity.
DLM - Detection Limit Adjusted due to sampl
effects (e.g. chemical interference, colo
ND - Not detected at the associated reporting
PEHT - Parameter Exceeded Recommended
Holding Time Prior to Analysis.
TKNI - TKN result is likely biased low due to N
Nitrate-N is > 10x TKN.

Criteria Notes:
(1) Ministry of the Environment (MOE), Ontari
Standards (ODWS), August 2000, revised Ja
and June 2003, where applicable.
(2) Sodium is a non-health based standard, b
concern to individuals with sodium reduced d
(3)The local guidance for Total Coliform Bact
less in samples 1 to 3 weeks apart.