

Proposed Milton Quarry East Extension **JART COMMENT SUMMARY TABLE – Adaptive Management Plan**

Please accept the following as feedback from the Milton Quarry Joint Agency Review Team (JART). Fully addressing each comment below will help expedite the potential for resolutions of the consolidated JART objections and individual agency objections. **Additional, new comments may be provided once a response has been prepared to the comments raised below and additional information provided.**

	JART Comments (December, 2022)	Reference	Source of Comment	Applicant Response (January 2023)	JART Response
Report/Date: Addendum to Updated Adaptive Environmental Management and Protection Plan (AMP) December 2021 Author: GHD & Goodban Ecological Consulting Inc. (GEC)					
1.	Standard 1.2.28 under Operations requires "any recommendations and/or monitoring program(s) identified in the technical reports." While the AMP and WMS are referenced on the Site Plans (page 2 of 4) and specific direction is provided in Section D (DI and D2) to implement the AMP, monitoring locations, frequency and parameters are not incorporated into the Site Plans.	Standard 1.2.28 (Page 2 of 4)	Daryl W. Cowell	The proposed approach to inclusion of the AMP in the Site Plans is acceptable to MNRF. The adaptive management approach is intended to be flexible and allows for adjustment to monitoring locations, frequency, and parameters. This process includes formal documentation through annual reporting and discussion with the Agencies at the annual water meeting. The monitoring program is intended to adapt to observed conditions and would necessitate cumbersome annual site plan revisions/approvals. As a result, the MNDMNRF has opted to implement the plan by reference to the AMP document, as may be amended from time-to-time.	
2.	The WMS is described in the AMP Addendum and is noted as having "been in place and operating successfully since 2007" (page 2) with regard to groundwater recharge (injection wells) and diffuse wetland water augmentation in the license areas of the West and East cells. I have not confirmed this statement, however, if successful, newly planned injection wells for the MQEE should mitigate at least some groundwater impact during extraction. It is understood that recharge via the injection wells will continue beyond extraction until groundwater monitoring targets are met. These targets have not yet been established (see comment #2 in Progressive and Final Rehabilitation table.	Addendum to Updated AMP	Daryl W. Cowell	The methodology for establishing groundwater level targets has been implemented at both Milton Quarry, and more recently, Acton Quarry. The targets are determined in consultation with the Agencies and will be submitted in a Pre-Extraction Report, prior to extraction below the groundwater table in the MQEE area. This approach beneficially allows the target levels to be calculated using the maximum amount of data collected prior to the commencement of extraction. Furthermore, target levels are the subject of ongoing review, annual reporting, and if necessary, adjustment.	
3.	The AMP does not include water quality/chemistry sampling and monitoring other than that currently underway for recharge water taken from the existing reservoir. The Water Resources Assessment Report specifically notes potential contamination during excavation in the form of elevated turbidity, suspended solids ammonia and bacteria (Geology and Water Resources Report, Section 10.3.4) which would warrant on-going groundwater monitoring in monitoring wells adjacent to the MQEE extraction area.	Geology and Water Resources Report, Section 10.3.4	Daryl W. Cowell	<p>The proposed water quality/chemistry monitoring program is suitable and sufficient. Monitoring of water quality is completed proactively as it is drawn from the Reservoir and prior to discharge, rather than downgradient at an unidentified receptor. Samples are also collected throughout the recharge system, including at 3 recharge wells spaced near, mid-distance, and distant from the Pumping Station.</p> <p>The sampling program has been established for the WMS and is regulated under an Industrial Sewage Works Environmental Compliance Approval (ISW ECA# 6124-C42GL4). Any necessary adjustments to the sampling program</p>	

	JART Comments (December, 2022)	Reference	Source of Comment	Applicant Response (January 2023)	JART Response
				associated with the MQEE will be determined in consultation with the MECP.	
4.	The AMP provides a map showing the proposed locations of groundwater and surface water monitoring locations, including background monitoring (Figures 4 and 7, Part I). No minimum levels or trigger levels are provided in the AMP but it commits to including these following "minimum 3-year baseline water level monitoring". Trigger well 83.21 will actually be a minimum of 2-years (page 4, footnote).	Addendum to Updated AMP	Daryl W. Cowell	<p>As discussed above in AMP comment #2, the targets will be established and provided to the Agencies for review prior to extraction below the groundwater table in the MQEE.</p> <p>If less than 3 years of data is available, the target level determination will combine recent water level data with older data from background and other monitoring well data to develop surrogate historical baseline data similar to that derived for the existing quarry.</p>	
5.	The AMP does not refer to the presence of karst nor directly provide contingencies should karst be encountered. However, the Response Action Plan (Part II, Section C), in the case of a trigger well water level below the target level (Yellow Zone, Section 2.2.2), includes potential actions relating to discharges into the excavation. Responses could include quarry wall buttressing, grouting and/or the creation of an hydraulic dam (Footnote 11, page 4, Part II, Section C). This would cover problematical karst fractures/conduits. Similar responses are proposed in the case of continued low surface water levels in wetlands (Part II, Section C, page 6).	Addendum to Updated AMP	Daryl W. Cowell	<p>This understanding is consistent with GHD's proposal and was also supported by Dufferin's karst expert, Dr. Worthington who concluded:</p> <p>"Consequently, it is concluded that karst issues are most unlikely to be a concern in the development of the East Extension and if karst issues were encountered, the mitigation and monitoring plan described by GHD would ensure the protection of water resources." (GWRA, Appendix E, page 5)</p>	
6.	It is noted in Section 2.4.1 that "the watermain will generally be installed within a 10 m wide disturbance zone which will not encroach into the buffers for Significant Woodlands or Significant Wetlands". The combined width of the buffer and the disturbance zone should be clarified for the significant woodland on the southeast side of the study area. The use of the word "generally" implies that there are some areas where the watermain may be installed within the buffer. Any reduction in buffer width should be explicitly shown and justification provided. The location of the access road in this area should also be clarified.	Section 2.4.1	Sarah Mainguy, NSE	<p>Please refer to the response provided for Comment 20 in the Natural Environment Comment Matrix. Please also refer to Tab D, Figure 1, in the Natural Environment Comment Matrix.</p> <p>The buffer that has been recommended is a <i>minimum</i> of 10 m in width, plus an additional 10 m wide area to accommodate the WMS, e.g., watermain and access road, CV Huts, etc., resulting in a 20 m extraction setback to the Significant Woodland boundary.</p> <p>The 10 m Significant Woodland is the <i>minimum</i> buffer that will be applied. The Significant Woodland boundary on the MQEE property is approximately 2340 m in length. The 10 m buffer applies to only 215 m of the Significant Woodland boundary. The edge of the Significant Woodland in these areas is well established and no new woodland edges will be created.</p>	

	JART Comments (December, 2022)	Reference	Source of Comment	Applicant Response (January 2023)	JART Response
				<p>As shown on Natural Environment Comment Matrix, Tab D, Figure 2, adjacent to the southeast portion of the proposed MQEE extraction area, there are two sections of the Significant Woodland boundary where a 10 m buffer and 10 m WMS setback was applied. The edge of the Significant Woodland is generally comprised of younger successional growth next to the long-established mature forest edge. This was readily apparent during the site visits. This can clearly be seen on the aerial photograph used for Figure 2 in Tab D and this is quite clear when reviewing the sequence of historical air photos that are available.</p> <p>NETR & EIA Figures 38a, 39, 41a and 43 all show the carefully designed WMS layout. The watermain and Control Valve huts will not be located within the Significant Woodland buffers.</p>	
7.	Section 2.3 states that groundwater levels are likely to be kept at higher levels than prior to extraction. Target levels should be set so as to maintain habitat for Black Ash and other wetland tree species, in addition to breeding habitat for amphibians.	Section 2.3	Sarah Mainguy, NSE	Please refer to the response provided for Comment 15 in the Natural Environment Comment Matrix.	
8.	Section 4.5.1: Wetland W41 should also include monitoring of Black Ash, a Species at Risk.	Section 4.5.1	Sarah Mainguy, NSE	<p>On page 50 of the NETR it is stated that:</p> <p><i>“Most of the [Black Ash] trees are dead or in severe decline due to infestations of the Emerald Ash Borer. There are still numerous seedlings and saplings still growing in W41.”</i></p> <p>The cause of Black Ash decline and mortality in Wetland W41 is infestation by the Emerald Ash Borer (EAB). This species is anticipated to continue to decline in Wetland W41. As the Black Ash seedlings and saplings grow larger, they will become infested with EAB.</p> <p>Aubin et al. (2015) reported on ash regeneration and infestation at the epicentre of the initial Emerald Ash Borer invasion in Canada, which was near Windsor, Ontario. Up to 12 years after detection of the outbreak, they found abundant ash regeneration in the impacted area. However, they noted that the likelihood of these stems reaching maturity appears to be low. They examined a subsample of saplings which allowed them to confirm the presence of an active residual</p>	

	JART Comments (December, 2022)	Reference	Source of Comment	Applicant Response (January 2023)	JART Response
				<p>Emerald Ash Borer population, with infestation in 19% of regenerating stems (including stems as small as 2 cm in basal diameter).</p> <p>Monitoring of Black Ash will occur where the species is located within the vicinity of fixed-point photo stations and wetland vegetation monitoring plots.</p> <p>Reference:</p> <p>Aubin, I., Cardou, F., Ryall, K., Kreutzweiser, D. and T. Scarr. 2015. Ash regeneration capacity after emerald ash borer (EAB) outbreaks: Some early results. <i>Forestry Chronicle</i> 91(3): 291-298.</p>	
9.	Section 4.5.2.: Monitoring of vegetation should be conducted in all restored areas, including those around recharge well and feeder line installation areas.	Section 4.5.2.	Sarah Mainguy, NSE	<p>Please refer to the response provided for Comment 22 in the Natural Environment Comment Matrix.</p> <p><i>A Proposed Invasive Species Monitoring and Mitigation Strategy</i> (GEC July 20, 2022) has been developed and it includes monitoring of restored areas, including those around recharge wells and feeder line areas. This monitoring and mitigation strategy was provided to the agencies in Dufferin's July 22, 2022, responses to agency objection letters. It was also provided as Tab C for the Natural Environment Comment Matrix.</p> <p>Section 3.0 of the <i>Proposed Invasive Species Monitoring and Mitigation Strategy</i> deals specifically with WMS installation areas that are to be restored. It recommends additional requirements that will be included in AMP Addendum Part II, Section 2.4.2, to address invasive species monitoring and mitigation, with respect to WMS restoration areas.</p>	
10.	<p><i>"The target water levels will be established based upon existing groundwater levels prior to extraction below the water table within the MQEE. The targets will be based on representative long-term baseline average water table conditions consistent with the target level approach for the existing quarry under the AMP. If less than 3 years of monitoring data is available, the target level determination will combine recent water level data with older data from background and other monitoring well data to develop surrogate historical baseline data similar to that derived for the existing quarry."</i> (AMP Addendum Part II Section B, page 4, section 2.3)</p> <p>It is not clear how historical groundwater levels will be integrated with more recent groundwater levels to establish target groundwater levels. It is also not clear to what extent water levels at the recently installed trigger wells have been impacted by the existing quarry operations and whether these are appropriate for use as baseline conditions for rehabilitation purposes. It is also not clear what effect the existing Water</p>	Page 4, Part II, Section B, Establishment and Monitoring of Target Levels, Section 2.3, 1 st paragraph -Target Levels, (Issues list item 2.1)	Norbert M. Woerns	<p>As part of the target setting process a statistically correlated background well is identified for each trigger well. This correlation can be used independent of time to supplement the historical data series or to set future targets reflective of climatic conditions. This approach has been implemented successfully for the existing Milton Quarry WMS and was recently approved for the Acton Quarry Extension.</p> <p>The proposed mitigation approach is based on maintaining the existing groundwater levels that support water resources (wetlands) beyond the recharge alignment and using diffuse discharge to enhance two wetlands that have been</p>	

	JART Comments (December, 2022)	Reference	Source of Comment	Applicant Response (January 2023)	JART Response
	<p>Management System has had on lessening the impact from the existing quarry on the MQEE area. A question remains, what role the historical pre-excavation water levels will play in establishing target groundwater levels for the MQEE. Clarification is required. See Comment 20 in <i>Geology and Water Resources Table</i> (Issues list item 1.6).</p> <p>Water quality sampling should be continued and augmented as required during site operations and a post-closure period. Water quality targets/triggers should be established.</p>			<p>identified as having been impacted by past quarry dewatering influences (Wetland U1 and Wetland W36).</p> <p>Assessment of past conditions has been completed to the extent possible with available data. No further analysis is proposed. The current water levels and flow regime are protective of groundwater dependent features beyond the trigger well alignment and maintenance of these levels will continue to be protective of the water dependent features. Confirmation of these suitable conditions will be provided by GEC through the Supplemental Ecological Monitoring program.</p> <p>As identified above, water levels from prior to the excavation of the MQEE (current) are protective, and will be employed for baseline target level establishment.</p> <p>Water quality is regulated by the MECP through the site ISW ECA, as discussed at greater length above under Comment #3. Targets/triggers for water quality at the Site have been established and will be reviewed with the MECP considering the minor changes proposed for the MQEE.</p>	
11.	<p>The response action plan for groundwater and surface water is focused on meeting target water levels when water levels drop below target levels. There is no discussion on addressing the impact of major storm events and excessively high groundwater and surface water levels. Stormwater management issues in the broader sense are pertinent to the MQEE operation as the MQEE is considered an extension of the existing quarry operations.</p>	Part II – Section C, Response Action Plan, (Issues list item 2.2)	Norbert M. Woerns	<p>Stormwater within the excavation areas is routed to sumps and pumped to either the Reservoir or the West Cell for lake filling. Ample capacity exists within both; however, should flooding of an active cell occur operations would simply be suspended until water levels were within an acceptable range.</p> <p>Overland flow and surface runoff outside the excavation area will continue to follow the natural drainage pathways with concentration in Wetland U1, overflow through the discharge channel to Wetland W36, and should sufficient precipitation occur, discharge to the Main Quarry. This discharge would be routed to the Reservoir via existing WMS facilities, including but not limited to the Central Sump.</p> <p>Groundwater recharge rates are controlled by a programmable logic controller (PLC) and adjust flow based on groundwater levels. Should groundwater levels be excessively high, groundwater recharge would be reduced or stopped altogether. This process would occur without operator intervention.</p>	

	JART Comments (December, 2022)	Reference	Source of Comment	Applicant Response (January 2023)	JART Response
12.	The response actions and contingency measures within the supplementary monitoring plan should include proposed surface water target levels for wetlands W41, W46a, W46b, W46d and W56 to ensure effective mitigation measures are in place in the event of an undesirable influence on wetland hydroperiods and impact on wetland ecological functions during and post quarry operations. Update the contingency measures to include target levels for wetlands W41, W46a, W46b, W46d and W56.	AMP Addendum Part II Supplemental Information and Implementation Details	CH	<p>The establishment of specific targets for the wetlands identified in the comment is not consistent with the mitigation and AMP approach. Water level targets are proposed where there is direct control over the associated water level using the mitigation measures – i.e. Wetland U1 and Wetland W36.</p> <p>The other wetlands described in the NETR & EIA are located at considerable distances from the proposed MQEE extraction area. There will be no changes to the surface catchments of these wetlands and any quarry dewatering influences during the interim period will be mitigated through the operation of recharge wells per the AMP Addendum. The same approach to protecting wetlands is used for the existing Milton Quarry Extension.</p> <p>There is no direct control of these wetland water levels as the groundwater influence from the quarry side of the wetland is only one of the factors that can significantly influence the wetland water level. Other factors include: climate conditions (precipitation, snowpack, temperature, etc.), influences within the wetland (e.g. flow obstructions from beaver dams, tree fall, etc.), and any influence from other areas beyond the wetland. It is anticipated that groundwater conditions will be maintained passively under the rehabilitation condition, although future monitoring will determine if any seasonal operation of recharge wells will be necessary. This is all described in the AMP Addendum.</p> <p>Although there are no target levels proposed for these wetlands, there is comprehensive monitoring and evaluation of water levels in these wetlands as described in the AMP Addendum (Part II, Sections A.2.6, D.4.1, and D4.5). If warranted, further mitigation or rehabilitation adjustments would be implemented to protect these wetlands in accordance with the AMP Addendum.</p>	
13.	Understanding that wetlands W41 and W46a are identified as significant wildlife habitat (SWH) and confirmed breeding pools for Jefferson Salamander (JESA), CH recommends that wetland monitoring be conducted annually during final rehabilitation and lake filling to ensure there is no impact on the hydrological form and function of the wetlands.	AMP Addendum Part II Supplemental Information and Implementation Details Section 4.5.3, Monitoring Frequency (Page 10)	CH	As described in AMP Addendum Part II, Section D.4.5.3, during the final rehabilitation and lake-filling stage, wetland ecology monitoring surveys will be conducted annually for Wetlands U1 and W36, and every 2 years for Wetlands W41, W46a, W46b and W56. Once the lakes are at their final elevations, data will be collected annually for an additional 3 years. The ecological monitoring frequency may be refined based on the results of the data collection.	

	JART Comments (December, 2022)	Reference	Source of Comment	Applicant Response (January 2023)	JART Response
				<p>GEC proposes that the AMP Addendum be revised such that, during the final rehabilitation and lake-filling stage, Wetlands W41, W46a, W46b and W56 will be subject to the following ecological monitoring requirements:</p> <ul style="list-style-type: none">• General wetland reconnaissance and fixed-point photography will be conducted annually; and,• Amphibian call count surveys, salamander egg mass surveys and wetland vegetation monitoring will be conducted every 2 years.•	
14.	Considering that the information from the AMP has been integrated into the natural environment and the geology and water resources reports, all CH comments on these reports, should also be updated in the AMP in a revised submission to the satisfaction of CH.	General	CH	The AMP will be updated as necessary to reflect any changes that are agreed to by CRH and the agencies.	