If you require this information in an alternate format or through a communications support, please contact us.

Proposed Burlington Quarry Expansion
JART COMMENT SUMMARY TABLE – Natural Heritage

Please accept the following as feedback from the Burlington 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 (February 2021)	Reference	Source of Comment	Applicant Response	JART Response
Report/Date: Level 1 and Level 2 Natural Environment Technical Report, April 2020				**Author: Savanta**	
1.	Confirmation of the existence and extent of critical fish habitat within 240.0 metres of any identified key hydrologic feature should be provided though DFO (NEP, Part 2.7.5 & 2.7.6 (d))	General	Niagara Escarpment Commission		
2.	Further clarification should be provided related to assessed significant woodlands on the western expansion site (golf course). The technical report identifies woodlands 'D' & 'M' on the golf course lands as significant; with woodlands 'A' on the opposite side of Colling Road also being significant. • If the technical report identifies these areas as significant woodlands, Part 2.7.3 of the NEP (2017) must be considered in the context of the future health of the feature. Currently the extraction plan proposes to isolate significant woodlands 'D' from surrounding features; NEC Staff are of the opinion this would not maintain or enhance the feature, or associated features through extraction. • The impact of this isolation should be discussed in the report and should take into consideration the wording of Part 2.7.6 (d) & 2.9.3 (e). • Hedgerows are identified in the ELC mapping; typically, hedgerows will be included in the connectivity/wildlife corridor considerations. Please include assessment of hedgerows within the scope of maintenance and enhancement of key natural heritage features and wildlife habitat. • Amphibian movement corridors are considered an important function of significant wildlife habitat, they have been identified as being present impacts/mitigation should be considered in relation to SWH.	General	Niagara Escarpment Commission		
3.	In some areas buffers to significant woodlands have been proposed <30.0 metres in width despite lands being available to achieve 30.0 metres. 30.0 metres is a generally accepted standard for protection from an extraction use, please provide further justification for these reductions (relevance to significant woodlands and wetlands) (Part 2.7.6 (c) & 2.7.7) • Reduced setbacks to the FOD7-4 community is of specific concern.	General	Niagara Escarpment Commission		
4.	Fulsome assessment of potential endangered species habitat on the golf course lands has not been completed. Golf course ponds were not surveyed for presence of Jefferson salamander. Connectivity between these ponds, and potential salamander corridors are in scope for the study. The presence of predatory fish in the northernmost pond does not justify excluding the more southern ponds from assessment (Part 2.7.6 (d)).	General	Niagara Escarpment Commission		
5.	Only one Turtle basking station was implemented on the southern expansion lands. Clarification sought as to why wet areas farther south were not included in the turtle assessment.	General	Niagara Escarpment Commission		
6.	Amphibian assessment is noted in close proximity to wetland 13200; clarification is sought as to why no amphibian call station was implemented in the feature.	General	Niagara Escarpment Commission		

7.	Overall impacts on the hydroperiod for the assessed wetlands should be further assessed taking into account various phases of quarry operation and rehabilitation.	General	Niagara Escarpment Commission		
8.	It is identified that wetlands 13200 & 13201 will likely be impacted due to a change in catchment area resulting from extraction. • A broader review of impacts should be provided that considers the connectivity of these wetlands (and 13202) as well as the cumulative impact on key natural and hydrologic features demonstrating connectivity within 240.0 metres. (Part 2.2.1, 2.7.3, 2.7.6 (d), 2.9.3(d&e)). • Outlets for these areas should be confirmed. • Maintenance and enhancement of key hydrologic features considered through this report, including wetlands, should be incorporated into the proposed rehabilitation and after-use plans (Part 2.9.3 & 2.9.11 (b)).	General	Niagara Escarpment Commission		
9.	Broadly, the report needs to discuss the impacts of fragmentation on the significant woodlands and wetlands in more depth, and should discuss how this fragmentation may, or may not be addressed through mitigation or rehabilitation. • Scope of consideration for impacts to key natural heritage and hydrologic features extends to connected features within 240.0 metres of the individual feature being assessed. A landscape approach within the site as well as broader capture and discussion of connected features off-site should be incorporated into the report. (Part 2.7.6 (d)).	General	Niagara Escarpment Commission		
10.	An acknowledgement/assessment of Section 2.2 of the PPS (2020) – Water, does not appear in Section 2.1.1 of the Report. NEC Staff are of the opinion that Section 2.2 of the PPS contains a number of policies linked to natural heritage that should be assessed and incorporate findings from the Hydrologic and Surface Water reports.	General	Niagara Escarpment Commission		
11.	Additional assessment of downstream impacts to Brook Trout populations related to Willoughby creek is being requested due to the proposed change in water levels and the proposal to utilize perpetual pumping as a mitigation measure to maintain water levels in key hydrologic features.	General	Niagara Escarpment Commission		
12.	The Level 1 and Level 2 NETR describes the current fisheries inventories conducted within the existing quarry (Burlington Quarry) and proposed expansion lands and provides an assessment based on the proposed changes associated with extraction and future operations on those lands. Discussion is limited to within 120.0 metres of the proposed quarry expansion lands. Supporting studies, such as the Surface Water Assessment, as well as hydrogeology submitted as part of the application discuss potential fisheries impacts to surrounding areas beyond 120.0 metres. The aquatic impacts provided in the 2020 NETR do not appear to be integrated with surface and groundwater reports and impacts to fisheries from these studies are not well understood.	General	Matrix Solutions Inc.		
13.	The inventories presented in the NETR describe the existing fisheries as consisting primarily of warm water species such as Largemouth Bass, which are commonly stocked in warm water ponds, as well as tolerant warm water fish communities typically found in intermittent tributaries. Given that the existing land uses consisted of a golf course and quarry operations, these results are not surprising for the most part, as the golf course has been in operation since the early 1960s and the lands have undergone ongoing disturbances. Since the existing quarry has been in operation, fisheries impacts have existed due to changes in drainage patterns from extraction activities. As the initial placement of the quarry has irreversibly changed the fish habitat conditions within the headwaters, it is more relevant to focus on the effect of the	General	Matrix Solutions Inc.		

	proposed new quarry expansions on the surrounding fish habitat. The 2020 NETR does not include discussion of the cumulative impacts to the surrounding water bodies that have been described in historical studies as being important. The cumulative effect on the surrounding aquatic habitats from the incremental quarry footprint expansion should be included in the discussion.				
14.	The Level 1 and 2 NETR also states that although that ponds and drainage features within the existing quarry and proposed expansion lands contain fish, these systems are not really fish habitat due to their anthropogenic origin and their isolation from other features, and as a result support no recreational fishery. Given the extent of quarrying, the fish community within the quarry footprint is expected to consist of species that can persist within the changing aquatic habitat conditions that are artificially maintained. The NETR describes the ponds and drainage features as having a hydrologic connection to fish bearing waters in the surrounding watercourses immediately outside of the proposed quarry extension lands. As there are linkages to fish habitat downstream of these areas, it is not clear where does fish habitat begin and end, and if alterations within the quarry in terms of flow, thermal regime, water quality or quantity will affect the downstream fish bearing waters. A table describing the rationale for fish habitat designations, supported by *Fisheries Act* definitions for these habitats should be included. Consistency with the application of fish habitat designations should be demonstrated in this table.	General	Matrix Solutions Inc.		
15.	Drainage and surface outflows of the existing quarry operations extend beyond the quarry footprints and are maintained through pumping operations, which are recommended to continue in perpetuity, long after the license for extraction has been surrendered. As long-term plans for the quarry contemplates changes to drainage conditions, along with the changes associated with climate change, understanding the effects on the surrounding fisheries habitat within the Niagara Escarpment is a key consideration in the proposed quarry expansion. The rationale for continued pumping operations should be supported by more detailed information on how fish habitats and linkages are to be maintained. Discussion on the existing flow regime and the form and function of watercourses and linkages should be included to determine how future changes with pumping and drainage will impact these watercourses. Hydrograph information and hydroperiods in relation to the surrounding fish habitat should also be included in the discussion.	General	Matrix Solutions Inc.		
16.	With respect to the quarry expansion application, the applicant has assessed the fisheries habitat within 120.0 metres of the proposed expansion area. Other studies that relate to fish habitat that are submitted as part of the quarry application discuss impacts beyond 120.0 metres of the proposed quarry expansion area. To have a better understanding of the impacts to fisheries resources, the applicant needs to integrate the 2020 NETR with surface and groundwater studies which extend beyond 120.0 metres. Impacts to fisheries resources needs to be described in relation to future drainage scenarios associated with the changing nature of the quarrying activities over time, as well as the ultimate rehabilitation scenarios involving the creation of landforms, lakes, and changes associated with climate. The following provides a summary of the issues and concerns as they relate to fisheries.	General	Matrix Solutions Inc.		
17.	The fish information available in the downstream reaches such as in Willoughby Creek are based on older baseline data (2006) and no further recent information regarding the fish communities in these areas have been made available. The paucity of recent fish data is reflected by the limited study area, no sampling or surveys in private property, and of active sampling gear such as seining, electrofishing methods and visual observations.	General	Matrix Solutions Inc.		
18.	Predicted impacts to downstream watercourses are discerned from the surface water report which can only be based on older baseline data by collected by others, such as records from 2006. As the data has been collected over 14 years ago, changes that	General	Matrix Solutions Inc.		

	have occurred over time regarding the fish community and habitat changes are not accounted for in predictions related to surface water impacts.				
19.	The 2020 NETR discusses what is impacted within the existing quarry and extension footprints, it does not provide a more fulsome picture of what happens to the downstream watercourses and particularly the Willoughby Creek system. The applicant should provide more discussion on specific effects to fish habitat as it relates to the receiving waters affected by future drainage and alterations to hydrology and hydrogeology from future expansion. The surface water assessment report provides statements which affirms the sensitivity of Willoughby Creek to changes in baseflow, and the primary concern is that this feature, as well as the other watercourse will be maintained through pumping. Should pumping be subjected to unexpected shutdowns or malfunctions, it is unclear what these effects would manifest to fish habitat. For example, if fish populations are reliant on this flow to successfully spawn and rear their young, what happens during the coldest winters and summer drought conditions is of concern as a sudden withdrawal of flow in the upper reaches may result in fish mortality.	General	Matrix Solutions Inc.		
20.	As extraction proceeds to its later stages and progressive rehabilitation takes place, it is unclear how this impacts fish habitat. It is not fully explained how the quality and quantity of discharge water will be maintained. It is anticipated that there will be a lowering of local groundwater and surface water levels from quarry operations and quarry dewatering. It would be good to understand how water quantities will be balanced and water quality will be maintained at various stages during blasting and quarry operations. Furthermore, it is uncertain if ground water conduit flow paths will be interrupted during quarrying operations.	General	Matrix Solutions Inc.		
21.	There may be contaminants introduced into water bodies from blasting and quarry operations that can affect fish habitat. As blasting will be used for extraction, what is the potential for contaminants to be released or the event of a pipeline rupture from blasting (from the Enbridge Pipeline in Colling Road)?	General	Matrix Solutions Inc.		
22.	Effects from pumping and lake creation, including shutdown of the pumps, malfunctions or spills at the quarry should be included in the discussion. Furthermore, temperature impacts from the creation of the lake, and other potential effects such as exotic species invasion/blue green algae should also be included in the discussion.	General	Matrix Solutions Inc.		
23.	Future Gaps to be Addressed: The setting for the quarry extension takes place within the Niagara Escarpment Protection Area where the management focus is directed to maintaining the key natural heritage features and key hydrologic features for the movement of native plants and animals across the landscape. The natural feature of concern is in Willoughby Creek, where a remnant Brook Trout population exists. This remnant population presumably still occurs within a short distance within the Willoughby Creek Tributary kept separated from Bronte Creek through a dam from more aggressive migratory salmonid species. This current population is dependent on the existence of baseflows and groundwater discharges that occur in Willoughby Creek. During the previous quarry submission, the Joint Agency Review Team (JART) had requested that discussion of each watercourse should include a detailed description of each of the following: (a) locations of groundwater upwellings (and their significance to fisheries), species composition, distribution, relative abundance, and life history of the fish inhabiting the creek. (b) JART also requested identification of critical or sensitive habitat with reference to species distributions.	General	Matrix Solutions Inc.		

	(c) Considering the pumping which will be used to maintain the current baseflows to the Willoughby Creek and other tributaries, this strategy needs to be further understood with respect to future risks to the fish habitat downstream. For example, if a passive means of supplying water to these downstream systems is possible, this may be a safer alternative rather than relying on pumps that may be susceptible to mechanical failure and regular monitoring to ensure proper function. (d) Some of the information requirements that are relevant to the understanding of the potential impacts of the proposed extension raised by JART include: • predicted flow rates for groundwater discharge for the tributaries • effects of groundwater and surface water changes on the fisheries in each tributary • groundwater disruptions may have a very large effect on fisheries and the effects should be further quantified • threshold flows and predicted effects on fisheries habitat • impact of shortened periods of groundwater contribution on fish productive capacity in intermittent streams • the relative contributions/effects to groundwater should be summarized in a table for each watercourse • potential thermal impacts on the watercourse and whether the quality of groundwater is affected (including thermal pollution) • effect of increased flows on channel stability, fisheries, and productive capacity in Willoughby Creek • effect of mitigation/pumping of water into the ground and the impact on watercourses In addition to these, the applicant should discuss how the progression of quarrying (in various stages) impacts the water quality that is discharged to downstream systems.				
24.	Discussion of the site's ecoregion, ecodistrict and physiographic context is missing, as is a discussion about the relationship with significant Regional features such as the Mount Nemo Plateau. The previous hearing raised concerns about the variable local groundwater setting within discrete areas of the Mount Nemo Plateau, with concerns that groundwater flows were currently affected by the existing quarry and these impacts could extend further because of the cumulative impacts of the existing quarry plus the extension. There is the potential for significant harm to the off-site Jefferson's Salamander breeding habitat pools (the "wetland vernal pool" and "woodland vernal pool" shown on Figure 4.0), through impacts on their hydroperiod, if the groundwater inputs to the ponds are significantly affected by the extraction. The 2012 decision by the Joint Board noted that monitoring of water levels in the salamander breeding ponds (which are off-property) is critical because of the uncertainty regarding the impacts of lowering the groundwater table. The concern associated with the accuracy of assessment of groundwater inputs to the Jefferson's Salamander breeding habitat ponds was an important issue to the 2011 Joint Board and it is not clear what additional work has been done to address these concerns. Concerns that the connection between groundwater and surface features has been underestimated in the current application have again been noted by many technical experts in their review of this application.	General	North-South Environmental Inc.		
25.	Golf course ponds were omitted from salamander trapping. The report states this is because they have predatory fish in them but the only pond that was electrofished was the northernmost pond. Other ponds were surveyed visually. Largemouth Bass were observed only in the main irrigation pond, the uppermost irrigation pond and the golf	General	North-South Environmental Inc.		

	course irrigation channel. No fish were observed in the three smaller ponds. The author of this review has personal experience with Jefferson's Salamanders breeding in human-made ponds (and salamanders would be more likely to breed in smaller ponds that might be without fish). Salamander trapping should be conducted in the smaller golf course ponds, particularly smaller ponds that do not contain predatory fish.				
26.	Additional surveys should also be conducted for: a. Blanding's Turtle, according to Provincial Blanding's Turtle protocols, b. turtle nesting areas, and c. snakes, according to the protocols for Milksnake.	General	North-South Environmental Inc.		
27.	Weather conditions were omitted from the table summarizing field investigations. Though there are general notes about weather conditions in the text describing the field methods, the weather conditions should be shown for each date for amphibian, reptile and bird surveys.	General	North-South Environmental Inc.		
28.	The significant Woodlands analysis resulted in several woodlands (E, F and G) identified as Key Natural Heritage Features in the Regional Natural Heritage System being evaluated as non-significant. More discussion should be provided to explain the difference between the Region's and Nelson's analysis of these features. The discussion should include the rationale behind removing from the NHS both the features and the intervening restoration areas that provided a connected north-south linkage between these woodlands.	General	North-South Environmental Inc.		
29.	The function of woodlands E and F, particularly as stepping stones that link Woodland D to adjacent features, should be discussed. This is particularly important for Woodland E, which appears to be less than 20.0 metres from Woodland D on the basis of on-line aerial photography, and would therefore meet the criterion for inclusion as a continuous part of woodland D, as stated in Section 6.2.1 (last paragraph on page 50). Since Woodland E meets the criteria for Significant Wildlife Habitat, its contributing function to Woodland D should be assessed.	General	North-South Environmental Inc.		
30.	There is almost no discussion of impacts other than surface water on Woodland D: the area of woodlands that will be retained between the existing quarry and the western extension. This area will become fragmented as it will be surrounded by existing and proposed quarry land. There is a strong north-south emphasis in the Regional Natural Heritage System through the extension lands, and this linkage will be eliminated throughout the extraction. The phasing of the extraction and the placement of the infiltration pond do not mitigate fragmentation. In addition, a note on the Operational Plan regarding the western edge of the existing quarry states that this edge is "subject to separate Site Plan Amendment to reduce setback to 0 m", which would isolate the woodland completely. Clarity is required to describe exactly what changes are proposed to the existing plan, when they will occur, and to assess the cumulative impacts of the increased setback and the extension.	General	North-South Environmental Inc.		
31.	Fragmentation will in effect create a literal island with no physical connection. Impacts of fragmentation should be described, and appropriate mitigation proposed so sufficient corridors are provided to allow movement of wildlife. Provincial and Regional policies require that the test of no negative impact be met. These two policies will not be met if there is no physical linkage/connection with the woodland to the south. According to the Niagara Escarpment Plan, diversity and connectivity between key natural heritage features must be maintained and/or enhanced. The Regional Official Plan Guidelines' Aggregate Resources Reference Manual also notes that it should be demonstrated that the long-term ecological function and biodiversity of the natural heritage system can be maintained, restored or where possible improved. While the rehabilitation plan shows that the southern linkage will be restored in the final rehabilitation plan, the time frame to restoring this linkage is unclear. Section 4 of the	General	North-South Environmental Inc.		

	Final Rehabilitation and Monitoring Study (page 14) appears to indicate that it could be more than 30 years before this linkage is restored.				
32.	Exposure to wind and high light levels in Woodland D will likely increase. The population of Large Toothwort (Cardamine maxima), a Provincially rare plant species with a status of S3, is particularly adapted to cool, moist, sheltered forests and would likely be affected by the increase in exposure as it is on the eastern side of Woodland D. The two wetlands within Woodland D that are collectively numbered 13200 (the wetlands between the existing quarry and western extension, which will become physically isolated) are discussed only to say that since the catchment will be removed, mitigation such as discharge of quarry water will have to be used to maintain these wetlands. There should be further discussion of impacts, including isolation, fragmentation of surrounding habitat, noise, drying winds and light, etc., in addition to impacts of pumping quarry water.	General	North-South Environmental Inc.		
33.	The discussion of wetlands should include Wetland 13203, which is the only wetland identified that provides Significant Wildlife Habitat for breeding amphibians, as well as habitat for painted turtle.	General	North-South Environmental Inc.		
34.	There is no discussion of potential cumulative impacts of the existing quarry and the extensions (only a very brief mention of cumulative impacts).	General	North-South Environmental Inc.		
35.	Discussion of mitigation is incomplete: there should be a discussion about the mitigation of impacts in the short term (in addition to impacts related to erosion and sediment control) as extraction progresses (as required by the Aggregate Resources References Manual) – impacts of the quarry will not be addressed by the rehabilitation for many years.	General	North-South Environmental Inc.		
36.	Mitigation should include a discussion of Wetland 13203.	General	North-South Environmental Inc.		
37.	All studies should be coordinated and integrated. In particular, the findings of the Hydrogeologic and Hydrologic Impact Assessment, Surface Water Assessment and Level 1 and 2 Natural Environment Technical Report should inform each other and should be reviewed for consistency	General	Conservation Halton		
38.	Not all of the natural heritage features that have the potential to be impacted are identified in the report. For example: • PSWs that are within the zone of influence of the proposed quarry but outside of the 120.0 metres adjacent lands are discussed only at a high level, though potential exists for impact as noted in the Hydrogeological and Hydrological Impact Assessment Report and the Surface Water Assessment. • Significant Wildlife Habitat (SWH) discussions did not include all of the identified SWH in the study area (e.g., FOD7-4, seeps and springs, amphibian movement corridors, etc.). • The extent of fish habitat on the site and within the zone of influence should be confirmed by DFO. • Connectivity across the landscape should be considered in more broader terms. Recommend revising the report to discuss all of the natural features that have the potential to be impacted by the proposed quarry and mitigation measures developed as appropriate.	General	Conservation Halton		
39.	Please include a more detailed discussion on net gain as per Halton Region's Aggregate Resources Reference Manual. Currently direction is to refer to the Site Plan and AMP, which does not give enough detail to ensure that net gain is achieved.	General	Conservation Halton		

40.	Savanta states: “An assessment of the quality and extent of natural heritage features found on, and adjacent to, the Subject Lands and the potential impacts to these features from the proposed aggregate application will be undertaken in association with the following legislation and policies.” It should be clear that the significance of each feature will be evaluated according to the criteria provided by the Province and Region. Two pieces of legislation should be added to the list of policy and legislation in this section: • the *Migratory Birds Convention Act* and • *Fish and Wildlife Conservation Act*.	Section 2.1. Natural Heritage Policy Overview	North-South Environmental Inc.		
41.	Recommend expanding the applicable PPS policies to include those in the Policy 2.2 Water, given that some of these speak to natural heritage features and areas, and the connection to the water system.	Page 9 Section 2.1.1. Provincial Policy Statement	Conservation Halton		
42.	Policy 110 (7.2) should be specifically discussed in this section, as it addresses the requirement for a systems-based approach to the assessment of impacts as follows: “In accordance with Section 118(3)d), apply the following systems based approach in the assessment of the impact of a new or expanded mineral aggregate operation on the Region’s Natural Heritage System…”	Section 2.1.3. Halton Regional Official Plan	North-South Environmental Inc.		
43.	The paragraph in Savanta’s report in Section 2.1.6 indicates the following: “Some projects may be eligible for exemption from the DFO review process, as specified under Step 3 of the DFO Fish and Fish Habitat Protection Program review process (DFO 2019b; e.g., artificial waterbodies with no hydrological connection to occupied fish habitat).” In the Fish Habitat Discussion section in 7.2.4, it is mentioned that “There is no direct or indirect fish habitat within the proposed Limit of Extraction within either the South or West Extension areas. Therefore, no direct encroachment into any watercourse providing fish habitat will occur and no direct impacts on fish habitat are anticipated within the Limit of Extraction, during any phase of the Project.” Since there is a hydrological connection by way of the outflows to direct and indirect habitat, it would seem that the irrigation ponds within the golf course have been ruled out as not fish habitat. This would suggest that the *Fisheries Act* does not apply to harmful alterations to these ponds. Unless the ponds are self-contained, pollutants could potentially be released into the discharges flowing out of these ponds to direct and indirect fish habitat. It is unclear how the irrigation ponds would not be considered fish habitat if they are hydrologically connected to fisheries habitat and impacts from alterations to these ponds could have a downstream impact.	Section 2.1.6. Federal *Fisheries Act*	Matrix Solutions Inc.		
44.	The background data collection should have included Citizen Science databases such as eBird and iNaturalist. The report notes that in the NHIC background search, four 1.0 square kilometre “squares” were examined. In fact, six squares are needed to encompass the site: 17NJ 8805, 8905, 9005, 9105, 9104 and 9004. If the search is broadened to include the immediately surrounding habitat (as is the usual approach), approximately 12 squares should have been selected. This larger study area is justified because the locations of significant species are often not known exactly, and many wildlife species are mobile enough to roam more widely within the landscape than where they were reported.	Section 2.2. Background Data Collection	North-South Environmental Inc.		

	This section should be summarized by a more inclusive table listing all the SAR that have been noted by an extensive review of background sources in the general area, with their habitat requirements. This should have directed Savanta's survey methodology and focus. In addition, several Species at Risk were left out of the analysis. The following additional species, noted in the two Ontario Reptile and Amphibian Atlas squares that encompass the site, were omitted from the sources mentioned: Ontario Herpetofaunal Atlas: • Western Chorus Frog (latest record 2019) – Threatened Federally, Not at Risk Provincially. • Blanding's Turtle (latest record 2017) – Threatened Provincially and Federally • Midland Painted Turtle (latest record 2018) – Special Concern Federally • Map Turtle (latest record 2018) – Special Concern Provincially and Federally • Milksnake (latest record 2019) – Special Concern Federally, Not At Risk Provincially.				
45.	This section provides a listing of the natural features within the defined Study Area and the Broader Landscape. The first paragraph in this section states that Savanta has relied, in part, on supporting background information from government agencies and previous site surveys/investigations to provide additional insight into the overall character of these Subject Lands. The second paragraph describes how Savanta was involved in the previous application and states that "given the period of time that has passed, changes in policies and the changes in both the footprint and field conditions, we have not relied on it but have considered the field data and information obtained during that process to enhance the background data collection review and establishment of the field program." The lack of reference to previous historical work from 2004 and 2006 limits the understanding of the fisheries context regarding quarry operations and surrounding fish habitat. The next sections describing the fish habitat in the 2020 NETR are therefore very limited, whereas the fisheries information from the previous work by Stantec is extensive.	Section 2.2. Background Data Collection	Matrix Solutions Inc.		
46.	Features on or within the Study Area (bottom of Page 15 and top of page 16) should have included a discussion of the Mount Nemo Plateau. This is a landscape feature that is not mapped per se as an ecological feature – however, it has been identified as an important area for wildlife connectivity and it was identified as a significant recharge zone by the previous study team. Previous findings of groundwater connection with the wetlands in the previous hearing should be addressed.	Section 2.2.1. Natural Features Desktop Summary	North-South Environmental Inc.		
47.	Discussion of the fisheries context is found in Section 2.2.9 Conservation Halton Long-Term Environmental Monitoring Program Data, where characterization of the Grindstone Creek Watershed and Bronte Creek Watershed from Conservation Halton in 2002 was used to describe fish habitat. The fish habitat character from 2002 and fish species data in 2012 provided in this section from Conservation Halton provides a very limited background information despite the wealth of more detailed fisheries information contained in historical reports, which provide an indication of baseline conditions. This section confirms no fish community sampling is known to have been conducted in the unnamed tributary of Willoughby Creek downstream from the Subject Lands. Furthermore, no fish sampling has been completed on the West Branch of the Mount	Section 2.2.9. Conservation Halton Long-Term Environmental Monitoring Program Data	Matrix Solutions Inc.		

	Nemo Tributary of Grindstone Creek. The Mount Nemo Tributary has been characterized as intermittent.				
48.	This section should have included a description of the Ecoregion and Ecodistrict context of the site.	Section 3. Physiographic Conditions	North-South Environmental Inc.		
49.	In addition to considering individual Coefficients of Conservatism, Floristic Quality Analysis (FQA) should be included to provide an assessment of vegetation quality in each community as a whole.	Section 4. Field Investigations and Methods - Section 4.1.2	North-South Environmental Inc.		
50.	A sampling plot radius of 5.0 metres is smaller than that generally accepted for sampling of woodlands (e.g. the sampling method for determining whether there are enough trees with cavities to meet the threshold for bat maternity colony habitat is 12.0 metres). This small sampling radius could have influenced the assessment of Significant Woodlands, if the small radius was used in the smaller woodlands as noted. A description of how the location of sampling plots were selected should be provided. It would be easy to unconsciously select areas with fewer trees for sampling if plots were selected in the field.	Section 4. Field Investigations and Methods - Section 4.1.4	North-South Environmental Inc.		
51.	The golf course ponds should have been included in salamander surveys (Figure 4a, Appendix A) and aquatic turtle surveys. Though these are human-made, there is the potential that one or more of them may provide habitat for SAR, including Jefferson's Salamanders (The retained consultant has personally observed this and other Ambystoma species in human-made ponds). There is no detail on time or weather during amphibian, bird, turtle and snake surveys, to permit a full assessment of whether wildlife survey methods were appropriate. Appropriate weather conditions (generally relatively warm, with no precipitation and low winds) are essential for reptile, amphibian and bird surveys. Inappropriate weather conditions can lead to the false conclusion that the species is not present. Surveys did not conform to the MNRF protocols for Blanding's Turtle, for which five visits are required prior to June, in highly specific weather conditions.	Section 4.2. Wildlife Surveys	North-South Environmental Inc.		
52.	It is not clear that MNRF/MECP were involved in selection of sampling sites; only that they were consulted regarding survey protocols. This should be clarified. Conservation Halton should also have been consulted regarding survey locations and methods. As noted above, the retained consultant has had experience with Jefferson's Salamanders and other Ambystoma species use of human-made ponds, so golf course ponds should have been included in trapping.	Section 4.2.2. Salamander Habitat Assessment and Hydro-period Monitoring Methodology	North-South Environmental Inc.		
53.	It is not clear whether tail-tip samples were obtained for genetic testing.	Section 4.2.3. Salamander Minnow Trapping Survey Methodology	North-South Environmental Inc.		
54.	This section states: "Survey protocols were created in consideration of MNRF (2012) and Toronto Zoo (Caverhill et al. 2011) turtle survey methods." This is imprecise language as it is unclear what "consideration" means: whether MNRF protocols were followed, or whether they were just given "consideration". If a variation in the protocols was followed this must be fully described. Clear times and weather conditions for each visit have not been provided.	Section 4.2.6. Turtle Basking Habitat and Nesting Surveys	North-South Environmental Inc.		

	The final paragraph in this section notes that turtle nesting surveys were not completed due to absence of suitable habitat. However, turtles are frequently observed to nest on lawns (personal experience of the author), and turtles frequently nest at long distances from their basking habitat. Turtle nesting surveys should have been conducted at the appropriate time of year. There is no indication that methods for surveying non-basking turtles were used. As noted above, Blanding's Turtle (Threatened) have been noted within the Ontario Amphibian and Reptile Atlas "squares" in the vicinity of the site in addition to Midland Painted Turtle (Recently evaluated as Special Concern) and Snapping Turtle (Special Concern). Blanding's Turtles bask less often than other turtle species, and must be surveyed particularly early in the year, in ideal weather conditions, as detailed by Blanding's Turtle survey protocols (MNRF 2013).				
55.	Times and weather conditions for snake surveys are important, but have not been provided for each survey. It is noted that visual encounter surveys were conducted on mild spring mornings, but the following sentence says they were conducted between 8:00 AM and 5:00 PM, which means not all were conducted in the morning. The first sentence notes that survey methods are based on MNRF species at risk protocols, but the final sentence on the first paragraph of this section notes that specific protocols were not applied as no threatened or endangered snakes have been recorded in the area based on the species desktop summary. Milksnake (a species of Federal Special Concern) has been recorded in this area by the Ontario Herpetofaunal Atlas, so the MNRF protocol for Milksnake surveys (which are often used to guide surveys for non-SAR species generally) could have been followed.	Section 4.2.7. Snake Habitat and Visual Encounter Methodology	North-South Environmental Inc.		
56.	It is stated that the MNRF Guidelines for Bobolink and Eastern Meadowlark point counts were followed. These guidelines state that 3 surveys should be conducted, in the early, mid and late season. A third survey date for these species is not listed.	Section 4.2.8. Breeding Bird Surveys	North-South Environmental Inc.		
57.	It is noted in this section that survey methods targeted habitat for Little Brown Myotis, Northern Myotis and Tri-colored Bat, but that surveys were conducted in leaf-off condition, focusing on tree cavity assessment. However, surveys for Tri-colored bat habitat must be conducted in leaf-on condition, as Tri-colored Bats nest in leaf clusters.	Section 4.2.9. Bat Habitat Assessment Survey Methodology	North-South Environmental Inc.		
58.	It is noted on page 29 that "any calls with a positive identification were manually vetted by a wildlife ecologist with training in bat species identification by sonagram." Calls noted as "NoID" should also be vetted by an ecologist with training, as Myotis sp. calls are frequently recorded without identification to species. The three Myotis species that occur in southern Ontario (as well as the Tricoloured Bat Perimyotis subflavus) have very similar calls that cannot always be identified by auto-ID algorithms, but all Myotis and Perimyotis species are considered Endangered.	Section 4.2.10. Bat Acoustic Survey Methodology	North-South Environmental Inc.		
59.	Typically, an assessment of potential HDF is done prior to going on site using orthoimage interpretation or ArcHydro analysis to look for drainage features that have a catchment of 2.5 hectares or larger. The report should describe how this was completed.	Section 4.3.1. Headwater Drainage Feature Assessment	North-South Environmental Inc.		
60.	Please discuss how the delay in the Headwater Drainage Feature (HDF) Assessment timing impacted the results of the assessment and provide additional mitigation as necessary. For example, the first round of the HDF Assessment was completed on April 18, 2019 with a temperature of 22.0 degrees, which is outside of the spring freshet of that year. The second round was completed outside of its typical period (June 3, 3019 vs Late April – May) and the last round was at the very end of the window as well (August 26, 2019 vs July-August).	Page 29 Section 4.3.1. Headwater Drainage Feature Assessment	Conservation Halton		

61.	This section describes the fish community sampling that was completed on June 17 and 24, 2019. Backpack electrofishing (using a Halltech HT-2000 electrofishing unit) and seine netting (using a 30.5-metre long by 1.83-metre high, small mesh seine net) were used in combination to survey all habitats present. The other excavated golf course ponds were steep-sided and too deep to wade; therefore, visual observations of fish presence were recorded. As fish sampling methods are known to be selective to fish, discussion of biases associated with these methods should have been included in this section as the methodology used for fish sampling is biased to larger fish. No attempt was made for example, to use minnow traps in areas that are too deep to wade to obtain an understanding of smaller bodied fish species. Visual fish observations yield limited information and accuracy of fish identification is based on the experience of the observer. At the very least, the mesh size of the netting should have also been indicated as well as catch per unit effort to understand the relative abundance of fish. If the objective of the fish sampling was to demonstrate an understanding of the fish community, including the presence/absence and types of fish inhabiting various watercourses in the study area, a discussion on gear selection and deployment should have been included. The presence or absence of fish is a useful indicator in determining a particular pond's potential to support other species such as the Jefferson Salamander.	Section 4.3.3 Fish Community	Matrix Solutions Inc.		
62.	Giant Swallowtail (S3) was not included in the mapping of significant species on Figures 7a and 7b. It was omitted because its host plant, Prickly Ash, was not observed within the areas where the butterfly was observed. However, nectaring habitat is important for butterfly species and this species should have been added to the mapping in order to inform mitigation.	Section 5.2.1. Insects	North-South Environmental Inc.		
63.	Please provide the number of surveys, location of sites and dates of the egg mass surveys.	Page 35 Section 5.2.4. Egg Mass Survey Results	Conservation Halton		
64.	The report indicates that no amphibians were heard calling from ACC11 however wetland 13037 (PSW12) is identified as an amphibian breeding area in the MNRF Grindstone Creek Headwaters PSW evaluation. Recommend referencing the evaluation and discussing in the report.	Page 36 Section 5.2.5. Amphibian Call Count Survey Results	Conservation Halton		
65.	It should be noted that Midland Painted Turtle's S4 status does not indicate "common and secure" as stated on page 36. The S4 status definition, according to NatureServe Conservation Status Ranks (which are used by NHIC) is: "Apparently Secure— At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors." In addition, Midland Painted Turtle has recently been evaluated by the Committee on the Status of Species at Risk in Canada (COSEWIC, 2018) as a Species at Risk in Canada with a status of Special Concern, indicating a greater level of concern about its status. On page 27, it was stated that turtle nesting surveys were not completed due to absence of suitable habitat, so this section should not refer to nesting survey results. It is possible that both turtles observed on the golf course (Snapping Turtle and Midland Painted Turtle) nest on the golf course or in the southern extension study area and surveys should be conducted for nesting habitat.	Section 5.2.6. Turtle Basking Habitat and Nesting Survey Results	North-South Environmental Inc.		

	The finding of a Snapping Turtle walking on land from one irrigation pond to another on June 11, 2019 (and described as an observation of a turtle "moving through the area"), is within the nesting window for this species and this was just as likely to have been an observation of a turtle searching for nesting habitat. Locations of turtle observations should have been shown on Figure 7a (Significant Wildlife Habitat and Species at Risk Observations).				
66.	Headwater Drainage Features are discussed in a separate report by a member of the Study Team.	Section 5.3.1. Headwater Drainage Feature and Aquatic Habitat Results	Matrix Solutions Inc.		
67.	Please note that the identified H2 is a regulated watercourse under Ontario Regulation 162/06 and not a headwater drainage feature as discussed in the report. Please revise the table accordingly.	Page 39 Section 5.3.1. Headwater Drainage Feature and Aquatic Habitat Results	Conservation Halton		
68.	The information provided in this section describes the watersheds associated with the West Extension and the South Extension of the Burlington Quarry. West Extension primarily affects the outflow to the Willoughby Creek Tributary and an unnamed tributary that comes from the Medad Valley which are both in the Bronte Creek Watershed. The South Extension primarily affects the outflow to the Mount Nemo Tributary, which is part of the Grindstone Creek Watershed. The degree to which fish assessment is discussed is not only limited to within 120.0 metres, but the fish sampling is limited to areas where Savanta has been given land access, and where they have been able to sample. This not only provides a limited fish species list but also a much smaller sampling study area. As the reach of Willoughby Creek north of Colling Road was not sampled or visited due to private ownership, characterization of fish habitat and fish presence was inferred from past reports. Given the magnitude of the proposed West Extension and implications on the downstream reaches, information regarding downstream effects is sparse. It is not surprising that only very few fish species are observed and reported in this section. As access has presumably been granted to others such as Worthington to directly observe karsts within the Willoughby Tributary, the applicant should explain if landowner consent to enter private property for the purposes of sampling and investigation was attempted. The baseline aquatic habitat for these receiving stream systems are described in historical ecological reports (e.g., 2004 and 2006 electrofishing surveys). The significance of the Willoughby tributary in terms of fisheries is highlighted within these historical reports. These reports, completed by Stantec as 2004 Level 2 NETR (Stantec 2004) and 2006 Level 2 NETR (Stantec 2006) discuss natural features within a 5.0 kilometre radius of the study area, and was focused on identifying ecological links to environments not immediately adjacent to the Subject Lands. These reports state that "these links are important to understand Regional environmental features that could be impacted by on site operations". Justification should be provided why a different approach was used in the 2020 Level 1 and 2 NETR.	Section 5.3.2. Fish and Fish Habitat Assessment Results	Matrix Solutions Inc.		
69.	This section discusses how the presence/absence of natural heritage features as defined in the PPS (MMAH 2020) within the Study Area is assessed. The NHRM	Section 6. Natural Heritage	Matrix Solutions Inc.		

	(MNR 2010), NEP (2017), Halton Region OP (2018) and City of Burlington OP, which provide technical guidance for implementing the natural heritage policies of the PPS, were referenced to assess the potential significance of natural areas and associated functions. Under Subsection 6.6 however, the discussion on Fish Habitat is only limited to what waterbodies are considered fish habitat under the *Fisheries Act*. Key pieces of policy information such as (a) identification of the connections and linkages between natural heritage features and areas, surface water features and groundwater features; and (b) how the diversity and connectivity of the natural features in an area and the long-term ecological function and biodiversity of the natural heritage system can be maintained, restored or where possible improved as they pertain to fish habitat is omitted from this discussion.	Feature Assessment			
70.	Once the additional hydroperiod information for the wetlands is complete, please revise and include an ecological interpretation of the data in this report. The data should be assessed from a dry, wet and average climate conditions perspective to ensure that proposed changes do not exacerbate natural dry conditions.	Page 46 Section 6.1.2. Significant Wetlands – 120 m Adjacent Lands	Conservation Halton		
71.	The MNRF Grindstone Creek Headwaters PSW Evaluation notes that the larger wetland of the 13037 (PSW12) is seepage-fed and contains a seep that can be seen discharging to the surface, whereas the report indicates that this wetland is precipitation and surface runoff fed with groundwater contribution to be less than 2.0%. Recommend referencing the evaluation and discussing in the report.	Page 46 Section 6.1.2. Significant Wetlands – 120 m Adjacent Lands	Conservation Halton		
72.	All of the PSWs within the zone of influence of the quarry should be discussed in this report, regardless if they are within the 120.0 metres adjacent lands. There are number of PSWs in the Grindstone Creek PSW Complex that may be impacted by the quarry that are not discussed in the report.	Page 46 Section 6.1.2. Significant Wetlands – 120 m Adjacent Lands	Conservation Halton		
73.	Please confirm the source of water input for the SAS1 inclusion within the MAM2-2/SWT2-2.	Page 49 Section 6.1.3. Other Wetlands within the 120 m Adjacent Lands	Conservation Halton		
74.	This section should include a detailed discussion of why the analysis came to a different conclusion regarding the significance of woodlands E, F and G from the Regional Natural Heritage System's analysis. The potential functions of these woodlands to provide connectivity (i.e., stepping stone function) of Woodland D to adjacent features should be discussed. Review of aerial photography for this area indicates that Woodland E is less than 20.0 metres from Woodland D, and should be investigated as a continuous part of Woodland D, as it is noted in Section 6.2.1 that woodlands within 20.0 metres should be treated as a continuous unit.	Section 6.2. Significant and Other Woodlands	North-South Environmental Inc.		
75.	The significance and role of Woodland E relating to the RNHS should be expanded upon. Provide further analysis to confirm the functions and contributions of Woodland E for: • SWH (Eastern Wood-Pewee Habitat, Bat Maternity Roost Habitat); • Separation distance from Woodland D; • Overall connectivity/ linkage opportunities within the RNHS; and • Overall significance. It is recommended that detailed avoidance rationale be provided to reflect the role Woodland E plays within the larger RNHS and all associated impacts.	Page 53 Section 6.2.2. Halton Region Official Plan	Conservation Halton		

76.	This section notes that species of conservation concern include “species listed as S1 to S3 or SH by SRANKS and those listed on the Species at Risk in Ontario List as Special Concern.” However, neither the Natural Heritage Reference Manual nor the Ecoregion Schedules state that the species of Special Concern must be on the Species at Risk in Ontario List. As noted in Section 7.4.2.2, Midland Painted Turtle has been evaluated as a Species at Risk in Canada by COSEWIC, and should have been discussed here; its location should also be shown on Figure 7b. The location of the Snapping Turtle (a Species of Special Concern) should have been shown on Figure 7a. This species should have been discussed, as it can rely on human-made habitat. While human-made habitat is excluded from some SWH (such as turtle overwintering habitat) it is not excluded as SWH for species of conservation concern.	Section 6.4. Significant Wildlife Habitat	North-South Environmental Inc.		
77.	The FOD7-4 community is rare in the Province and is therefore confirmed SWH, regardless of its frequency in Halton Region. The report should provide the full 30.0 metre buffer for this woodland, an impact assessment for this feature and mitigation measures developed as necessary.	Page 57 Section 6.4.1. SWH Assessment Summary, Table 19	Conservation Halton		
78.	The Grindstone Creek Headwaters PSW Evaluation notes that a number of the wetlands adjacent to the proposed south extraction support amphibian breeding. Further discussion on the potential use of these wetlands by amphibians and potential SWH should be provided. Recommend referencing the evaluation and discussing in the report.	Page 57 Section 6.4.1. SWH Assessment Summary	Conservation Halton		
79.	This subsection starts with providing a definition of what is fish habitat. The paragraph goes on to state that “definition of fish habitat includes direct fish habitat (i.e., habitat that may be occupied by fish on a permanent or periodic basis) and indirect fish habitat (i.e., habitat that would not be used directly by fish, but that may be important for downstream direct fish habitat).” The rest of this section goes on to say that there is no fish habitat in the proposed limit of extraction. The reasons provided for not considering these areas as fish habitat should include justification to explain why these habitats do not fit the definition of fish habitat.	Section 6.6. Fish Habitat	Matrix Solutions Inc.		
80.	The rest of this section goes on to assign fish habitat categories based on their support function to fisheries. As the basis for fish habitat designations appear to be related to hydrologic connections rather than the fish occupancy, as well as origin, and whether the fish population is considered “natural” to the area, this needs to be rationalized back to the *Fisheries Act* (i.e., the basis under the *Act* that these habitat classifications are warranted).	Section 6.6. Fish Habitat	Matrix Solutions Inc.		
81.	Confirmation from DFO is needed on the status of fish habitat on the site. Until this is confirmed, it is premature to state that no fish habitat is present.	Page 59 Section 6.6. Fish Habitat	Conservation Halton		
82.	Recommend additional impact assessment as it pertains to fish habitat outside of the project footprint, given the potential impact to the water inputs to the offsite watercourses. Until such time that this occurs or direction from DFO is received, a precautionary approach should be taken.	Page 59 Section 6.6. Fish Habitat	Conservation Halton		
83.	As noted in Section 7.2 above, there are additional species that are listed in the background review sources that should be discussed in this section. Of these, there is the potential for two of these species to occur in the study area: • Blanding’s Turtle	Section 6.7. Habitat of Endangered and Threatened Species	North-South Environmental Inc.		

	• Jefferson Salamander In addition, Snapping Turtle should be added to the discussion of SAR within the Limit of Extraction.				
84.	Recommend consultation with MECP regarding Species at Risk for this project to determine if the surveys and associated survey efforts are acceptable and to determine the current regulation limits for those identified. Any feedback from MECP should be provided to JART.	Page 62 Section 6.7. Habitat of Endangered and Threatened Species	Conservation Halton		
85.	Recommend that the general mitigation measures discuss the potential impacts associated with blasting. Currently, blasting is discussed for wetlands, but as there are other natural heritage features present, this should be expanded to a general list.	Page 66 Section 7.1. General Mitigation Measures	Conservation Halton		
86.	Without having access to the approved Spills Action Centre report for the existing quarry, it is challenging to know if what is contained in it is appropriate for the proposed expansion. Recommend including this detail in the application.	Page 67 Section 7.1.2. Accidental Spills	Conservation Halton		
87.	This section discusses the Level 2 evaluation of the potential impacts due to the quarry development and operation. The Level 2 assessment also includes recommendations regarding any mitigation and/or enhancement measures, as well as rehabilitation plans. The discussion pertaining to fish habitat is in Subsection 7.2.4 where the discussion pertaining to fish habitat impacts are simplified.	Section 7. Level 2 Impact Assessment	Matrix Solutions Inc.		
88.	The location of the berm adjacent to the weir pond should be changed to 30.0 metres from the wetland, rather than 14.0 metres as currently proposed, to ensure the hydrologic and ecologic function of this pond is not impacted.	Page 68 Section 7.2.1. Wetlands	Conservation Halton		
89.	For indirect water quality impacts, recommend including turbidity in the assessment.	Page 68 Section 7.2.1. Wetlands	Conservation Halton		
90.	More information has been requested with respect to the water balance assessment for the wetlands adjacent to the extraction areas. Please refer to comments on the Surface Water Assessment and the Level 1 and 2 Hydrogeologic and Hydrologic Impact Assessment. The Natural Environment Report should be revised to provide an ecological interpretation of those changes, as applicable.	Page 68 Section 7.2.1. Wetlands	Conservation Halton		
91.	All of the wetlands that have the potential to be impacted by the quarry application should be discussed in this report. The zone of influence of the quarry is identified as 800.0 metres away and there is potential impact in those PSWs between 120.0 metres to 800.0 metres from the quarry. The Natural Environment Report should be revised to discuss all of the potential features impacted and mitigation measures discussed to ensure they are not impacted. This will ensure that all of the connections and linkages between the NHF, surface water features and groundwater features are identified.	Page 68 Section 7.2.1. Wetlands	Conservation Halton		
92.	Please provide the details of the monitoring collected in the spring 2020 wetlands 13200, 13201 and 13202.	Page 69 Section 7.2.1. Wetlands	Conservation Halton		
93.	Is it suggested that the catchment areas of the wetlands to the east of the extraction will be maintained, however as noted in the Surface Water Assessment drawings DP-1 and DP-2, it appears that there will be changes to the catchment areas of the wetlands. Please confirm and revise as necessary.	Page 70 Section 7.2.1. Wetlands	Conservation Halton		
94.	Please include a discussion on the potential impacts of reduced groundwater flows on the wetlands. For example, will less saturated soils lead to a great drawdown in water levels? Will there be impacts to the temperature of these wetlands from less groundwater and will this impact amphibian breeding?	Page 70 Section 7.2.1. Wetlands	Conservation Halton		

95.	In the Hydrogeological Report, Wetland 21 (13201) is considered to be compromised due to the road and culvert, and its water budget is not considered representative of future conditions. Please confirm how changes to this wetland will be assessed and mitigated, especially as this wetland is adjacent to a rare vegetation community.	Page 70 Section 7.2.1. Wetlands	Conservation Halton		
96.	This section discusses indirect impacts to this wetland, but the discussion is restricted to the hydroperiod. This wetland (and the surrounding woodlands) will become isolated from the surrounding landscape; they will be surrounded by the existing quarry to the east, and the quarry extension to the north, west and south. The removal of stepping-stone connections provided by Woodlands E and F will exacerbate the isolation of Woodland D containing the wetlands. Connections to the west will be severed. The remaining patch of natural habitat will be perched above the quarry floor on all sides. The impacts of fragmentation on this wetland should be discussed. Impacts to wetland unit within this area would likely include a more rapid rate of drying in wetland and woodland soils, as well as increased temperature extremes because of increased winds, the increased heat island effect induced by the quarry's exposed rock, and increased ambient sunlight. This would likely affect Significant Woodlands and Significant Wildlife Habitat (Eastern Wood-pewee and Large Toothwort) as well as the wetland environment. A 15.0 metre buffer would likely not mitigate this impact, as physical edge effects can be seen at a distance of greater than 15.0 metres from the edge. Additional mitigation (in addition to the 15.0 metre buffer) and monitoring for this impact should be discussed.	Section 7.2.1. Wetlands (Specifically Units SWD3-2a (Wetland 13200))	North-South Environmental Inc.		
97.	As discussed with wetlands, the woodlands within the West Extension will be physically isolated and fragmented by the cumulative effect of the surrounding quarries, especially since the woodlands will become perched above the quarry floors. Woodland D, in particular, will be subject to high levels of drying winds, increased albedo from the surrounding quarries, and their function will decline. In turn, these impacts will likely lead to declines in insect populations that are important as prey species. Connections to the Medad Valley (identified as a Regional linkage) to the west are severed, and this connection would be highly important to animal movement through the landscape and persistence of meta-populations within Woodland D.	Section 7.2.2. Woodlands	North-South Environmental Inc.		
98.	The report indicates that bat maternity colonies in the study are not unique in the subject lands or even the landscape. The Significant Wildlife Habitat Mitigation Support Tool (2014), Index 12, states that Bat Maternity Colonies are critical to the survival of local bat populations and the loss of any site has significant impacts on bat populations. Recommend that this discussion be revised to reflect Provincial policy and direction as it pertains to this type of SWH.	Page 72 Section 7.2.3. Significant Wildlife Habitat	Conservation Halton		
99.	The Rare Vegetation Community FOD7-4 is not discussed in this section. As this is a confirmed SWH in the study area (confirmed in Table 19 as well) and as it may be impacted by the proposed quarry, this SWH should be discussed.	Page 72 Section 7.2.3. Significant Wildlife Habitat, Table 19	Conservation Halton		
100.	FOD7-4 is not fully protected as it extends out past where the buffer is located. This SWH should be protected with a 30.0 metres just as the rest of the natural features are. Please revise.	Page 72 Section 7.2.3. Significant Wildlife Habitat. Figure 8a	Conservation Halton		
101.	In addition to the SWH discussed, Amphibian Movement Corridors should be discussed as this is identified in Table 19 as present.	Page 74 Section 7.2.3. Significant Wildlife Habitat	Conservation Halton		

102.	Fish Habitat, the potential direct and indirect impacts of the proposed development, including during the temporary construction phase, the long-term operations phase and the post-operations rehabilitation phase, are assessed based on direct impacts and indirect impacts. Direct are deemed non-existent in the proposed Limit of Extraction within either the South or West Extension areas as there is no fish habitat present there. Indirect impacts are dealt with as being minimal due to minimal construction work and lack of intrusion outside of the extraction area and continuing to pump quarry water to supplement flow as recommended by the Surface Water Assessment Report (Tatham 2020). The basis for flow supplementation in terms of volume, water quality and quantity should be explained in terms of its effects on fish habitat downstream of the quarry extension areas. In 2006 Level 2 NETR Report (Stantec 2006) Willoughby Creek has been described in previous reports as “the watercourse of greatest ecological sensitivity” as this Bronte Creek tributary was noted to support critical brook trout spawning and rearing habitat, as noted with the presence of juvenile brook trout captured during 2003 surveys. The Level 2 Natural Environment Technical Report notes that Brook Trout are reliant on groundwater for virtually all portions of their life cycle: spawning, incubation, nursery refugia, and thermal refugia during summer. The loss of groundwater discharge to this system would represent a negative effect. The basis for the maintenance of the quarry water in terms of how flow regime quantity and water quality will be maintained is lacking in this section. In the 2004 Level 2 NETR (Stantec 2004), fisheries inventory of the station (Station 1) reports a healthy population of juvenile Brook Trout in the reaches of Britannia Road and Cedar Springs Road Intersection and 80.0 metres downstream, which is located approximately 1.2 kilometres from the confluence of the Willoughby unnamed tributary to the mainstem of Willoughby Creek. This is consistent with the Bronte Creek Watershed Study, which noted extensive spawning activity in the area of the Cedar Springs community and Cedar Springs Road. The details for maintaining flow should be discussed in this section extending beyond 120.0 metres as the reports of the water levels in the Willoughby creek running dry were reported by conservation authority staff and maintaining flow during periods of drought is a concern (Bronte Creek, Urban Creeks and Supplemental Monitoring conducted by Conservation Halton 2012).	Section 7.2.4 Fish Habitat	Matrix Solutions Inc.		
103.	The proposed settling pond outlet at the bank of the West Arm watercourse and associated longer term sump should be assessed in further detail so that the outlet does not impact the natural features present. Mitigation measures should be developed to limit impact, such as the use of a flow spreader to reduce bank erosion.	Page 76 Section 7.2.4. Fish Habitat	Conservation Halton		
104.	Please confirm winter target numbers for baseflow upstream of Colling Road, as only spring, summer and fall are provided.	Page 77 Section 7.2.4. Fish Habitat	Conservation Halton		
105.	The potential impact of a 3.0% reduction in groundwater in the creeks and wetlands as it relates to temperature changes has not been provided. Even a small reduction can alter the ecological function of these features and this should be assessed in the report. In addition, consider temperature changes from the proposed mitigation pond.	Page 80 Section 7.2.4. Fish Habitat	Conservation Halton		
106.	Please discuss and quantify how the 4.0-6.0% reduction in runoff volume compares to a dry year and the potential impacts of this on the creeks and wetlands.	Page 80 Section 7.2.4. Fish Habitat	Conservation Halton		
107.	There is a disagreement about the justification provided with respect to the connectivity of the area. While the proposed expansion lands are currently in a non-natural state, there are limited barriers to obstruct the movement of species across the landscape. The connectivity that these lands currently provide would be lost based on the proposal. The diversity and connectivity of the overall Mount Nemo Plateau should be considered to ensure that the proposal does not restrict wildlife movement.	Page 80 Section 7.2.4. Fish Habitat	Conservation Halton		

108.	A reduced buffer to some Significant Woodlands is proposed, however justification for this reduction is not included. As these woodlands are also supporting other natural features and functions, and as the site can accommodate full 30.0 metre buffers, this reduction is not supported.	Page 82 Section 8. Niagara Escarpment Plan	Conservation Halton		
109.	As SWH is a Key Natural Heritage Feature, the vegetation protection zone should be 30.0 metres from these features. Please revise.	Page 82 Section 8. Niagara Escarpment Plan	Conservation Halton		
110.	The only mitigation proposed for the loss of a unit of Significant Wildlife Habitat (Woodland E) is compensation through the rehabilitation plan. As noted in Halton's EIS guidelines, section 3.7.2., "It is important to note that compensation for feature removal or anticipated negative impacts is not acceptable under the ROP." Thus, removal of this woodland would result in negative impacts to the Natural Heritage System. Avoidance is preferred over compensation. As noted previously, the function of Woodland E to provide linkage and other benefits to the Natural Heritage System should be further examined, particularly as this woodland is considered part of the Regional NHS and is in very close proximity to Woodland D. In Google imagery, the closest distance between Woodland D and Woodland E appears to be approximately 10.0-15.0 metres (i.e. it is not greater than the 20.0 metres considered to be the threshold for considering Woodland E separately), and so the function of Woodland E as a potential part of Woodland D should also be examined. The role of Woodland E in contributing to Eastern Wood-pewee and bat maternity roost habitat (for example in terms of numbers of nest sites, habitat area, foraging habitat, etc., as well as the potential importance of this area in the future when the connections to the north and south are removed) should also be considered in more detail. The rationale for avoidance of, rather than compensation for, impacts should be considered.	Section 9. Regional Official Plan	North-South Environmental Inc.		
111.	Please expand the SWH section to include the rare vegetation community FOD7-4 identified in the Level 1 Report. Discussion on how will be protected and any additional mitigation measures should be provided in addition to the SWH included in this section.	Page 84 Section 9. Regional Official Plan	Conservation Halton		
112.	Cumulative impacts discussed in the report are limited. Recommend that this section be expanded upon to provide more detail and discussion on what the cumulative impacts of the proposed quarry might be. For example, the existing quarry began in the 1950s and has impacted the natural environment since then. If the existing quarry is continued to be used, rather than rehabilitated as originally planned, then this would result in longer, cumulative impacts on the area.	Page 86 Section 10. Regional Official Plan Guidelines – Aggregate Resources Reference Manual	Conservation Halton		
113.	This section notes (Paragraph 1) that: "despite that no direct or indirect impacts will occur to Jefferson Salamanders or their habitat, habitat creation and enhancement opportunities have been identified for this species." It is proposed to restore 4.0 hectares of agricultural land between the eastern woodland south of the quarry, where Jefferson Salamander has been noted breeding, to an adjacent woodland to the west, where Jefferson Salamander has not been observed despite repeated surveys in several years, and despite apparently suitable habitat. The objective of the habitat creation is stated in paragraph 3 of this section: "This would enhance JESA habitat by providing increased coverage of summer refuge and overwintering habitat and improve connectivity between the two existing woodlands…	Section 11.2. Jefferson Salamander Habitat Creation and Enhancement Opportunities	North-South Environmental Inc.		

	The design of this restoration could also increase opportunity for JESA breeding by incorporating pit and mound construction techniques." Though it is not stated in the NETR, it is clearer in the Progressive and Final Rehabilitation and Monitoring Study that the proposed restoration is to address Section 110 of the Regional Official Plan, especially C: C) Priorities for restorations or enhancements to the Greenbelt and/or Regional Natural Heritage Systems through post-extraction rehabilitation shall be based on the following in descending order of priority: [i] restoration to the original features and functions on the areas directly affected by the extractive operations, [ii] enhancements to the Greenbelt and/or Regional Natural Heritage Systems by adding features and functions on the balance of the site, [iii] enhancements to the Greenbelt and/or Regional Natural Heritage Systems by adding features and functions in areas immediately surrounding the site, [iv] enhancements to that part of the Greenbelt and/or Regional Natural Heritage Systems in the general vicinity of the site, and [v] enhancements to other parts of the Greenbelt and/or Regional Natural Heritage Systems in Halton. D) Restorations or enhancements shall proceed immediately after extraction in a timely fashion.				
114.	Comments on the proposed restoration and enhancement are as follows: • This proposal is speculative, without even rudimentary detail to support feasibility. There is no certainty that created ponds would provide a sufficient hydroperiod and water quality for Jefferson Salamander to breed. There are no goals or objectives that drive the restoration, so no assurance that the restoration would create persistently suitable habitat for the long term.	Section 11.2	North-South Environmental Inc.		
115.	Comments on the proposed restoration and enhancement are as follows: • Jefferson Salamander has a high fidelity to its habitat, and is a notable habitat specialist. If Jefferson Salamanders are not present in the western woodland, there is no basis to speculate that they would use the restored habitat. The western woodland may not be suitable for Jefferson Salamander. There are many habitat needs that must be met for this species that have not been explored, such as the presence of breeding ponds with suitable hydro period and water quality, small mammal burrows to provide overwintering habitat, invertebrate prey populations, and downed woody debris to provide refuge for post-breeding adults and transforming juveniles.	Section 11.2	North-South Environmental Inc.		
116.	Comments on the proposed restoration and enhancement are as follows: • Salamander breeding and overwintering habitat is associated with mature woodlands, with their associated attributes of deep shade, leaf litter, high soil humidity, small mammal populations to provide burrows and abundant ground dwelling invertebrates to provide prey. It would take decades for the restored area to provide sufficient shade, humidity and hibernation sites to become suitable for Jefferson Salamander. If the quarry extensions had impacts on groundwater, the restoration site (even if it were feasible) would likely be too late to restore sufficient habitat to ensure Jefferson Salamander survival in this area.	Section 11.2	North-South Environmental Inc.		

117.	Comments on the proposed restoration and enhancement are as follows: • Jefferson Salamander movements are difficult to predict without movement studies. There is no evidence to show that salamanders would move in this western direction so that it could function as a linkage. More detailed studies of salamander movements and habitat needs should be conducted.	Section 11.2	North-South Environmental Inc.		
118.	Comments on the proposed restoration and enhancement are as follows: • The potential for creating an ecological sink should be considered. The western woodland and restoration site would be within 120.0 metres of the southern extension boundary, with the potential that these could be affected by the quarry.	Section 11.2	North-South Environmental Inc.		
119.	Comments on the proposed restoration and enhancement are as follows: • This proposal does not address the primary recommendation in the Jefferson Salamander Recovery Strategy (2018): The short-term recovery approaches should focus on the protection of existing populations of the Jefferson Salamander and Unisexual Ambystoma (Jefferson Salamander dependent population) by minimizing further loss or degradation of known habitat or potential recovery habitat. Recovery approaches should also focus on verifying, documenting, and monitoring the distribution and habitats used by extant, historic, and potential subpopulations. Developing and evaluating mitigation and restoration techniques, actively conducting research, and developing long-term management activities should also be prioritized to ensure the recommended recovery goal will be achieved.	Section 11.2	North-South Environmental Inc.		
120.	There is no evidence that this proposed restoration would enhance habitat for Jefferson Salamander. The restored area would likely function as a small patch of disturbed forest habitat. Sufficient baseline detail should be supplied to show that it is at least potentially feasible. Goals and objectives should be provided to guide the restoration. Even as a preliminary suggestion, the restoration should be proposed according to “SMART” principles: the restoration goals should be “specific, measurable, agreed-upon, realistic and timebound”.	Section 11.2	North-South Environmental Inc.		
121.	Recommend including the smaller portion of wetland 13037 on the ELC map. It is currently not identified.	Figure 3b	Conservation Halton		
122.	Please discuss why amphibian monitoring was not conducted in the SWS3-2a/b communities in the western expansion area and the SWS/MAM2-2 associated with the West Arm. Table 2 notes that surface water in SWS3-3b was usually present in the spring as well as July and September. Should suitable habitat be present, then recommend that amphibian monitoring occur.	Figure 4a and Table 2	Conservation Halton		
123.	Recommend that all of the hedgerows in the proposed extraction areas be assessed for potential bat habitat.	Figure 5a and Figure 5b	Conservation Halton		
124.	Please clarify why the FOD5-6 south of the proposed south extraction area was not assessed for bats. If suitable habitat is present, recommend that this assessment occur.	Figure 5b	Conservation Halton		
125.	Seeps were identified by the MNRF PSW evaluation in wetland 13037. This SWH should be considered as candidate and additional surveys done to determine the presence of these seeps.	Table 19	Conservation Halton		
126.	Recommend that additional targeted surveys be undertaken to assess the potential for turtle habitat. It is noted that turtles have been known to use irrigation ponds and as there were limitations to being able to sample some of the deeper irrigation ponds, habitat may be present.	Table 19	Conservation Halton		
127.	The table notes that monarchs were not observed during the insect surveys, however the CUM field sheets note four individuals on Sept 11 and 19. Recommend that host	Table 19 and Field Sheets	Conservation Halton		

	and feeding pollinating plant species be considered when developing restoration plans.				
128.	The ELC field notes are not complete as soils were not competed. Please discuss how this may impact the classification of the vegetation communities.	Field Sheets	Conservation Halton		