Technical Summary Report

(by the Joint Agency Review Team)

Proposed Expansion to the Burlington Quarry

June 2023

TABLE OF CONTENTS

1. TECHNICAL REVIEW BY THE JOINT AGENCY REVIEW TEAM

The review of proposals for new or expanded mineral aggregate operations within Halton Region occurs through a joint agency work program detailed in the Halton Consolidated – Streamlined Mineral Aggregate Review Protocol. The Protocol, often referred to as the JART Protocol, was originally developed through an extensive, consultative process between Halton Region, Niagara Escarpment Commission (NEC), local municipalities, Conservation Authorities, the Ministry of Natural Resources and Forestry (MNRF) and Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). The Protocol was first approved by Halton Regional Council on January 31, 2001. It was most recently updated in February 2020.

In Halton Region, a Joint Agency Review Team ("JART") is formed to complete technical review of proposals for new or expanded mineral aggregate extraction. Per step 6 of the Halton Consolidated – Streamlined Mineral Aggregate Review Protocol, the Chair of a JART will co-ordinate agency comments where possible and, with JART members' assistance, produce a JART Report or Reports consolidating and summarizing this work. As Chair of JART for the proposed expansion to the Burlington Quarry, Halton Region has prepared this Technical Review Summary Report ("JART Report" or "this Report") with input from the other public agencies.

1.1 PURPOSE OF REPORT

This technical report details the structure of JART, and the work undertaken by the team on the review of the quarry expansion proposed by Nelson Aggregate Co. ("Nelson") to the west and south of its existing operation on Mount Nemo. It includes a consolidated description of the proposal shared by the agencies. The summary of the technical work undertaken includes initial responses of the various agencies and an overview of technical findings arriving from the work of the technical reviewers. This technical work is to be used by the various participating agencies to inform the production of planning opinions and recommendation reports to the Councils, Boards, and Commission, as applicable.

The applicant and Ministry of Natural Resources and Forestry will be provided a copy of this Report.

The Report will also be provided to the Niagara Escarpment Commission, Halton Region Council, and City of Burlington Council, and the Board of Conservation Halton for information.

1.2 LIMITATIONS OF THE REPORT

This Report does not make a recommendation on the proposal itself. It is a distillation of technical review completed since the relevant applications were filed in May 2020.

The contents of this report are based upon technical review of information submitted up to August 4, 2022—the date of Nelson's filing of appeals for non-decision on the Regional and Local Official Plan Amendment application—plus information received after that date to complete the third technical submission started by Nelson. Technical review is generally based upon the documents listed in section 2.5 of this report, public input, and working meetings with the applicant.

Any revisions to the Nelson proposal to address remaining issues in this report or any other objector concerns will require review—and may necessitate updated analysis to be completed through JART or by the individual agencies.

1.3 JOINT AGENCY REVIEW TEAM (JART) MEMBERSHIP

The Niagara Escarpment Commission, Halton Region, the City of Burlington, and Conservation Halton first became aware of a potential proposal for quarry expansion on these lands in spring 2019. Nelson Aggregate Co. ("Nelson", or "the proponent") requested presentation meetings of planning staff at the various agencies to discuss the proposed expansion and conversation of the proposed after-use of the operation to an active park from its current approval for lake filling.

Throughout the review of the proposal, agency leads for the JART were:

- Halton Region, as lead agency: Gena Ali, Joe Nethery (Chair), Brian Hudson, Janice Hogg
- Niagara Escarpment Commission: John Stuart (prior to his move to the City of Burlington), Joe Muller
- City of Burlington: Brynn Nheiley, Kyle Plas, Gordon Dickson, John Stuart
- Conservation Halton: Kellie McCormack, Leah Smith, Jessica Bester

JART was supported by a number of agency staff, including Betty Pakulski, Umar Malik, Alina Korniluk, Jacek Strakowski, Lisa Jennings, Lesley Matich, Janette Brenner, and Jennifer Young.

Halton Region retained peer review support in the following areas of focus. Note that peer reviewers did review in multiple issue areas to ensure integration of reports—in particular, with respect to hydrogeology and the natural environment:

Table 1: Technical Peer Reviewers Retained by Halton Region for JART Support

Agricultural Impact Assessment	AgPlan Limited Michael K. Hoffman
Air Quality	Gray Sky Solutions Dr. Andrew Gray
Blasting	Englobe Ray Jambakhsh
Financial Impact	Watson & Associates Gary Scandlan and Daryl Abbs
Hydrogeology	S.S. Papadopulos & Associates, Inc. Chris Neville Norbert Woerns
Karst Topography	Daryl Cowell
Natural Heritage	North South Environmental Sarah Mainguy Matrix Solutions Inc. Arnie Fausto

Noise	J.E. Coulter Associates Ltd. John Coulter Brendon Colaco
Surface Water Assessment	Scheckenberger & Associates Ltd. Ron Scheckenberger
Traffic	CIMA+ Jaime Garcia

The City of Burlington retained Christienne Uchiyama (Letourneau Heritage Consulting Inc.) for support on archaeology and cultural heritage.

Halton Region additionally retained Nick McDonald (Meridian Planning Consultants Inc.) to provide support to the land use planners on the relevant policies and structure to consider in undertaking a land use planning analysis. Planning analysis was to be undertaken by agency planning staff based upon the technical review undertaken and summarized in this report.

1.4 Timeline of Applications

On November 6, 2019, a pre-consultation meeting was held with representatives of Nelson and staff from the Region, the City of Burlington, Conservation Halton, and the Niagara Escarpment Commission. A pre-consultation meeting is required in advance of the filing of Regional and City of Burlington Official Plan Amendment applications by Section 187(3) of the Region's Official Plan and City of Burlington Pre-consultation By-law 40-2007 and Official Plan Policy Part VI, Section 1.3(e). Meeting participants discussed application requirements, including required technical studies and associated terms of reference, and the main parameters for a Joint Agency Review Team approach and work plan for reviewing the proposal.

Terms of Reference for the technical studies needed were required by the agencies at the pre-consultation meeting. Those arrived in early 2020.

Nelson submitted the following applications for the proposed quarry expansion (noting the applications were submitted while draft terms of reference were still under review through JART):

- On May 14, 2020, an *Aggregate Resources Act* licence application for the proposed west and south extensions issued by the Ministry of Natural Resources and Forestry, with future potential to amend the licence for the current operation (associated with the rehabilitation plan).
- On May 15, 2020, a Niagara Escarpment Plan Amendment to re-designate the proposed expansion land to permit mineral aggregate extraction, and a Development Permit to ultimately permit the development.
- On May 14, 2020, an amendment to the Halton Region Official Plan to re-designate the proposed expansion land to permit mineral aggregate extraction.
- On May 14, 2020, an amendment to the City of Burlington Official Plan to re-designate the proposed expansion land to permit mineral aggregate extraction.

On July 20, 2020, the Region's Chief Planning Official and City of Burlington staff deemed the *Planning Act* applications complete. The Niagara Escarpment Plan Amendment process was initiated through a staff report received by the Niagara Escarpment Commission on August 20, 2020. The Ministry of Natural Resources and Forestry deemed the *Aggregate Resources Act* applications complete on October 5, 2020.

On November 4, 2021, Halton Region, the City of Burlington, Conservation Halton, and the Niagara Escarpment Commission received a circulation from Nelson Aggregate Co. regarding a proposed Site Plan Amendment to the licence for the current operation. The general intent of the amendment was to allow for the integration of the entire site as a single operation, which sought to permit aggregate material extracted within the proposed extension lands to be transported to the existing quarry for processing and shipping. This would be achieved by constructing a new entrance/exit access ramp adjacent to No. 2 Side Road to transport material from the proposed south extension into the existing quarry. The revision also included added noise attenuation recommendations that relate to the existing quarry and were identified through the ongoing technical review associated with the quarry extension applications.

1.5 JART Work Program

Initial conversations around forming a JART for review began following spring 2019 meetings requested by Nelson Aggregates Co. (note that the City of Burlington did not participate in the summer 2019 meetings). JART conversations continued through to the November 2019 preconsultation meeting conducted by the applicant through City of Burlington pre-consultation requirements and became a regular occurrence in spring 2020 to prepare for the arrival of the respective applications.

The application went through two complete technical circulations with JART agencies: a first circulation from May 2020 that completed in January 2021, and then a second circulation arriving in stages from September 2021 through to May 2022. A third circulation of the application began with updated information submitted by Nelson on June 27, 2022. On August 3, 2022, while technical review was being completed on some parts of the third circulation, Nelson filed appeals with Halton Region for non-decision on the application for a Regional Official Plan Amendment, and the City of Burlington for non-decision on the application for a Local Official Plan Amendment. The third technical circulation has been completed by staff and peer reviewers. Review involved detailed assessment of the submitted reports, internal discussion meetings to review findings, and discussion meetings with the proponent to work through issues. The consolidated comment tables are attached as a series of appendices to this report.

Throughout the Nelson expansion's application review process with JART, multiple site visits occurred to better understand the area's context. The site visits enabled JART to assess the application in more detail through closer investigation. The following focused site visits and field work occurred:

- **November 20, 2019**
    - Intent: Preparation for the preconsultation meeting.
    - Attendees: Select Nelson team and JART staff.
- **November 9 and 24, 2021**
    - Intent: General site orientation, visiting and observing the features of the proposed expansion lands, and receiving a tour of the current site and operation.
    - Attendees: Nelson, JART staff and peer reviewers.
- **December 3 and 9, 2021**
    - Intent: Detailed staking of woodlands features.
    - Attendees: Nelson, JART staff and peer reviewers (ecologists).
- **October 25 and November 3, 2022**
    - Intent: JART reviewers looking at select features on Conservation Halton lands within the Medad Valley, including piezometers and test wells drilled by Nelson with the authority's permission.
    - Attendees: JART staff and peer reviewers (hydrogeologists, surface water engineers, ecologists, and planners).

In addition to the above focused visits, each agency and a number of peer reviewers completed their own independent site visits and area scans.

The Halton Consolidated – Streamlined Mineral Aggregate Review Protocol and associated work program is adaptable and meant to be flexible rather than prescriptive. It is based upon agreement by agency staff to work together as much as possible. The processing of each application will vary depending on the type and scale of the application under consideration as well as its location and predicted impact. The work program also is flexible to respond to shifting needs or requirements during technical review.

1.6 Letters of Objection to the *Aggregate Resources Act* Licence Application from the Agencies

Letters of Objection were provided by the JART agencies in December 2020, within the initial 45-day review window. Concerns identified in these letters were informed by the preliminary review of technical reports and studies submitted in support of the application by staff and retained consultants.

The Niagara Escarpment Commission's Letter of Objection focused on a lack of sufficient detail to demonstrate conformity with the 2017 Niagara Escarpment Plan.

Key issues raised were:

- Cumulative impacts of the existing extraction operation and proposed future recreation use in the context of a continued and expanded extraction operation were not comprehensively analyzed with respect to:
    - The proposed rehabilitation plan for the extensions and amendment of the rehabilitation plan for the existing quarry.

    - Insufficient hydrogeology and surface water baseline data to permit a comprehensive analysis of impacts of the existing quarry, and proposed expansions.
- The scope of the assessment of key natural heritage features and key hydrologic features, including their connectivity, being limited to 120 metres of the lands, rather than the 240 metres of connectivity between key natural heritage features and key hydrologic features stipulated in Niagara Escarpment Plan, resulting in proposed removal of some connecting features and subsequent isolation of some key natural heritage features and key hydrologic features.
- Incomplete analysis of Impacts to critical fish habitat resulting from proposed changes to hydrogeology, surface water, and blasting, in addition to a lack of confirmation by the Department of Fisheries and Oceans (DFO) of the proximity of critical fish habitat on or near the site.
- Incomplete Cultural Heritage Assessment (archaeology, built heritage, cultural heritage landscapes and visual impact assessment), and no documented Indigenous consultation.
- An incomplete evaluation of the proposed Progressive and Final Rehabilitation Plan, focused on justifying a specific after-use, where a comprehensive inventory and analysis of prior and present environmental conditions of the subject lands from a natural heritage, hydrologic feature, prime agricultural, or open landscape character perspective is warranted.
- Incomplete evaluation for potential rehabilitation of lands to resume agricultural use of the site, given the identification of extension lands as prime agricultural.
- A Visual Impact Assessment lacking a comprehensive assessment of the open landscape character requiring more viewpoints and potential project impacts from Mount Nemo and surrounding areas, to provide a complete mapping of cultural heritage landscape(s).
- Incomplete integration of the findings from the various technical studies, particularly from lens of natural heritage and ecology.

The Niagara Escarpment Commission also noted the *Aggregate Resources Act* application was premature because, under Section 24 (3) of the *Niagara Escarpment Planning and Development Act* (NEPDA), no permits may be issued nor approval, permission or decision authorized under any *Act* prior to a Development Permit being issued under the *Niagara Escarpment Planning and Development Act*. Further, those permits and approvals must be consistent with the issued Development Permit.

Halton Region's Letter of Objection raised 29 distinct issues, categorized under the following nine thematic groupings:

- The potential effects of the operation of the proposed pit and quarry on the natural environment have not been adequately addressed, including effects upon key natural features, cumulative impacts, and the potential impacts are not addressed by the proposed Adaptive Management Plan.
- The baseline used for the assessment of impacts was inadequate with respect to natural heritage as it omitted important information gained from surveys conducted recently (in the mid-2000s) in the course of past investigations.

- The potential effects of the operation of the proposed pit and quarry on nearby communities have not been adequately addressed, including transportation, air quality, and noise and vibration effects.
- The suitability of the progressive rehabilitation and final rehabilitation plans for the Site have not been adequately addressed.
- The potential effects on ground and surface water resources including on drinking water sources and private wells have not been adequately addressed.
- The potential effects on agricultural lands have not been adequately addressed, including the Burlington Springs Golf Course's location on Prime Agricultural Lands as identified in the Regional Official Plan.
- Detailed consideration should be given to planning and land use matters, including conformity with Provincial and Regional plans and policies.
- Haulage routes and effects related to truck traffic have not been adequately addressed.
- Considerations remain with respect to the applicant's existing licence and how expansion plans are considered and accommodated by those licences.
- Other, miscellaneous concerns related to fees and the *Aggregate Resources Act* review process, the plan drawings and notations, and public engagement.

The City of Burlington's Letter of Objection, dated December 3, 2020, indicated several concerns with the proposed ARA licence application broadly summarized as follows:

- Improved coordination and cross-referencing between the applicant's various disciplines is needed to perform a holistic review and analysis of issues related to groundwater, hydrology (quality and quantity) and impacts on surface water.
- Suitability of the analytical tools selected by the applicant to simulate the existing and proposed drainage conditions and the accuracy of modeling techniques, assumptions and interpretation of results.
- Additional assessment is required by the applicant to demonstrate that the lost hydrologic functions are appropriately replicated in the post-development conditions
- Further review is needed by the applicant of the potential impacts to surrounding key hydrologic features
- The further consideration and analyses of these matters may involve the coordination and review of other technical studies and reports in the context of natural heritage, including potential and/or indirect impacts that may result from the proposed development
- Additional information is required to ensure the protection and reduced impacts of the proposed development on significant natural heritage resource areas, features and functions; particularly as it relates to mitigation and monitoring.
- The assessment of long-term, cumulative impacts of future uses and long-term rehabilitation (after-use) plans may require additional clarification and data support.
- The provided Agricultural Impact Assessment (AIA) makes several assumptions and conclusions regarding impact to prime agricultural lands that require further justification.

- A peer review related to the applicant's Air Quality Assessment has yet to be concluded.
- There has not been consistent or adequate detail pertaining to the use of the existing quarry lands for an industrial use in the event that aggregate resource extraction ceases (or is substantially reduced) on that portion of the quarry operation and its resultant conformity with applicable legislation and policy related to the Niagara Escarpment Area.

Conservation Halton issued a Letter of Objection dated December 9, 2020, indicating several concerns with the proposed ARA licence application as summarized below:

- The 45-day notification and consultation period does not allow adequate review, given the scale, scope and potential implications of the application. The studies submitted require detailed technical review and the review is still ongoing in coordination with JART.
- Based on a preliminary review of the information submitted, the following key issues and/or deficiencies have been identified, including but not limited to:
    - Insufficient detail has been provided to determine what impacts the proposed quarry may have on surrounding surface water and groundwater resources, as well as natural heritage features, functions, and areas. Further, it is not clear whether the proposed mitigation measures will adequately ensure that features and their functions will not be impacted over the long term.
    - The study area(s) identified in the reports may not be sufficient to fully assess potential impacts of the proposed quarry on surrounding features.
    - Insufficient detail has been provided to assess cumulative impacts to surface water, groundwater, and the natural environment. Further, the 10-year period of baseline data for groundwater and surface water is insufficient to evaluate impacts.
    - The various studies submitted have not been adequately coordinated and integrated to provide a comprehensive evaluation of impacts and the identification of appropriate mitigation measures.

These initial responses were supplemented with a full set of technical comments from JART provided in installments from December 2020 to February 2021.

The agencies also explained that a Joint Agency Review Team (JART) was formed to coordinate the assessment of the application by Halton Region, the City of Burlington, the Niagara Escarpment Commission and Conservation Halton, and to contribute effectively to MNRF's decision.

Copies of the original Letters of Objection are provided as Appendix A to this report.

1.7 Reply Letters of Objection and Confirmation of Objections from Agencies

Nelson Aggregate Co. provided reply letters of objection to the agencies (and other public objectors) on June 29, 2022, or July 4, 2022, in the case of Conservation Halton. This initiated the formal reply period under the *Aggregate Resources Act* where objectors would need to indicate if the resolution was satisfactory or if the objection remained (and what might be required to resolve the recommendation). Nelson provided approximately 40 days to the agencies to respond (August 15, 2022).

- The Niagara Escarpment Commission's reply of August 12, 2022, confirmed the objection remained. The response stated the *Aggregate Resources Act* application should not be approved until further public consultation and technical review had occurred, as well as the Niagara Escarpment Plan Amendment being approved, and the Development Permit being issued.
- Halton Region's reply of August 12, 2022, confirmed the objection remained. The letter acknowledged progress made by Nelson in resolving some of the initial concerns raised. The most significant outstanding concerns relate to the protection of water resources and natural heritage features and functions that depend on them. Recommendations to resolve included addressing the technical comments raised in JART review, including completing a requested revision of Nelson's predictive groundwater model, additional field work, inclusion of past recent survey findings, and revisions to the proposed Adaptive Management Plan.
- The City of Burlington's reply of August 15, 2022, confirmed the objection remained. The letter noted many issues remaining in the original five thematic areas (operational/coordination, effects on water quantity and quality, natural heritage, agricultural effects, and human health/air quality), and that the JART process should continue through to its conclusion of review.
- Conservation Halton's reply of August 10, 2022, confirmed the objection remained. The letter noted insufficient detail or further work being required to provide a comprehensive evaluation of the impacts and identification of appropriate mitigation measures.

Copies of Nelson's reply letter and agency confirmation Letters of Objection are provided as Appendix B to this report.

1.8 Public Meetings and Sessions

The City of Burlington development application review process includes a developer / proponent-led pre-application community meeting, in which proponents are required to take notes of any comments received. Comments and the proponents' response are required to be included in the application submission. Nelson hosted this pre-application community meeting on February 18, 2020, at the Burlington Springs Golf Course. It was an open house and town hall format, with display boards covering various topics. The proponents were there with several of their technical consultants to address questions. City Staff attended to explain the planning review process. The meeting was also attended by the Mayor of Burlington, Ward Councilor, and approx. 150 residents. Questions and comments during the town hall session generally pertained to water quality and quantity impacts, traffic, and dust pollution.

In August 2020, the Ministry of Natural Resources and Forestry released a bulletin titled, "Resuming aggregate application timelines and public consultation under the Aggregate Resources Act (Post COVID-

19)." Prior to that, the Ministry of Natural Resources and Forestry had suspended all application review timeframes in alignment with Provincially-issued emergency orders related to COVID-19. As part of responding to the end of the Province's emergency order O.Reg. 73/20 on September 11, 2020, the Ministry made a modification to its consultation requirements. Nelson elected to proceed with individual conversations with residents and did not schedule a public information session as a result of the August 2020 bulletin. Nelson will be required to provide summaries of conversations held in pursuit of resolving objections in their final submissions to the Ministry of Natural Resources and Forestry.

Halton Region facilitated a virtual public meeting on Thursday, December 10, 2020, between 6:00 pm and 8:00 pm. The event was held in response to a resolution unanimously adopted by Halton Regional Council on November 25, 2020, to hold a public consultation event enabling residents to ask questions about the project and voice concerns to Nelson. Nelson's team provided a presentation and answered attendee questions live, with unanswered questions responded to in writing following the event. The content was distilled in an event summary report. This was not a statutory public meeting under any legislation or Act. Members of the public were invited to join the session online through Zoom as advertised. A call-in option was also provided. Participants were able to submit questions during the live event or via email in advance of the session. Overall, 158 members of the public attended the session. No identified members of the media were in attendance.

Halton Region hosted its statutory public meeting under the *Planning Act* on September 15, 2021. A statutory public meeting is required by legislation to be held with respect to applications for amendment to an official plan to give the public an opportunity to make representations in respect of the proposal. There were 182 total attendees on Zoom and 140 livestream viewers for a total of 322 viewers across both platforms with 31 delegates. Issues raised include protection of the natural environment, well-water concerns, concerns about traffic and heavy trucks, flyrock concerns, noise and vibration concerns, air quality and dust concerns, and the financial implications on taxpayers for the proposed after-use as a park.

The City of Burlington is planning to schedule a public meeting regarding the Local Official Plan Amendment upon release of the JART report.

With public meetings held by Halton Region and the City of Burlington with the proponent and Niagara Escarpment Commission staff in attendance, the Commission did not intend to host a separate public meeting under the *Niagara Escarpment Planning and Development Act* within the commending period. If any future public meetings are scheduled by other public agencies, the Niagara Escarpment Commission will coordinate with organizers to make staff available.

1.9 PUBLIC INPUT RECEIVED

Public input related to the proposal was welcomed and encouraged at any time during the application review process. JART staff was monitoring and facilitating four active application streams with consultation expectations, in addition to Provincial consultation requirements through the Environmental Registry of Ontario. As part of its mandate, the JART received and considered public input to explore the range of technical issues and impacts related to the proposal.

Technical information provided by the public was shared with technical reviewers and the applicant for consideration in their respective reviews. Content received by the various commenters was provided as part of staff reports (Region and City) and consultation reporting requirements (NEC). Public input was catalogued, summarized, and consolidated with materials received through statutory public consultation into a complete record of public comments received by each agency and placed before the respective Councils, Boards, and the Niagara Escarpment Commission.

JART technical reviewers considered submissions as part of their review of the application. The consolidated comment summary tables are attached as various appendices to this report.

Comments started arriving soon upon receipt of the application in May 2020. The majority of comments were received in advance of consultation milestones: April and May 2020 with the Niagara Escarpment Commission, and prior to Halton Region's Statutory Public Meeting in September 2021.

The Region received 455 emails indicating support for the proposed rehabilitation plan that includes using a portion of the expanded quarry as a park following the completion of extraction. The evaluation of the technical merits of the application to permit extractive uses looks at the proposed use itself. While the rehabilitation plan is a part of the overall proposal, the proposed after-use of the quarry site as parkland is not part of the technical consideration for the Regional Official Plan Amendment application. Regional staff note that some of these submissions were recalled or clarified by submitters after being introduced to the quarry proposal.

The Niagara Escarpment Commission received 298 responses through the Environmental Registry of Ontario posting of the NEP Amendment application: 295 objecting and three supporting. The three JART partner agencies (Halton Region, City of Burlington, and Conservation Halton) also submitted their letters of objection through the ERO, as did two community and environmental groups: Conserving Our Rural Ecosystem of Burlington Inc. (CORE) and Protecting the Escarpment and Rural Land (PERL).

Over 2,000 emails were received by the JART staff from residents and concerned citizens about the negative impacts of continued quarrying on the natural environment (wildlife, streams, and woodlands), quantity and quality of water (wells, streams, and wetlands) served by the headwaters of Mount Nemo, increased traffic, dust, vibration, flyrock, potential import of contaminated fill back onto the site, and removal of farmland and greenspace. Acknowledging some duplication of submissions as the majority shared the same template, the following emails went to individual agencies:

- 1942 comments by the Niagara Escarpment Commission for the NEPA application.
- 2343 comments received by the City of Burlington in response to public circulation of the Local Official Plan Amendment application. Some of these were copies of letters sent to other agencies.
- Halton Region was copied on many of these same emails.

Concerns raised in public submissions included:

- The importance of protecting the Niagara Escarpment as a designated United Nations Educational, Scientific, and Cultural Organization (UNESCO) Biosphere Reserve.

- The loss of key natural heritage features and functions including wetlands, woodlands, and protected species habitat.
- The loss of overall green space for the area, and potential loss of the golf course.
- The loss of prime agricultural lands.
- The expanded quarry operations contribution to climate change.
- The impact of the quarry operation on water quality and quantity for both drinking water (well supply) and the natural environment (groundwater and surface water).
- Increased quarry-related traffic, including truck traffic on Cedar Springs Road despite it not being a designated truck route by the City of Burlington, and safety concerns over the joint use of the haul route for recreation and active transportation.
- Concerns over the quality of fill proposed to be brought to the site.
- Increased industrial activity moving closer to existing residential communities.
- Operating hours of the quarry, including potential for all-day truck movement.
- Loss of property value, including a request to consider lowering property taxes if property values were shown to be reduced.
- The impact of blasting on homes with a history of blast damage from this operation, including those that would become closer to the quarry if approved, as well as concerns over the model methodology used by the proponent and inputs used in the model.
- The impact of dust from quarry operations on air quality and overall amenity, including settling on outdoor spaces on neighbouring properties.
- The lack of actual emissions data from the current quarry to inform the proponent's model.
- The impact of noise from quarry operations on quality of life, including concerns over the model methodology used by the proponent and inputs used in the model.
- The perception that the proponent proposed solutions that only meet minimum standards, contrasted with other operations where monitoring and adaptive management could be continuous.
- Questions as to how alternatives to the proposal have been considered, including aggregate recycling.
- Local understanding that the current quarry is approaching its end of operations, with the proposal effectively extending the operating life of the quarry.
- Requests for more analysis and further studies to assess the potential effects of the quarry.

In addition to comments received from the general public, JART has received comments from community groups Conserving Our Rural Ecosystem of Burlington Inc. (CORE) and Protecting the Escarpment and Rural Land (PERL). JART facilitated technical review meetings with both groups and select JART peer and technical reviewers, as well as a number of technical working sessions with Nelson and its consultant team.

Individual agencies will be providing public comment records to their respective Councils, Board, and Commission in accordance with typical reporting procedures.

2. DESCRIPTION OF THE PROPOSAL AND APPROVALS REQUIRED

Nelson is applying for a Class A (Quarry Below Water) licence under the *Aggregate Resources Act*, which is known as the Burlington Quarry extension application. If approved, the proposed new quarry would permit the expansion of the existing quarry onto new lands south (across the No. 2 Side Road) and west (on the current Burlington Springs Golf Course) of the existing quarry. Since the launch of the review process, Nelson has also filed site plan amendments to their current *Aggregate Resources Act* licences to enable the integration of operations across all licence boundaries—treating all of Nelson's licences at this location as a single, integrated quarry operation. The maximum annual tonnage proposed is 2,000,000 tonnes.

2.1 LOCATION

The Burlington Quarry has been in operation since 1953. The current quarry is generally located in the eastern half of the original survey block bounded by Colling Road to the north, Cedar Springs Road to the west, No. 2 Side Road to the south, and Guelph Line to the east. Nelson Aggregate Co. operates this site under the authority of licence No. 5499 and No. 5657 pursuant to the Aggregate Resources Act (ARA). In total, approximately 218.3 hectares are currently licenced as a quarry.

The proposed west extension licenced area is proposed to be approximately 58.8 hectares, (September 2022 site plan), of which approximately 33.1 hectares would be under active extraction. The lands under application are currently occupied by the Burlington Springs Golf and Country Club. Within the proposed west extension licenced area there is an area designated as part of the Region of Halton's Natural Heritage System. This area includes three small woodlands located adjacent to active golf holes. The proposed west extension includes one Butternut tree (Endangered), three golf course maintenance buildings containing barn swallow nests (Special Concern), 0.48 ha woodland that contains significant wildlife habitat (Eastern Wood-Pewee), which continues to be proposed for extraction, and another 0.48 woodland that contains significant wildlife habitat (Bats and Eastern Wood-Pewee) and habitat for an endangered species (Bats), that has been reassessed as contiguous with Woodland D and is now proposed for retention (not originally proposed for retention). The proposed west extension licenced area also contains and/or is adjacent to features regulated by Conservation Halton. This includes tributaries of Willoughby Creek, and the flooding and erosion hazards associated with these watercourses in addition to wetlands.

The proposed south extension licenced area was originally proposed to be approximately 18.1 hectares, of which approximately 14.3 hectares would be under active extraction. The area proposed for extraction is predominantly in agricultural production. The remaining lands not under application for the south extension are generally occupied by natural heritage features and functions, including significant wetlands, wetlands, woodlands (both plantation and natural), and habitats of wildlife including but not limited to fish, reptiles, amphibians, bats, and snakes. Significant wildlife habitat is found in a pond along a channel proposed as a discharge point for water from the quarry. Habitat restoration is also proposed along the southern property line. The proposed south extension licenced area also contains and/or is adjacent to Conservation Halton regulated features. This includes tributaries of Grindstone Creek, and the flooding and erosion hazards associated with these watercourses, in addition to wetlands.

In total, approximately 76.9 hectares of land are proposed to be redesignated in the Niagara Escarpment Plan, Halton Region Official Plan, and the City of Burlington Official Plans to permit the extraction of mineral aggregates on these lands. Of the approximately 76.9 hectares of land, approximately 47.4 hectares would be the site of active extraction. Remaining lands would include all lands that are a component of an aggregate operation required as conditions of the licence, such as berms or ponds.

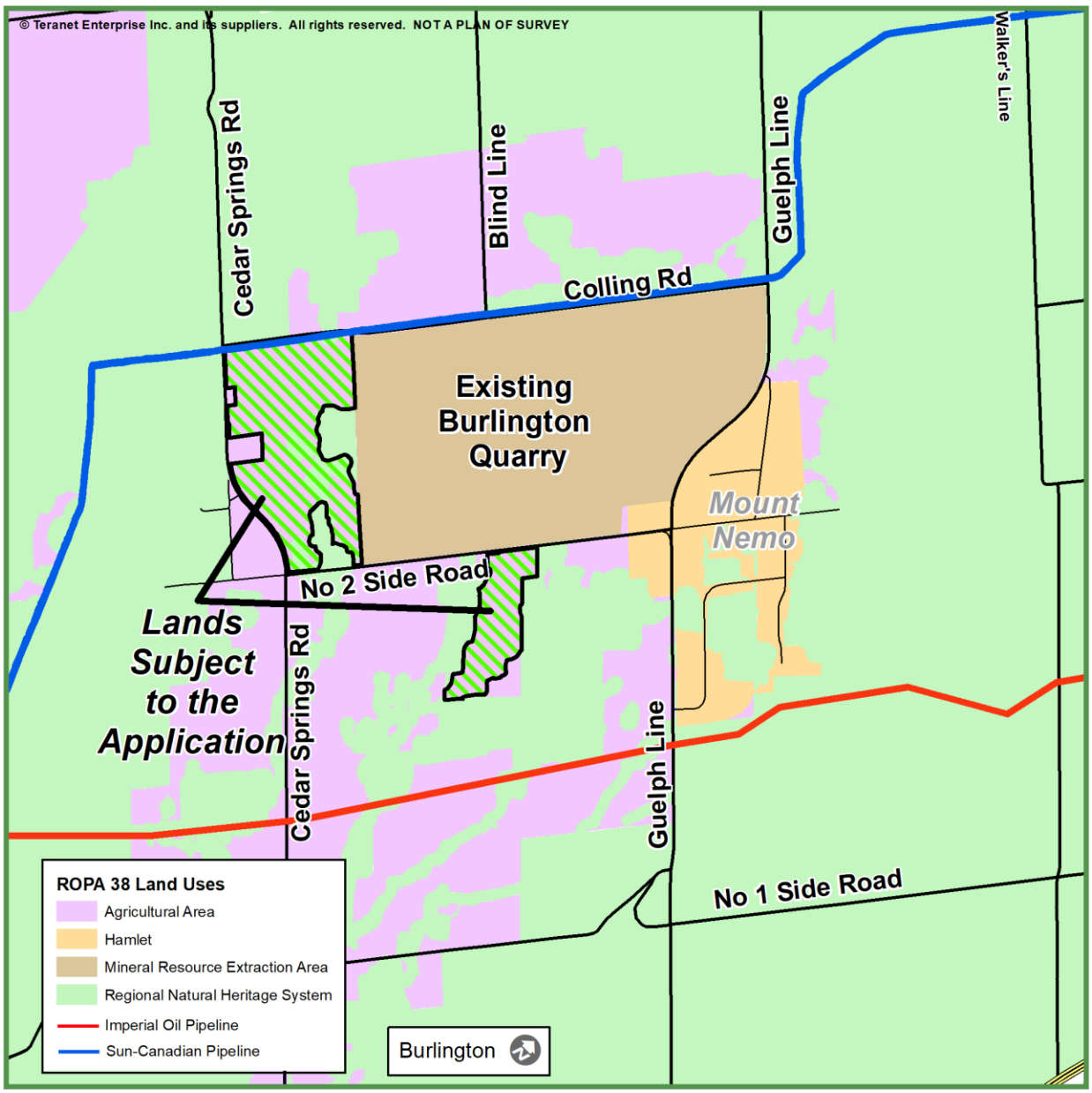

Figure: *Existing Burlington Quarry and surrounding areas with Regional Official Plan designations.*

2.2 Surrounding Land Uses

The Burlington Quarry abuts the hamlet/rural settlement area of Mount Nemo and extends approximately 1.5 kilometres west to border the Burlington Springs Golf Club. Rural and estate residential development exist to the south and west of the golf course, while agricultural lands and lands within the Region's identified Natural Heritage System generally surround the entire quarry lands.

Imperial Oil operates the Sarnia Products Pipeline running from Sarnia to Toronto, via Waterdown and Burlington. It is important infrastructure that provides products used by households and businesses across the Greater Toronto and Hamilton Area. This includes a significant portion of jet fuel for Toronto Pearson International Airport, as well as gasoline and diesel fuel. It runs south of the existing and proposed quarries, between the No. 1 Site Road and No. 2 Side Road. Imperial Oil replaced a 63-kilometre portion of the pipeline from the Waterdown Pump Station in rural Hamilton, through Burlington, Oakville, Milton and Mississauga, to a storage facility located in Toronto's North York area. Construction activities were completed in early 2023.

The Sun-Canadian Pipe Line Company Ltd. transports refined petroleum products, namely gasoline, diesel, jet fuel and fuel oil from the Suncor and Shell refineries in Sarnia to London, Hamilton, and the Greater Toronto Area. The system is composed of two transmission pipeline systems: one supply line to the Hamilton terminal and a second supply line to the Toronto terminal that crosses through Halton Region—generally along Colling Road to the immediate north of the existing quarry. The supply line runs through Halton Region. Its total length is approximately 644 kilometres.

2.3 Approvals Required and Current Applications

As detailed in section 1.2, of this report, the following approvals are required to facilitate the proposed quarry expansion:

- A Niagara Escarpment Plan Amendment to re-designate the proposed expansion lands to permit mineral aggregate extraction, and a Development Permit to ultimately permit the development.
- An amendment to the Halton Region Official Plan to re-designate the proposed expansion lands to permit mineral aggregate extraction.
- An amendment to the City of Burlington Official Plan to redesignate the proposed expansion lands to permit mineral aggregate extraction.
- A licence for the new site issued by the Ministry of Natural Resources and Forestry (Aggregate Resources Act Licence).
- A corresponding amendment to the site plan for the current operation was also required by the Ministry of Natural Resources and Forestry, to allow for the integration of the entire site as a single operation.
- Niagara Escarpment Commission Development Permit recommended conditions are part of the application of the expansion of the lands.

2.4 CONSERVATION HALTON'S REVIEW ROLE

Conservation Halton is a member of JART but is not a decision-making body with respect to the applications. Conservation Halton reviewed the applications based on its responsibility to comment on risks related to natural hazards, including the prevention or mitigation of those risks, and based on its delegated responsibility to represent the Province on the natural hazard policies of the Provincial Policy Statement (PPS Sections 3.1.1 through 3.1.7) per O.Reg. 686/21. Conservation Halton also reviewed the applications to ensure that they aligned with Conservation Halton's regulatory requirements under O.Reg. 162/06 (e.g., natural hazard or wetland related policies and requirements).

The proposed extension lands contain and/or are adjacent to features regulated by Conservation Halton under O.Reg. 162/06. Conservation Halton regulates all watercourses, valleylands, wetlands, Lake Ontario and Hamilton Harbour shoreline, hazardous lands, as well as lands adjacent to these features. Conservation Halton regulates a distance of 15.0 metres from the greater of the flooding and erosion hazards associated with watercourses part of major valley systems, which includes Bronte and Grindstone Creeks, 120.0 metres from Provincially Significant Wetlands and wetlands greater than 2 hectares in size and 30.0 metres from wetlands, less than 2.0 hectares in size. Conservation Halton has Board approved regulatory policies that guide the administration of CH's regulation entitled, "*Policies, Procedures and Guidelines for the Administration of Ontario Regulation 162/06 and Land Use Planning Policy Document*". Conservation Halton's regulation applies prior to an ARA licence being granted and once it is surrendered or revoked, or for lands outside of a licenced area.

Prior to the introduction of Bill 23 by the Province in fall 2022, Conservation Halton also provided technical advisory advice through the JART on natural heritage and water resources matters through the technical review process. However, on January 1, 2023, *Ontario Regulation 596/22: Prescribed Acts – Subsections 21.1.1 (1.1)* and *21.1.2 (1.1)* of the *Conservation Authorities Act (O. Reg. 596/22)* came into effect. As a result, Conservation Authorities are no longer able to provide technical review services for planning and development applications that were previously provided under Memorandums of Understanding with municipalities (e.g., technical reviews related to natural heritage and select aspects of stormwater management). Consequently, all outstanding natural heritage related reviews and comments are deferred to the Region, City and Niagara Escarpment Commission.

O.Reg. 596/22 does <u>not</u> affect Conservation Halton's mandatory programs or services. As part of Conservation Halton's review of the most recent submission to JART (i.e., Nelson's third submission), Conservation Halton has limited its responses to comments related to natural hazards, and wetland matters, per *Ontario Regulation 686/21* and *Ontario Regulation 162/06*.

2.5 REPORTS SUBMITTED IN SUPPORT OF THE APPLICATION

Nelson Aggregate Co. submitted the following reports in support of the proposal and during the technical review:

- Agricultural Impact Assessment, MHBC Planning, April 2020
- Soil Survey and Canada Land Inventory (CLI) Assessment, DBH Soil Services Inc., November 2020

- Archaeological Assessments: Stages 1 and 2, Golder Associated Ltd., March 2020 (revised September 2020); Stages 1, 2 and 3, Archaeologix Inc., July and August 2003; and Stage 4, Archaeologix Inc., August 2004
- Cultural Heritage Impact Assessment, MHBC Planning, April 2020 (revised June 2021)
- Environment Technical Report (Level 1 and 2), Savanta Inc., and Stantec Consulting Ltd., September 2010 (revised by Savanta Inc., April 2020)
- Watercourse Characterization Summaries, Earthfx Incorporated, Savanta Inc. and Tatham Engineering, April 2021
- Wetland Characterization Summaries, Earthfx Incorporated, Savanta Inc. and Tatham Engineering, March 2021
- Financial Impact Study, Nelson Aggregates, April 2020; Altus Group, September 2021
- Air Quality Study, BCX Environmental Consulting, March 2020
- Planning Justification Report and Aggregate Resources Act Summary Statement, MHBC Planning, April 2020 (revised September 2020)
- Progressive and Final Rehabilitation Monitoring Study, MHBC Planning, April 2020
- Traffic Report, Paradigm Transportation Solutions Limited, February 2020
- (Traffic) Safety Review, True North Safety Group, June 2021
- Level 1 and 2 Hydrogeological Assessment (including a Karst Assessment as an appendix), Earthfx Incorporated, April 2020
- Surface Water Assessment, Tatham Engineering, April 2020
- Adaptive Management Plan, Earthfx Incorporated, Savanta Inc. and Tatham Engineering, April 2020
- Noise Impact Assessment, HGC Engineering, April 2020 (revised November 2021)
- Blast Impact Analysis, Explotech Engineering Ltd., March 2020 (revised June 2021)
- Visual Impact Assessment, MHBC Planning, April 2020 (revised June 2021)
- Site Plan and associated notes, MHBC Planning, April 2020

Many of the reports were prepared as comprehensive studies covering both the existing site and the proposed site plan amendment, not solely the expansion areas. The reports were reviewed comprehensively to produce comments for all applications.

Additional information was received from Nelson throughout the technical review process, in the form of replies to JART comments, addendum reports, memos, and email correspondence. This information was used as the basis for technical discussions between JART staff and peer reviewers and Nelson. References to this updated information are found throughout the technical review summaries in Section 3 and the detailed appendices to this report. These items are listed below (noting that all individual correspondences may not be reflected in this list):

- **Fall 2020**

    - Updated the date of the Archaeological Assessment Report in Section H, September 2020
    - Agricultural Impact Assessment Comments Response, September 2020
    - Site Plan Signed, September 2020
    - Bronte Creek Watershed Study, September 2020
    - Level 1 and 2 Natural Environment Technical Report, September 2020
    - Grindstone Creek and Annual Monitoring – Long Term Environmental Monitoring Program – October 2009, September 2020
    - Sixteen Mile Creek, Grindstone Creek and Supplemental Monitoring – Long Term Environmental Monitoring Program – 2012, September 2020
    - Grindstone Creek, Sixteen Mile Creek and Supplemental Monitoring – Long Term Environmental Monitoring Program – 2011, September 2020
    - Bronte Creek, Urban Creeks and Supplemental Monitoring – Long Term Environmental Monitoring Program – 2012, September 2020
    - Acoustic Assessment Report – Halton Asphalt Supply, September 2020
    - A summary of stationary source noise levels for each receptor, all calculations, and updated noise limits, September 2020
    - Whitewater Well Monitoring Letters and Water Quality Results, September 2020
    - Surface Water Balance – Proposed Conditions, September 2020
    - Natural Hazard Study, September 2020
    - Hydrologic Model, September 2020
    - Grindstone Creek Wetland Evaluation Report, September 2020
    - Mount Nemo Wetland Evaluation Report, September 2020
    - Pre-Application Public Consultation Report, September 2020
    - Soil Survey and Canada Land Inventory (CLI) Assessment, November 2020
    - Revisions to the site plan legend were made to address a Ministry of Natural Resources and Forestry's letter, December 9, 2020

- **Summer 2021**
    - MNRF wetlands for South Extension, April 2021
    - Significant Wildlife Habitat, Species of Conservation Concern and Species at Risk, April 2021
    - Nelson Response to JART Archeology Comments – LHC Heritage Planning & Archaeology Inc., June 2021
    - Nelson Response to JART Blasting Comments – Explotech, June 2021
    - Nelson Response to JART Agriculture Comments – DBH Soil Services, June 2021
    - Nelson Response to JART AMP comments – Earthfx, June 2021
    - Nelson Response to JART Cultural Heritage Comments – MHBC, June 2021
    - Nelson Response to JART Visual Impact Comments – June 2021

- Nelson Response to JART Traffic Comments - Paradigm Transportation Solutions Limited – June 2021
- DFO – Letter of Advice, June 2021
- Nelson Response to JART Air Quality Comments – BCX Environmental Consulting, July 2021
- Nelson Response to JART Financial Impact Comments – Altus Group, June 2021
- Nelson Response to JART Surface Water Comments – Tatham Engineering, July 2021
- Nelson Response to JART Natural Environment Comments – Savanta, July 2021
- Nelson Response to JART Hydrogeology Comments – Earthfx, July 2021
- The site plan revisions consisted of areas to be removed from the limit of extraction and adjusted the proposed berm locations. Revisions 1 and 2 for the west extension, revision 3 for the south extension.
- Revision 1
    - Berm repositioned to remain 30m from Wetland
- Revision 2
    - Area to be removed from limit of extraction to remain 30m from FOD7-2
    - Area to be removed from limit of extraction to remain 30m from FOD7-4
    - Berm repositioned to remain 30m from FOD7-4
- Revision 3
    - Berm repositioned to remain 30m from FOD7-4

- **November 2021**
    - Nelson Response to JART Noise Comments – HGC Engineering, November 2021

- **Winter 2022**
    - Surface Water Clarifications; Schedule A: MECP Response Matrix, Schedule B: Wetland Characterization, Schedule C: Watercourse Characterization
    - Updated site plans to address agency comments and to incorporate requested changes by agencies from the ongoing technical review
    - Adjusted licence boundary and limits of extraction in the proposed west and south extensions based on dripline and wetland surveys completed in the field
    - Nelson Response to JART Air Quality Comments – BCX Environmental Consulting, January 2022
    - Modifications in the west extension:
        - Added Earth and Life Science Area of Natural and Scientific Interest (ANSI) Lake Medad Meltwater Channel and Medad Valley to plan view
        - Added MNRF Unevaluated Wetland, MNRF - Unevaluated (Assumed Significant for Planning Purposes)
        - Labeled Wetland 13202, Surveyed by Savanta/MNRF in Accordance with OWES (Assumed Significant for Planning Purposes)
        - Added two Bat Maternity Colonies
        - Added MNRF Unevaluated Wetland

- Modifications in the south extension:
    - Added additional Significant Wildlife Habitat - Amphibian Breeding (woodland) area and Turtle Wintering Area
- Updated site plan to address agency comments
- Added additional wetland surveyed by Savanta and MNRF to the west extension
- Air Quality Modeling Reports

- **Spring 2022 (including items up to the August 2022 filing of *Planning Act* appeals)**

    - Modifications to the proposed west extension including:
        - Updated limit of extraction in the west extension
        - Added dripline and setbacks dimensions from the driplines to the plan view
        - Adjusted driplines to correspond with the surveyed driplines
        - Updated hatching to be solid green which represents significant woodlands
    - Modifications to the proposed south extension included:
        - Added dripline and setbacks dimensions from the driplines to the plan view
    - Revised note H.1 on the Site Plan
    - Earthfx Memo, dated April 19, 2022, regarding Response to JART comments and follow up to February 16, 2022, JART working meeting
    - Earthfx Presentation dated May 20, 2022 regarding Medad Valley. The presentation was prepared for the May 20th meeting with NDMNRF
    - Earthfx Memo dated May 29, 2022 regarding Documentation of Deep Pond Simulation Results presented at May 20, 2022 NDMNRF Meeting
    - GEI Memo dated May 31, 2022 regarding Nelson Burlington Extension and the Medad Valley Life Science ANSI and PSW
    - Earthfx, GEI and Tatham Adaptive Management Plan, dated June 2022
    - An additional updated site plan, June 2022
    - Nelson Response to JART Agricultural, AMP, Archaeology, Blasting, Cultural Heritage, Financial, Groundwater, Hydrogeology, Natural Environment, Noise, Surface Water, Traffic, and Visual Comments, June 2022

- **September 2022**
    - Updated site plan for the proposed extensions and existing quarry

- **Spring 2023**
    - Memorandum Re: Nelson Quarry, Burlington, Response to Comments, prepared by Tatham Engineering, April 13, 2023

2.6 *Aggregate Resources Act* Site Plan Amendment for the Existing Operation

On November 4, 2021, Halton Region, the City of Burlington, Conservation Halton, and the Niagara Escarpment Commission received a circulation from Nelson Aggregate Co. regarding a proposed Site Plan Amendment to the existing Licence Nos. 5499 & 5657 which apply to the existing quarry lands along No. 2 Side Road. The general intent of the amendment was to allow for the integration of the entire site as a single operation, which would allow for material extracted within the proposed extension to be transported to the existing quarry for processing and shipping. The amendment proposed several changes to the existing licences, including:

- A revised extraction limit in the existing quarry adjacent to the proposed west extension to allow for an integrated operation.
- Harmonization across all licences of the proposed after-use of the operation from a deep lake system to a shallow lake system supporting a park and agricultural use.
- Additional permissions for material extracted from the expansion lands to be processed on the existing quarry site.
- A new entrance/exit ramp adjacent to No. 2 Side Road.
- Requests for Provincial overrides to facilitate integrated operation of the existing and proposed extension operations and rehabilitation.
- A revised rehabilitation plan.
- Revised noise attenuation mitigation measures.
- Updated site plan notes characterizing proposed variations to the Control and Operation of the Pit or Quarry.
- Other minor housekeeping items.

On December 6, 2021, Niagara Escarpment Commission staff provided comments back to the Ministry of Natural Resources and Forestry in response to the Site Plan Amendment Application noting that until such time that an NEC Development Permit was issued, any approval of an amendment to a Site Plan under the Aggregate Resources Act being contemplated would be premature as the lands are subject to NEC Development Control established by O.Reg. 826/90, as amended.

On December 8, 2021, Halton Region staff provided comments back to the Ministry of Natural Resources and Forestry in response to the Site Plan Amendment Application. The comments outlined a series of concerns related to the proposed Site Plan Amendment for the existing quarry. These concerns were informed by the review of technical reports and studies submitted in support of the application by staff and retained consultants. Halton Region posted the same information to Environmental Registry of Ontario posting 019-4921 on February 8, 2022.

In its review of the proposed site plan amendment to the existing licences, the City of Burlington issued a number of concerns in a December 2021 letter addressed to the MNRF and the applicant's representative. These concerns included:

- Prematurity of the application in relation to the legislative requirement for an NEC Development Permit to be issued prior to any other approvals being issued.
- Changes to the proposed rehabilitation plan may not be permitted unless the after use meets the policies of the NEP (2017) and a Development Permit under the NEPDA is issued.
- The application is premature as it fails to consider additional rehabilitation obligations.
- The application incorporates the proposed expansion lands into the newly designed overall rehabilitation plan. The expansion lands are still subject to a number of applications reviews including under the Aggregate Resource Act (ARA).

On December 8, 2021, Conservation Halton staff also provided comments back to the Ministry of Natural Resources and Forestry in response to the Site Plan Amendment Application. Similar to the other agencies, the comments outlined concerns and identified that a decision should be made on the expansion applications before the Site Plan Amendment Application is approved. Conservation Halton posted the same information to the Environmental Registry of Ontario posting 019-4921 on February 15, 2022.

Given that the proposed site plan amendments were driven by Nelson's expansion plans, many of the issues identified apply equally to the existing quarry licence and, in particular, to the amended site plan for which the applicant is seeking approval. Many comments raised during the technical review considered the proposal as a single, integrated operation with integrated effects.

2.7 Niagara Escarpment Plan Amendment and Development Permit

The Niagara Escarpment Plan Amendment application seeks to both redesignate lands from Escarpment Rural Area to Mineral Resource Extraction Area and apply a special policy for continued use of existing infrastructure used in the current Nelson Aggregate operation. At its meeting on August 20, 2020, the Niagara Escarpment Commission circulated the proposed amendment for comments from the public, non-governmental organizations (NGOs), and partner agencies including municipal, provincial, and federal organizations.

The proposed amendment was posted on the Environmental Registry of Ontario on February 24, 2021, with a request for comments by April 26, 2021 (a 61-day commenting period). As noted above in section 1.9, a total of 298 comments were received through the Registry posting, in addition to 1942 direct emails.

On March 15, 2021, the Niagara Escarpment Commission circulated the Proposed Amendment and requested comments from relevant Indigenous communities, Ministries, affected municipalities, interested parties, neighboring property owners and the public. The proponent also posted a notice at the site with specifications provided by the Niagara Escarpment Commission, for comments to be filed by April 16, 2021. Notices were also placed in the Burlington Post and Milton Champion newspapers on February 25, 2021, requesting comments by April 26, 2021. The Niagara Escarpment Commission Public Interest Advisory Committee (PIAC) convened on March 29, 2022, and July 26, 2022, and provided advice on the Proposed Amendment recommending against the proposed Niagara Escarpment Plan Amendment.

Objection letters were received from the Region of Halton, City of Burlington, and Conservation Halton. Halton Regional staff identified a number of concerns with the application, concluding that the application as submitted does not have appropriate regard for the development criteria listed in Part 2 of the Niagara Escarpment Plan, or support objectives listed in Policy 1.9.1 of the Niagara Escarpment Plan.

City of Burlington staff identified several areas where information or data provided were not sufficient, analyses were not adequately coordinated between studies and/or where the methodology behind information presented in the plans and studies or reports was unknown or inconsistent.

Conservation Halton staff identified concerns with the data collection, evaluation, analysis, and conclusions in the proposal where information or data provided were not sufficient, analyses were not adequately coordinated between studies and/or where the methodology behind information presented in the plans and studies or reports was unknown or inconsistent.

On May 10, 2022, the Niagara Escarpment Commission circulated the Development Permit Application and requested comments from relevant Indigenous communities, Ministries, affected municipalities and non-governmental organization. Objection letters were received from the Region of Halton, City of Burlington, and Conservation Halton, reiterating prior comments made on the proposed Niagara Escarpment Plan Amendment.

At the request of the proponent, on April 27, 2023, the proposed Niagara Escarpment Plan Amendment was referred by the Niagara Escarpment Commission to the Ontario Land Tribunal, and the Development Permit Application was refused. The proponent made this request in order to facilitate a consolidated hearing at the Ontario Land Tribunal.

2.8 Previous Application (2004-2012)

Nelson previously made applications in October 2004 to permit extraction of approximately 82.3 hectares of land south of No. 2 Side Road, in the general area of the south extension currently proposed. At its meeting on October 28, 2009, Regional Council refused the Regional Official Plan Amendment application. At its meeting on November 9, 2009, City of Burlington Council refused the Local Official Plan Amendment application. The proposal was ultimately brought to a Joint Board hearing convened under the former *Consolidated Hearings Act*.

JART completed its technical review of the applications and made every attempt to ensure a thorough and comprehensive analysis. A number of issues were identified which JART concluded were left largely unaddressed or lacking in sufficient justification:

- The application did not demonstrate conformity with portions of the Niagara Escarpment Plan, Region of Halton, and City of Burlington Official Plans.
- The proposed footprint as identified in the 2008 revised application would have included extraction within a significant woodland and a Provincially Significant Wetland not supported by policy.

- The assessment of the applications needed to consider the broader Mount Nemo Plateau in a landscape ecology context.
- With respect to wells and hydrogeology, questions around lake filling, wetland protection, and the impacts on private wells (water quality and quantity) remained unaddressed.
- The applications suggested an extended timeline for rehabilitation of the existing quarry, in light of the fact that processing of materials from the new quarry would be carried out in the existing quarry. Questions regarding integration between the existing quarry and proposed quarry operations remained outstanding.
- Detailed mitigation measures remained outstanding for species at risk.
- Commitment to the preparation of an Adaptive Management Plan and related legal agreements and associated securities, needed to be addressed.

On October 11, 2012, the application was denied by the Joint Board on the basis that Nelson had not made sufficient provision for the protection of the unique ecological and environmentally sensitive areas and that, if approved, the expansion of the extraction operation, as proposed, had the potential to impact habitat for the Jefferson salamander, an endangered species found in the area.

While the proposed southern extension occupies part of the footprint of the refused 2012 application, and technical studies submitted in support of the current applications do reuse some material and data from the previous applications, all current applications are being treated by the agencies as new applications.

2.9 THE PLANNING POLICY FRAMEWORK

The following provincial and regional policies must be considered when reviewing the proposal:

- The Provincial Policy Statement (PPS, 2020) contains policies for managing and protecting natural resources including the following relevant areas to the proposal: Natural Heritage, Water, Agriculture, Mineral Aggregate Resources, and Cultural Heritage and Archaeology. It also requires that development be directed away from areas of natural hazards where there is an unacceptable risk to public health or safety or of property damage, and to not create new or aggravate existing hazards. Further, the PPS requires rehabilitation of man-made hazards such as mineral aggregate operations prior to permitting future development on these sites in order to protect public health and safety. (At the time this report is being published, a draft new Provincial Policy Statement is being consulted on by the Province of Ontario. It remains in consultation status.)
- The subject lands are within the Niagara Escarpment Plan Area under the Greenbelt Plan (2017) to which the policies of the Niagara Escarpment Plan apply as well as the Parkland, Open Space and Trails policies of the Greenbelt Plan.
- The subject lands are located within the Escarpment Rural Area land use designation in the Niagara Escarpment Plan (2017). As a Provincial land use plan, the Niagara Escarpment Plan guides land use planning decisions within the Plan area and takes precedence over the Provincial Policy Statement and the Greenbelt Plan to the extent of any conflict. Municipal Official Plan policy must not conflict with the Niagara Escarpment Plan and no development approvals can be

given, including an *Aggregate Resources Act* licence until the Niagara Escarpment Commission has issued a Development Permit.

- A Place to Grow: The Growth Plan for the Greater Golden Horseshoe, as amended by Amendment 1 (2020) provides policies for growth management and environmental protection. This Plan defers to either the Greenbelt Plan or the Niagara Escarpment Plan where similar or overlapping matters are addressed. (At the time this report is being published, the Province of Ontario is consulting on combining the Growth Plan and the Provincial Policy Statement into one standalone document. This proposal remains in consultation status only.)
- The Halton Region Official Plan (2022, as amended up to and including ROPA 49) includes requirements for amending the Official Plan as well as policies for the protection of the Agricultural System and Agricultural Area, Mineral Resource Extraction Areas, and the Natural Heritage System.
- There are two official plans applicable in the City of Burlington. The 1997 Burlington Official Plan (as amended) outlines a long-term vision of the community and quality of life for Burlington residents and provides policy direction to the public and private sectors on land use, development, and resource management matters to guide the future planning and development of the City towards the desired community vision. The Official Plan implements policies recognizing and guiding the protection of the City's agricultural system, water resources, cultural heritage, natural heritage, and mineral resources.
- Burlington's New Official Plan was adopted by City Council on April 26, 2018, and approved with modifications by the Region of Halton on November 30, 2020. The 2020 Official Plan includes policy to manage physical change in relation to land use and development, transportation, infrastructure, the natural environment, heritage, parks, and social, economic, and environmental sustainability. The New Official Plan builds on the principles and direction of the previous Official Plan, including the recognition of a City Natural Heritage System, as well as recognizing and achieving consistency and conformity with policy advancements being implemented at other levels of government. The Ontario Land Tribunal has confirmed that sections of the new Official Plan are in force and not subject to appeal.

3. Overview of Technical Findings by the Joint Agency Review Team

JART planners worked with the applicant and their consultants through three circulations of updated plans and responses to technical review comments (through the consolidated comment tables and memoranda or letters as required). A third circulation was initiated in the summer of 2022, during which appeals for non-decision on the Local and Regional Official Plan Amendment applications were received from Nelson. These technical comments expanded upon the initial Letters of Objection provided by the agencies in December 2020. The work was supported by subject matter experts retained by Halton Region and the City of Burlington (see section 1.1 of this report) and technical staff from the public agencies.

The full record of consolidated technical comments is attached as individual appendices to this report. Below is a summary of the retained consultant's findings and opinions.

3.1 Agricultural Impact Assessment (AIA)

Michael Hoffman was retained by Halton Region to provide a review of the Agricultural Impact Assessment (AIA) prepared by MHBC Planning.

Detailed technical comments and proponent replies are provided in Appendix C to this report.

3.1.1 Review Methodology

The soils and agricultural review of the information provided by consultants on behalf of Nelson was prepared with the expectation that opinions provided by Nelson's consultants would be based on evidence. In the absence of information collected using randomized controlled trials, the following criteria were used to evaluate the Agricultural Impact Assessment, proposed rehabilitation plan, and other information presented in a technical review meeting listed above:

i. Concordance between the supplied terms of reference and the submitted AIA
ii. Conclusions and opinions based on quantitative evidence
iii. Context, both geographic and temporal, to provide for comparison (a relative importance ranking) as required by policy
iv. A description of methods as supported by published literature and practice in agrology
v. Searches to ensure that the latest information available is being used to assess agriculture (for example, currently OMAFRA, is correlating soils and soil capability values in Ontario which will potentially change soil names and soil capability classes)
vi. A study area, larger than the site subject to the proposed designation change, where the minimum study area size would be set by the zone of impact measured over time in former, as well as existing, quarry operations
vii. Discussion of the limitations of the methods and information presented
viii. The language in policy used as a rationale for the agricultural characteristics or factors documented and compared

ix. Discussion on the relative importance of agricultural characteristics documented and compared (for example, if agricultural characteristics are weighted or are not weighted, why was that decision made, and if agricultural characteristics are combined into a single rank or score, how that was completed?)
x. The scale at which the information is presented and the limitations of combining information (multi-attribute analysis) which may only be available at different scales
xi. An analysis of the size, location, and boundary conditions of the lands to be temporarily or permanently removed from agricultural use and/or the agricultural designation (prime agricultural area)
xii. Proof demonstrating that, for lands already used for aggregate extraction in Ontario, substantially the same areas and same average soil capability for agriculture have been restored; and, that the proposed Nelson rehabilitation to an agricultural after use will use the same or similar soil materials, within the same or similar environment, following the same or similar methods of rehabilitation as used to reach the goal of the same areas and same average soil capability for agriculture have been restored

3.1.2 Original Findings

AgPlan's peer review summarized findings related to MHBC's submitted AIA, the "AIA Reply", and the DBH Soil Services Addendum for the proposed west extension as incomplete because of:

i. Missing or incomplete information (Agricultural Table: Row 15)
ii. Inadequate reference to, and application of, existing policy, and guidelines including the analysis of alternative locations (Agricultural Table: Row 13)
iii. Lack of reference to quantitative, preferably replicated, studies concerning impacts to agriculture resulting specifically from the existing quarry, and/or generally to other aggregate operations (Agricultural Table: Row 17)
iv. An evidence-based rationale for the size of the secondary study area (Agricultural Table: Row 10)
v. No discussion on cumulative impacts (Agricultural Table: Rows 10 and 51)
vi. Insufficient integration of information from different disciplines (Agricultural Table: Row 14)

The review of the MHBC Site Plan Amendment (report number 4 on page 1 of this summary) listed several requests for additional information. The primary conclusion of the AgPlan review was that agricultural and soils information may be available, if and when, an updated Agricultural Impact Assessment is prepared by MHBC/DBH Soil Services.

3.1.3 Professional Opinion

Key conclusions out of the agricultural impact review include the following:

1. The proposed aggregate expansion application will remove prime agricultural lands from production in a Prime Agricultural Area (Agricultural Table: Row 18)
2. There is nothing in the information provided that the same or a similar range, diversity, and yield of crops, input requirements (e.g., water, fertilizer, farm management), and ecological effects will result on lands proposed to be rehabilitated to an agricultural after use relative to the agricultural

lands proposed to be removed from agricultural production as a result of aggregate mining. Therefore, an assessment of the rehabilitation plan cannot be based on the probability of the same or a similar crop diversity and yields, inputs, and ecological effects (Agricultural Table: Row 26)

3. In the peer reviewer's opinion, the approach taken by Nelson with respect to alternative locations does not consider a broader range of alternative locations, from a soil capability perspective, or a cost-benefit analysis, for example, at various scale from the Province through to the sub-tier municipal level, and subsequently to the lands in proximity to the proposed expansion area. Therefore, the analysis of alternative locations, required by agricultural planning policy, is flawed (Agricultural Table: Row 34)
4. The matter of cumulative impact has not been appropriately discussed. Such review and impacts need to be defined with respect to characteristics, time, distance, and scale relative to different kinds of impacts on agriculture (Agricultural Table: Rows 10 and 51)

The Proponent's Adaptive Management Plan shows additional use of soils to create an island in a ground water lake where that island will be rehabilitated for an agricultural after use. Unfortunately, the proponent has not cited literature indicating the probability that the agricultural island can be rehabilitated to a condition in which substantially the same areas and same average soil capability for agriculture are restored. Therefore, agricultural rehabilitation may require using new and/or untested methods to reach an end goal of same or similar soil capability relative to the agricultural land area used for aggregate extraction. Current information provided by the proponent means that it is unknown if adaptive management may reproduce similar soil capability, poorer soil capability or better soil capability for agriculture.

3.2 Air Quality Assessment

Dr. H. Andrew Gray (Gray Sky Solutions) was retained by Halton Region to conduct a review of the Air Quality Study prepared by BCX.

Detailed technical comments and proponent replies are provided in Appendix D to this report.

3.2.1 Review Methodology

Dr. Gray reviewed the Air Quality Study, which consisted of the main report and a number of appendices documenting the modeling and analysis, including emission calculations, mobile source emissions factors, AERMOD supporting files (emission scenario summaries), and model results. In addition, Dr. Gray reviewed a set of AERMOD modeling files for several emission scenarios.

3.2.2 Original Findings

Comments on the air quality study included:

- A recommendation to estimate air quality impacts in a larger geographic area, not just in the immediate vicinity of the facility (Air Quality Table: Row 2)
- A recommendation to evaluate the significant uncertainties in the modeled air quality impacts due to the use of marginal quality emission factors (mostly taken from US EPA AP-42), many of

which are outdated and/or are not applicable to the sources at this facility. Source testing of existing operations could also be conducted to determine more appropriate emission factors (Air Quality Table: Row 3)

- A recommendation to include a health impact analysis to evaluate the potential increased mortality and morbidity in the surrounding community associated with emitted particulate matter at the facility (Air Quality Table: Row 4)
- A recommendation to include additional information in the report concerning the preparation of the meteorological data files (specifically, where the meteorological data was obtained, and whether the AERMINUTE preprocessor was used to reduce the number of calm hourly winds. This item is expanded upon in Section 3.2.4 below (Air Quality Table: Row 6)
- A recommendation to include a non-uniform diurnal distribution of traffic emissions and/or account for peak hourly truck traffic in the modeling analysis. (Air Quality Table: Row 7)

3.2.3 Summary of Changes through JART Review

The Applicant did undertake additional research in response to Dr. Gray's review:

- BCX analyzed the contribution of various data quality rated emission groups to the receptor with the maximum PM2.5 (24-hour average) concentration. The contribution of the marginal data quality group is approximately 38%. If the contribution of the marginal data quality group is conservatively doubled, the PM2.5 (24-hour average) modelling result is still predicted to be below the PM2.5 (24-hour average) criterion (Air Quality Table: Row 3)
- Maximum hourly trucking of 112 truck trips per hour were updated in the calculation sheets. Two scenarios were prepared: Peak hourly traffic was very conservatively concentrated into morning hours as requested, and actual expected truck distribution per hour as provided in Appendix B of the Traffic Study. Modelling results PM2.5 (24hr) shows that there would be negligible change and that the AQS conclusions remain unchanged (Air Quality Table: Row 7)

3.2.4 Professional Opinion

The Nelson air quality assessment has not complied with the request to provide sufficient additional information regarding the data sources for the preparation of the meteorological data. Per the fourth bullet in Section 3.2.2 above, it is apparent that one-minute ASOS wind data were not included in the meteorological data preparation. This represents a significant shortcoming in the meteorological data used for the dispersion modeling analysis.

Despite this and the few minor errors that remain in the dispersion modeling analysis, the total particulate matter will likely not exceed Provincial air quality criteria. However, this needs to be confirmed through updated analysis.

3.3 Archaeology and Cultural Heritage

LHC Heritage Planning & Archaeology Inc. was retained by the City of Burlington to conduct a review of the Cultural Heritage Impact Assessment and Archaeological Assessments.

Detailed technical comments and proponent replies are provided in Appendix E to this report.

3.3.1 Review Methodology

LHC completed a review of the Cultural Heritage Impact Assessment and Archaeological Assessments submitted as part of the above noted application. The review of these reports was informed by previous iterations of the Cultural Heritage Impact Assessment Report and the Golder Stage 1-2 Archaeological Assessment, and proponent responses to the comment on those earlier versions.

3.3.2 Original Findings

LHC reviewed the comment responses and revised Cultural Heritage Impact Assessment and is of the opinion that the revised report dated June 2021 generally satisfies the submitted Terms of Reference, with the exception of outstanding concerns related to the evaluation of the property 5235 Cedar Springs Road - specifically the stone Ontario Gothic Revival Cottage. LHC maintains that, given the potential for a direct adverse impact related to removal, a screening-level evaluation is insufficient, and the property warrants further research and evaluation to determine if O.Reg. 9/06 criteria are satisfied. Further to the site visit on November 24, 2021, additional concerns have been identified related to the smaller outbuilding at 2280 No. 2 Side Road and a large barn immediately northwest of the proposed south extension lands (Cultural Heritage Table: Row 1).

The Stage 1-2 Archaeological Assessment dated September 15, 2020, has been entered into the Ontario Public Register of Archaeological Reports. A letter from the Ministry of Heritage, Sport, Tourism and Culture Industries, dated May 14, 2021, was included in the comment response package. The review letter from the Archaeological Review Officer was not included in the comment response package and should be provided to the agencies for review. LHC is of the opinion that the Study Area's location on the Mount Nemo Plateau, has not been considered in the understanding of the property's physiography and that consideration of other sites on the plateau (such as those identified within the proposed south extension) is warranted in this case. Notwithstanding this, the identification of areas of archaeological potential appears to have captured all undisturbed lands within the study area and the extent of Stage 2 activities appears to be in conformance with the Ministry of Heritage, Sport, Tourism and Culture Industries Standards and Guidelines for Consultant Archaeologists. A more robust understanding of the context of the Study Area or AiGx-462 would be very unlikely to affect the results and recommendations (Cultural Heritage Table: Rows 1, 2, and 15).

3.3.3 Professional Opinion

Two specific areas of concern remain related to LHC's peer review. Specifically, these relate to potential direct impacts (related to removal) of the smaller outbuilding at 2280 Side Road No. 2 and the stone Ontario Gothic Revival Cottage (golf club house) at 5235 Cedar Springs Road. In both cases, insufficient evidence has been provided to clearly demonstrate a lack of cultural heritage value or interest. Based on the available information, both of these structures appear to have likely cultural heritage value or interest. Avoidance would mitigate this concern (Cultural Heritage Table: Row 1).

No substantive outstanding issues remain with respect to the archaeological assessments. LHC concurs with the proponent responses that the standards outlined in the Ministry of Heritage, Sport, Tourism and Culture Industries Standards and Guidelines for Consultant Archaeologists have been met.

3.4 BLAST IMPACT ASSESSMENT (BIA)

Englobe (previously DST Consulting Engineers Inc.) was to carry out a peer review of the blast impact analysis prepared by Explotech Engineering Limited (Explotech). The peer reviewer conducted and submitted a preliminary (draft) review of Explotech's March 24, 2020, blast impact assessment report on October 19, 2020.

Detailed technical comments and proponent replies are provided in Appendix F to this report.

3.4.1 REVIEW METHODOLOGY

This review was limited to the scope of Explotech's blast induced vibrations and overpressure assessment based on the Ministry of Environment, Conservations and Parks (MECP) Model Municipal Noise Control By-law NPC 119 governing blasting in mines and quarries in the province of Ontario. The review highlighted areas of concerns not addressed, and critical factors that should have been considered by Explotech in their BIA report.

Following an area visit on September 25, 2020, to observe the site, surrounding receptors, and verifying potential for blasting impacts on third-party properties, Englobe conducted and submitted a more comprehensive review of Explotech's report on November 2, 2020.

3.4.2 ORIGINAL FINDINGS

The following highlights the identified deficiencies in the original BIA, and recommendations made by Englobe:

1. Critical conditions recommended by the BIA be included in the site plan notes (Blasting Table: Row 12)
2. The Golder Associates vibration attenuation study report referred to in the BIA report be provided for ease of technical review and cross reference (Blasting Table: Row 13)
3. The source of the Nelson Quarry vibration and Air Attenuation Curves included in Appendix C (Figures 5 and 6) of the BIA report be identified (Blasting Table: Row 14)
4. Vibration and overpressure data collected in the first 12 months of the proposed quarry extensions be incorporated in the data attenuation database to develop a more reliable and new site-specific attenuation formula (Blasting Table: Row 15)
5. Provide the rational why the attenuation formula established by Golder in 2004 was used, but the historical vibration and overpressure data from the same site was not incorporated in formula (Blasting Table: Row 16)
6. According to the "Level 1 and Level 2 Natural Environment Technical Report, April 2020, page 60, Fish Habitat Summary" conducted by SAVANTA, there are potential direct fish habitat within 120.0 metres of the adjacent lands, and no fish habitat within the extraction areas. Potential impact of blasting may be insignificant on the potential fish habitat within 120 m of the adjacent lands considering the proposed blasting parameters, however, the potential impact should have been addressed by the BIA. Location of these water bodies are also shown in the site plan drawings and described as "Water Features" (Blasting Table: Row 17)

7. Considering that the proposed blasting operations at one point will approach a standoff distance of 12.8 m from Sun Canadian Pipeline corridor, all requirements of their blasting specifications outlined in Appendix 2, section 8.3 to 8.5 under the heading "Vibration and Blasting Control" be implemented (Blasting Table: Row 18)

3.4.3 Summary of Changes through JART Review

The proponents responded to JART feedback by making the following changes to the application:

1. The critical conditions have since been revised to include conditions of approval (with the exception of reference to latest Explotech's BIA report, please refer to Explotech's BIA report of June 16, 2021, Nelson_-_Blasting_Response_to_JART_June_2021_Package). (Blasting Table: Rows 12 and 21)
2. Explotech has included the complete Golder's report in Appendix C of their updated blast impact assessment (Blasting Table: Rows 5 and 13)
3. The source of the Nelson Quarry vibration and air attenuation curves has since been identified by Explotech in their updated blast impact assessment.
4. Explotech has provided explanation regarding the exclusion of the historical vibration and overpressure data obtained during the 2014-2019 blasting campaigns. The exclusion is due to lack of details of blasting parameters required to establish site-specific attenuation equation. Recording of details are generally not required when vibration and overpressure monitoring are conducted for compliance purposes. The peer reviewer is satisfied with this explanation (Blasting Table: Row 16)
5. In their updated BIA report of June 16, 2021, Explotech has included a section under the heading "Blast Impact on Adjacent Fish Habitats." This section provides mitigation procedures and set back distances required by DFO to allow blasting operations in the vicinity of fish habitats. The peer reviewer is satisfied with this explanation (Blasting Table: Row 17)
6. Explotech has incorporated the requirements of the third-party pipeline company, namely Sun Canadian Pipelines guidelines for vibration and blasting control in their updated BIA report of June 16, 2021, which satisfies the pipeline companies' concerns (Blasting Table: Rows 18 and 21)

3.4.4 Professional Opinion

The context of blasting impact assessment the proponent has satisfied the requirements of the *Aggregate Resources Act* as it applies to the effects and impact of blast induced vibration and overpressure (noise) levels on sensitive receptors, provided the proponent implements the recommendations outlined in the Explotech updated BIA report of June 16, 2021.

3.5 Financial Impact Assessment

Watson & Associates Economists Ltd. (Watson) undertook an initial peer review analysis of the file and provided comments (report dated February 2021). Subsequently, Nelson retained Altus Group Economic Consulting (Altus) to update the financial impact study that was prepared in 2008. This report was also reviewed by Watson to determine the accuracy of the information presented and to confirm the report

met the requirements of the JART. The applicant and Altus provided comments in June 2022 along with an update memo. This memo along with the comments were also reviewed by Watson.

Detailed technical comments and proponent replies are provided in Appendix G to this report.

3.5.1 Review Methodology

The peer review assignment was undertaken by reviewing the Altus Report and identifying areas that were either not addressed or addressed incorrectly. Watson prepared an initial letter report for review with JART members and City of Burlington finance staff for discussion and input. This analysis included testing of assumptions (e.g., property assessments, tax classes) to determine the validity of the information utilized in the Altus Report.

When conducting a financial impact analysis, the methodology Watson uses involves an operating and capital cost/revenue analysis. The operating portion of the analysis involves calculating the City's and Region's tax and non-tax expenditures and revenues with the addition of the proposed quarry expansion. Note that for the purposes of the analysis, utilizing Financial Information Return (F.I.R.) data is reasonable as it provides the most up to date data on actual spending and revenues received for the municipalities. The data for population and employment is based on the applicants' assumptions (identified through the economic impact analysis discussed subsequently). The evaluation, revenues, and expenditures attributable to the development are estimated on an incremental basis. That is, revenue and expenditure dollars are assigned to the project, only in accordance with anticipated variations it would create from the base year, if it had been built out, as of that time. Sunk costs are ignored, and service levels are planned as remaining generally constant.

The impacts on services may be identified through other submitted studies (e.g., roads and water changes or issues which may have a financial impact) or through an analysis of the operating budget.

In undertaking the economic impact analysis, Watson utilized the input-output multiplier information provided by Statistics Canada. For temporary benefits arising from initial construction, these multipliers provide an estimate of the number of direct and indirect jobs per million dollars of construction value. This can also be utilized to estimate anticipated income tax revenue for the Provincial government (based on average salaries for the construction industry). For permanent impacts, the multipliers provide for an estimate of the number of direct and indirect jobs per million dollars of Gross Domestic Product (GDP) from the sale of aggregates. This information can also be used to estimate the income tax revenue for the Provincial government.

In general, Altus utilized a similar methodology, with some variations on the operating budget analysis.

The methodology Watson utilizes in conducting financial and economic impact analyses was used to peer review the Altus Report. This methodology has been utilized by the firm in conducting similar analyses, is considered best practice in municipal finance, and has been tested as the Ontario Land Tribunal (formerly, Local Planning Appeal Tribunal and Ontario Municipal Board). Since 1989, Gary Scandlan has undertaken over 175 municipal financial and economic impact assessments.

3.5.2 FINDINGS

As the quarry expansion will not increase employment, but rather continue the existing level of employment, there are no direct incremental economic benefits to identify. However, Altus has noted that the analysis reflects the continuation of operations relative to ceasing operations (Financial Table: Row 14).

In general, the fiscal impact study prepared by Altus initially focused on revenues the municipality will receive (e.g., property taxes, TOARC fees). With respect to operating expenditures, the approach taken was based on incremental assessment rather than incremental employment. Further, where a decrease in net operating costs was identified, no corresponding rationale for the decrease in services is provided. In Altus' latest update, the decreases in operating costs have been removed from the analysis (Financial Table: Rows 2, 6, 8, 10, 12, 13, 23, and 33).

With respect to the anticipated tonnage of aggregate to be extracted, it appears the amount utilized in the analysis is not in addition to the current extraction amount. This implies the revenues identified are not incremental to existing revenues. If the argument of the applicant is that without the quarry extensions, the revenue would no longer be provided to the City and Region, the fiscal impact study should also include a scenario which identifies the fiscal impact of this option. In Altus' June 2022 update memo, this was confirmed (Financial Table: Row 27).

ASSESSMENT ASSUMPTIONS

Watson would suggest an alternative approach to the estimating assessment. As part of the *Assessment Act*, the land valuation for assessment purposes shall have reference to equity with similar lands in the vicinity. As a result, Altus' survey of quarries in Brant, Puslinch, Melancthon, and Wellesley would not be appropriate. The survey should be focused on properties in the more immediate area (e.g., Burlington, Milton, and Halton Hills).

The assessment assumptions were overstated and therefore the tax revenues were overstated (Financial Table: Rows 7, 15, 28 and 29).

TAX CLASS ASSUMPTIONS

The assumption for the quarry expansion was that the entire licenced area would be taxed at the industrial rate and the remaining lands would be taxed 50% at the farmland rate and 50% at the managed forest rate.

The MPAC valuation guide for quarries and the Assessment Act note the following:

- The lands in the licenced area that are used for extraction are to be classed as industrial;
- The lands that are licenced but are not industrial or farmland are classed as residential; and
- The non-licenced lands in the total site area would be classed based on the use.

As a result, it is Watson's suggestion that the anticipated tax revenue was overstated as more of the property was identified as industrial which has a higher tax rate than residential (Financial Table: Row 22).

MPAC Proximity Adjustments

Watson identified adjustments that MPAC makes for residential properties adjacent and within one kilometre of a quarry site. No analysis was initially provided by Altus to quantify the impact on existing assessment values. The June 2022 update memo provided a high-level rationale for not undertaking the analysis. Given the property tax revenue was overestimated and not adjusted, the analysis should be undertaken to confirm the potential impact on assessment and tax revenue for the City of Burlington and Region of Halton (Financial Table: Row 29).

Calculation of the annual aggregate levy amounts was appropriately completed; however, the analysis appears to note that the tonnage amounts identified are a continuation and not incremental to existing tonnages. As a result, the annual aggregate levy calculated is not in addition to current revenues. This was confirmed in the 2022 update memo, which states that the analysis is undertaken in comparison to the scenario whereby the quarry ceases operations (i.e., does not expand) (Financial Table: Row 8).

The net operating expenditures analysis is undertaken in a similar manner to Watson's methodology, with the exception that assessment data is used rather than population and employment data to identify incremental costs. Some costs are identified to decrease based on a loss in assessed value, however, no rationale is provided. Watson would suggest a smaller (if any) reduction in the cost of services arising from this expansion. As a result, Altus updated their analysis to remove the reduction in operating costs (Financial Table: Row 33).

Based on the items noted above, the net fiscal impact (i.e., surplus) on the Region and City budgets was overstated (Financial Table: Rows 7, 15, 28 and 29).

Through comments on the initial financial impact submission by the applicant, it was noted that any long-term monitoring of the water supply, along with any related costs such as pumping, would be the financial responsibility of the applicant. Although this is a cost to be funded by the applicant, should the applicant no longer own/maintain the property in the future (e.g., through bankruptcy or other means), the City and Region should assume the potential annual costs to continue with long-term monitoring, pumping, etc. It was recommended that the financial impact analysis include an estimate of these costs, however, in the 2022 update memo, it was noted that this would be the responsibility of the Province. It appears that TOARC fees fund a program for rehabilitation of quarry sites called the Management of Abandoned Aggregate Properties (MAAP). The rehabilitation of any site can only be undertaken with the consent of the property owner and is paid from the 3% portion of the tonnage fee paid by aggregate producers (Financial Table: Rows 10 and 12).

The Altus Report estimates the economic impacts of the quarry expansion using the standard Input-Output model. This approach estimates the impacts using multiplier data from Statistics Canada. The anticipated employment, wages, and taxes are estimated based on the assumed Gross Domestic Product from sales of 1,000,000 tonnes of aggregate per year. In general, the approach to the calculations appears valid and consistent with the approach Watson would undertake. However, the economic impact of the ongoing operations (section 4.2.4 of the Altus report) should clarify that this would be a continuation of the existing levels of economic activity and not incremental to the existing operations. Note that the 2022

Altus update memo confirms this employment is a continuation of existing quarry employment (Financial Table: Rows 14, 16, 32).

3.5.3 Results of Analysis

Although the net financial impact has been overstated, in Watson's opinion, this alone would not be a basis to deny the application of Nelson to expand the Burlington Quarry. The net financial impact, however, provides the JART with a full picture of the information in order to properly assess the financial implications of the proposal. Once the items noted are addressed, staff will be able to incorporate these results into their overall recommendations.

3.6 Hydrogeology

Norbert Woerns was commissioned to review technical reports related to hydrogeology. Additional support comes from S.S. Papadopulos & Associates, Inc. (modelling focus) and Daryl Cowell (karst focus). Technical review by Conservation Halton staff was also provided. Hydrogeology emerged as the issue area associated with the greatest need for further integration into other studies prepared by Nelson and their consultants to support the proposal.

Detailed technical comments and proponent replies are provided in Appendix H to this report.

3.6.1 Review Methodology

Hydrogeological documentation was reviewed for appropriateness of methodologies used in the investigations, completeness of the investigation and analysis, and consistency between the report conclusions and recommendations and the field data. The documentation was also reviewed to ensure it aligned with the terms of reference prepared by Nelson in support of their studies, with comments incorporated into the first round of technical review.

The following major components are included in the hydrogeological review:

1. Review of the Terms of Reference for the 'Level 1 and Level 2 Hydrogeologic and Hydrologic Impact Assessment of the proposed Burlington Quarry Extension, Nelson Aggregates Co.' February 2020.
2. Review of the 'Level 1 and Level 2 Hydrogeological and Hydrological Impact Assessment Report of the Proposed Burlington Quarry Extension, Nelson Aggregates Co., April 2020' by Earthfx Incorporated (Earthfx) for completeness.
3. Assess whether the Earthfx report adequately characterized the hydrogeology of the subject lands and adequately defined the potential for impact of the proposed quarry operations on the local groundwater system.
4. Review of the conclusions and recommendations with respect to local impacts on the groundwater system from the proposed quarry operations as they relate to existing groundwater users and natural heritage features.
5. Assessment of the adequacy of the proposed groundwater and surface water monitoring and mitigation program.

6. Examination of the reports by Tatham Engineering (Tatham), Savanta Inc. (Savanta), MHBC Planning, Urban Design and Landscape Architecture, (MHBC), and Explotech Engineering Limited (Explotech) as well as plans of the proposed quarry operations by MHBC. These related reports and plans were examined to ensure consistency with respect to the assessment of potential impacts on the groundwater and surface water systems, natural heritage features, and groundwater users.

3.6.2 Original Findings

The review resulted in the identification of some deficiencies and inconsistencies in the hydrogeological investigations completed by Earthfx. The detailed comment table is long, with numerous issues identified by JART reviewers which remain unresolved by Nelson. The following issues are particularly critical to supporting the principle of the application:

1. The integrated groundwater and surface water model is complex, consisting of a number of subcomponents which have been combined to provide an integrated groundwater/surface water model. The hydrogeological analysis relies upon the integrated model for predictions of potential impact of the quarry expansion. The conclusions of the analysis do not fully account for some field evidence at odds with the report conclusions and mitigation recommendations. The assumption that existing conditions represent 'baseline' conditions for purposes of computer modelling, does not identify or acknowledge the impacts of the existing quarry and therefore cannot be considered an analysis of cumulative impacts as defined through applicable policy documents (Hydrogeology Table: Rows 6, 61, 63 and 65)
2. Considerable on-site groundwater monitoring data exists, particularly for the proposed southern extension, from previous investigations that have not been incorporated into the studies for this application. There are gaps in groundwater monitoring data utilized in the model simulations that limit calibration of the model results for critical periods. The report does not identify the significance of these data gaps with respect to the reliability of the model analysis and conclusions. Further, the applicant and the JART and agency staff recognize data limitations for the proposed west extension lands and have proposed establishing threshold groundwater levels for those lands once sufficient data have been collected—as a condition of approval. The applicant has proposed that the collection of monitoring data, from which threshold levels are to be established for the proposed west extension, will be obtained during the period of operation of the proposed south extension. It is questionable whether these data will provide appropriate baseline conditions from which to establish threshold levels as they will be established while potentially under the influence of the ongoing operations of the proposed south extension (Hydrogeology Table: Rows 10, 20, 156, 191, 262, 263, and 276)
3. The model predicts there will be minor impacts to private wells located downgradient of the western extension. It is proposed to construct an infiltration pond to maintain groundwater levels and thereby maintain downgradient water supplies to private wells. There are no data or field testing to confirm that the proposed infiltration ponds will function as assumed and be sufficient to maintain down gradient private wells (Hydrogeology Table: Rows: 229, 264, 269 and 311)

4. Flow profiling data obtained as part of the previous Nelson Aggregate Co. expansion application in 2004 demonstrated that water availability diminishes with depth through the Amabel Formation with no flow of water near the bottom of the Amabel Formation. These data cast doubt on the proposed mitigation measure of deepening existing wells into the Amabel Formation in maintaining private wells that are subject to well interference from the proposed quarry expansion (Hydrogeology Table: Row 308)
5. Measures to protect groundwater quality within the quarry ponds and sumps from significant potential sources of contamination such as the adjacent pipeline have not been addressed. The spill response plan provides a description of the mechanics of spill reporting and cleanup, also outlining roles and responsibilities of individuals with respect to spill detection, reporting and cleanup. Absent from this document are monitoring requirements to determine effectiveness of spill cleanup and measures to protect the quarry sumps from discharging contaminants in the sump discharge. Likewise, water quality limits were provided in the Environmental Certificate of Approval (ECA) for sump discharges for the existing quarry. It was proposed to maintain those limits with the proposed rehabilitation Scenario RHB1 where sump discharge would continue as part of the rehabilitation plan. No reference is made to drinking water quality limits as the discharge water is proposed to be infiltrated by proposed infiltration ponds to maintain groundwater levels in down-gradient private wells (Hydrogeology Table: Rows 7 and 208)
6. Earthfx contends that the Halton Till is a regionally extensive aquitard that limits groundwater flow and isolates the surface wetlands from the groundwater system. The modelling results indicate minor groundwater contribution to wetlands in the vicinity of the proposed quarry extensions. The report fails to provide a thorough analysis of on-site data including hydrographs of shallow groundwater monitors installed by Tatham and from hydrographs and previously completed pumping tests by Golder Associates (2004 and 2006) that suggest there is hydraulic connection between wetlands and the underlying groundwater system (Hydrogeology Table: Rows 9 and 99)
7. The revised site plan for the existing quarry (April 2021) shows a vertical quarry wall adjacent to a part of the proposed southern extension, along No. 2 Side Road. The potential for enhanced seepage through and long-term stability of the intervening rock mass should be evaluated as part of the site rehabilitation and closure of the aggregate operations (Hydrogeology Table: Row 19)
8. The proposed rehabilitation plan RHB1 requires ongoing pumping in perpetuity to maintain current water regimes." The analysis provided does not contain adequate evaluation of all possible alternatives to perpetual pumping (Hydrogeology Table: Row 252)

3.6.3 Summary of Changes through JART Review

Earthfx responded to the JART comments by providing clarifications of its analysis and also provided additional summary tables of their analysis and conclusions. Additional computer simulations were also provided of the proposed infiltration ponds between the proposed west extension and the private wells along Cedar Springs Road to the west. Additional water quality data was provided for groundwater monitors primarily in the west extension area as well as some private wells.

3.6.4 Professional Opinion

Nelson and Earthfx responded to a number of issues identified above and provided some clarification with additional information to the JART (Hydrogeology) Comment Summary Table. The major issues noted above require further resolution and additional information. Some additional information was provided during the site visit and has not yet been received in writing. For example, additional monitors have been installed and a commitment to an on-site climate station was provided.

Few details were originally provided on the nature and preliminary design of the proposed infiltration ponds. It was noted in subsequent information that the proposed infiltration ponds would be excavated to the bedrock surface with the removal of overburden deposits (Hydrogeology Table: Row 94).

It was observed during site visits on November 9, 2021, and October 25, 2022, that additional shallow overburden monitors were completed in the proposed west extension area primarily associated with the existing wetlands and in the Medad Valley respectively. Monitor details and monitoring data collected from these monitors was unavailable for the technical review. These monitors were completed after the pumping test of the bedrock in the proposed west extension and were not available for the pumping test to determine the hydraulic interconnection between the overburden and bedrock. Earthfx has not provided an explanation on the apparent contradiction in their conclusions regarding hydraulic connectivity between the overburden and bedrock in the west extension, where hydraulic connection is assumed through the overburden to the bedrock, and the south extension, where the Halton Till overburden is considered, a regional aquitard resulting in presumed hydraulic isolation of the wetlands from the underlying bedrock (Hydrogeology Table: Row 9).

The additional water quality data provided identified locally elevated sodium and chloride levels within groundwater monitors in the proposed western extension. This was attributed to localized road salt impacts. Higher sodium and chloride levels in deeper monitors with decreasing levels in shallower monitors suggests that the elevated sodium and chloride is from a deeper source and not road salt. This has implications for the proposed deepening of private wells impacted by quarry operations as a mitigation measure for private wells. A more complete investigation of downgradient private wells and the proposed mitigation measures is warranted given the uncertainties of the proposed mitigation measures (Hydrogeology Table: Rows 7 and 84).

3.7 Hydrologic/Hydrogeologic Modelling

S.S. Papadopulos & Associates, Inc., (SSP&A) was retained to provide an independent peer review of the hydrologic/hydrogeologic modelling prepared by Earthfx. Conservation Halton staff also reviewed the modelling.

Detailed technical comments and proponent replies are provided in Appendix I to this report.

3.7.1 Review Methodology

In addition to the Level 1 and Level 2 Hydrogeological and Hydrological Impact Assessment Report (Earthfx, April 2020), SSP&A reviewed a number of the various technical reports, the site plans as updated, and responses and clarifications provided by Nelson.

During the peer review, SSP&A has also consulted guidance documents on groundwater modelling and model reviews, including:

- Anderson *et al.* (2015). Applied Groundwater Modeling;
- American Society for Testing and Materials (ASTM) groundwater modelling guidance documents (2010, 2013, 2014, 2016);
- Spitz and Moreno (1996) textbook, A Practical Guide to Groundwater and Solute Transport Modeling;
- Wels *et al.* (2012) Guidelines for Groundwater Modelling to Assess Impacts of Proposed Natural Resource Development Activities, prepared for the British Columbia Ministry of the Environment; and
- Reilly and Harbaugh (2005) United States Geological Survey Guidelines for Evaluating Groundwater Flow Models.

SSP&A has also reviewed documents on the state of the practice of coupled and integrated groundwater/surface water modelling, including the following summaries of intercomparisons of integrated surface water/groundwater models published in the peer-reviewed literature:

- Delfs *et al*. (2021), "An inter-comparison of two coupled hydrogeological models."
- Haque *et al*. (2012), "Surface and groundwater interactions."
- Kollet *et al*. (2012), "The integrated hydrologic model intercomparison project."
- Maxwell *et al*. (2012), "Surface-subsurface model intercomparison."

3.7.2 Original Findings

The modelling reported in the Burlington Quarry Extension Level 1/2 Assessment Report (Earthfx, 2020) is an essential component of the proposed application and serves an important purpose. The modelling identifies the natural and manmade features that may be affected by the proposed extensions. These features include streams, wetlands, and private wells. The coupled analyses that have been developed and applied are comprehensive and have been conducted to a high technical standard.

The modelling is essential; however, it is important to note that it involves deliberate simplifications of a complex natural system. Viewed from this perspective, an impact assessment that is model-driven is problematic. Rather than replacing data collection and synthesis, the modelling should be complementary. Models provide insights into what is likely to happen when a proposed development proceeds and are important for the ongoing interpretation of changes. It must be stressed that models are not definitive. The emphasis of the assessment should be directed to the analysis of all site data, and to the development of a comprehensive and robust Adaptive Management Plan (Hydrogeology Table: Row 63).

Review of the Assessment of the Predicted Impacts for the South Extension

The presentation of the simulation results in the Earthfx (2020) report suggests that the impacts from construction of the proposed south extension are likely to be negligible. There are important uncertainties in the predictions of potential impacts. The uncertainties in the assessment highlight the importance of a comprehensive and robust Adaptive Management Plan.

1. There are no climate stations at the existing quarry or on Mount Nemo (Hydrogeology Table: Rows 104 and 113)
2. The simulations do not extend over a sufficiently long enough time period to adequately capture the likely range of climatic conditions (Hydrogeology Table: Rows 64 and 65)
3. The simulations are limited to a period during which the footprint of the quarry has not expanded (Hydrogeology Table: Row 61, 64 and 65)
4. Referring to Earthfx (2020) Figures 8.6 through 8.9, it is not possible to assess the reliability of the simulated streamflows through the wetlands (Hydrogeology Table: Row 236)
5. The conclusion that none of the wetlands in the immediate vicinity of the quarry receive significant groundwater inflows is contingent on the assumption that the wetlands are hydraulically isolated from the bedrock groundwater system (Hydrogeology Table: Row 340)
6. The simulated water levels at the wetland monitors near the proposed south extension are generally not consistent with field observations presented in the Earthfx wetland characterization summaries (Hydrogeology Table: Row 63)
7. The simulated wetland water budgets have fundamental limitations with respect to the assessment of potential impacts. First, the water budgets are presented for time-averaged conditions. The results are not useful for assessing the potential seasonal changes, and in particular the changes in the components of the water budget during the critical time of the wetland hydroperiods. Second, the plotted water budgets for the Phase 1 and 2 scenario cannot be compared directly with simulated water budgets for the baseline period. The water budgets for baseline conditions are averaged over water years 2010 and 2014 (see Earthfx, 2020; Figures 7.24 through 7.30). In contrast, the Phase 1 and 2 scenario water budgets are averaged over water years 2010 and 2011 (see Earthfx, 2020; Figures 8.31 through 8.37). The approach for presenting the results of the modelling in a manner that cannot support direct comparisons must be questioned (Hydrogeology Table: Rows 69 and 79)
8. The reporting of the potential lowering of groundwater levels resulting from the proposed south extension is presented only for Model Layer 6, the hypothesized Middle Amabel Fracture Zone (Figures 8.5 and Figures 8.12 through 8.19 in the Earthfx report). With respect to impacts to the wetland areas, the critical changes in groundwater levels are expected to occur at the contact between the glacial sediments and the bedrock, that is, Layer 4 of the GSFLOW model (Hydrogeology Table: Row 194)

Review of the Assessment of the Predicted Impacts for the West Extension

The wetlands of the Medad Valley are relatively close to the proposed west extension. Between the proposed extension and the Medad Valley there are numerous private wells along Cedar Springs Road.

1. As shown in Earthfx (2020) Figure 3.6, the wetlands of the Medad Valley are relatively close to the proposed west extension. The provided model predicts that the development of the proposed west extension (Phases 3, 4, 5 and 6 scenario) is predicted to cause reductions in surface water flows through the Medad Valley, and the model containing a high degree of uncertainty in prediction of changes to streamflow in the Medad Valley (Hydrogeology Table: Row 114 and 336)
2. There are also numerous private wells along Cedar Springs Road. The model predicts that development of the west extension may cause a lowering of groundwater levels (drawdown) in the Amabel aquifer surrounding the excavation. The model predictions suggest a complex pattern of drawdown. A small drawdown of 0.05 m or less is predicted in Model Layer 6 at a hypothetical monitoring location that is closest to the excavation, GW1 (Figure 8.12 of the Earthfx report). However, at the hypothetical monitoring location GW2, which is farther from the excavation, a maximum drawdown of about 0.65 metres is predicted in Model Layer 6 (Figure 8.13 of the Earthfx report). Referring to Figure 8.43 of the Earthfx report, the model predicts that time-averaged drawdowns may decrease sharply with distance; beyond 500 m from the active face will be less than 2.0 metres (Hydrogeology Table: Row 63)
3. Time-averaged water budgets for the Medad Valley wetlands (MNRF #13204) are not included in the *Level 1/2 Assessment Report*. However, it is indicated in the report that "The effects of P3456 on the wetlands in the vicinity of the excavation has been demonstrated by the water budget analysis". Simulated time-averaged water budgets are presented for the Medad Valley wetland in the *Wetland Characterization Summaries* (Earthfx, 2021; Wetland 13204 Figures 2A through 2E). Between the Baseline and P3456 simulations, the reported groundwater discharge to the stream running through the Medad Valley is predicted to decline from 187 m^3/day to 97 m^3/day, a 47% reduction. The reported leakage from the stream is predicted to decline from 99 m^3/day to 60 m^3/day, a 38% reduction. The predictions suggest that development of the west extension may cause substantial changes to the groundwater budget for the Medad Valley (Hydrogeology Table: Rows 69, 79)
4. The proposed infiltration pond at the west extension is conceived to help maintain groundwater levels and the flow divide between the quarry and Cedar Springs Road. The proposed infiltration pond at the west extension pond will have implications with respect to both the quantity of groundwater discharge to the Medad Valley and to the groundwater quality. The assessment of the potential effects of the proposed infiltration ponds presented in the Earthfx memorandum dated May 29, 2022, is model-driven, rather than data-driven. At the present time there are no data provided to confirm the reliability of the predictions. It is noted that the area between the proposed west extension and the Medad Valley has not been subject to extensive field investigations. As a result, the modeling predictions should be considered highly uncertain (Hydrogeology Table: Row 116)

5. The assessment of potential impacts on groundwater levels is limited to consideration of conditions in Model Layer 6, the Middle Amabel Fracture Zone. This approach introduces important uncertainties in the assessment (Hydrogeology Table: Row 63)
6. The requirement to retain a continuous model layer for the Middle Amabel Fracture Zone has been interpreted in a way considered to be nonphysical. The approach that has been adopted in the analyses likely leads to overprediction of the available drawdown in wells along Cedar Springs Road (Hydrogeology Table: Row 194)
7. In the assessment of private groundwater supplies, Earthfx has assumed that at any location in the vicinity of the quarry a private water well could be drilled to Model Layer 8, the Amabel Lower Fracture Zone. This is not supported by the available data. The depths of private wells within 500 metres of the extraction boundary are reported on Table 5.3 of the Earthfx report. It is likely that most of the private wells extend only into the weathered top of rock (Model Layer 4) or the Amabel Middle Fracture Zone (Model Layer 6) (Hydrogeology Table: Row 340)
8. It has been assumed in the modelling that the lower portion of the Amabel Formation is a productive aquifer. This assumption does not appear to be consistent with the results of packer testing (Figure 5.6), which do not show an interval of consistently higher productivity at the bottom of the Amabel (i.e., relatively higher hydraulic conductivity). It appears that the greatest weight has been placed on the results of the testing of BS-01 (Figure 3.25), a location that does not seem to be typical of the bottom of the Amabel Formation as shown on the profiles of packer testing (Figures 5.6, 5.7 and 5.8). (Hydrogeology Table: Row 194)

3.7.3 Summary of Changes through JART Review

A substantial record of comments and responses was developed during the JART review. The responses to comments have provided important clarifications of the analyses that have been conducted. However, the essential elements of the proposal have not changed through the review. During the review, additional analyses were conducted to assess the potential impacts of an infiltration pond included in the plans for the proposed west extension. This pond will have implications with respect to both the quantity of groundwater discharge to the Medad Valley and to the groundwater quality. However, it is indicated in the documentation of these analyses that the proposed infiltration pond is intended to maintain heads and the flow divide between the quarry and Cedar Springs Road. It is also indicated that the infiltration pond is not required. The additional analyses have not confirmed whether it would be advantageous to include the infiltration pond in the final proposed site plans.

3.7.4 Professional Opinion

There are important limitations and uncertainties in the analyses of the proposed south and west extensions. The uncertainties highlight the importance of including the conception and evaluation of mitigation measures and contingencies in the assessment. With respect to the proposed south extension, on the basis of the model results it is concluded that "the wetlands will leak a small amount more to the groundwater system when Phases 1 and 2 are complete, but the effect of this change will be so small that it cannot be measured in the field and will not change the overall water budget of each wetland". It is not clear how impacts to wetlands will be mitigated if there are areas where the vertical hydraulic conductivity of the Halton Till is higher than assumed in the analyses (Hydrogeology Table: Row 63).

With respect to the proposed west extension, it is not clear how impacts to private wells will be mitigated if declines in groundwater levels lead to reductions in well capacities. It is not clear that well capacities can be maintained by drilling the wells deeper; restoring well capacities by extending wells may not be feasible if the deeper rock is not sufficiently transmissive, or the ambient water quality deteriorates with depth (Hydrogeology Table: Row 63).

3.8 KARST HYDROGEOLOGY

Daryl Cowell was retained to contribute to a technical review of a component of the hydrogeology, specifically focussing on potential karst issues. Conservation Halton also reviewed the studies to ensure the regulatory requirements under O.Reg. 162/06 in terms of natural hazards: potentially hazardous karst (i.e., unstable bedrock) are met. Those findings are summarized in the Natural Hazards section.

Detailed technical comments and proponent replies are provided in Appendix J to this report.

3.8.1 REVIEW METHODOLOGY

Technical reviews are based on Mr. Cowell's professional training and work in the area of karst hydrogeology including undergraduate and a Master's studies and karst field and research work conducted over an approximately 50-year career. This work included previous involvement in Nelson's first expansion application in 2004. His opinion is informed by this knowledge and experience of potential karst features and processes on the site and immediate surroundings that could impact significant surface water features due to extended dewatering of the proposed two extensions.

A formal technical review with detailed comments on the submitted Hydrogeology report (including Dr. Worthington's Karst appendix) and the AMP report was submitted on December 21, 2020, with further review and responses to Nelson's reply submissions and comments in this issue area.

3.8.2 ORIGINAL FINDINGS

Significant surface water features include several Provincially Significant Wetlands and an Area of Natural and Scientific Interest – earth science and life science referred to as the Medad Valley. Potentially impacted wetlands include those on the surface of the till plain surrounding the proposed expansions, particularly to the south, and the Medad Valley to the west. Impacts to the till hosted wetlands could result from the interaction of karst and/or bedrock fracturing and enhanced permeability zones within the till hosting the wetlands. The water balance within the Medad Valley relies heavily on karst spring groundwater discharge from the escarpment located between the valley and the proposed western extension.

The two key findings related to a karst-oriented review of the proposal are:

1. The Halton Till does not have a uniform hydraulic conductivity (known as "K" in technical literature), is not an aquitard as stated, and has not been appropriately characterized regarding wetland hydrology and model layer input (Hydrogeology Table: Row 21)
2. Groundwater flows to the Medad Valley have not been adequately characterized. These flows involve flow through discrete karst conduits (not an equivalent porous medium, or EPM), which

could result in complete or partial abandonment due to extraction. Impacts to groundwater flow to the valley and its wetlands have not been adequately defined (Hydrogeology Table: Rows 34, 39 and 55)

There is also a lack of monitoring proposed in the adaptive management plan, particularly of spring flows, and no reference to how monitoring would be adjusted or revised based on the information generated. One particular fault is the absence of any contingency recommendations in the event of impacts such as shifting or halting quarry operations based upon the scale of issue generated (Hydrogeology Table: Rows 56 and 57).

3.8.3 Summary of Changes through JART Review

Four minipiezometers were placed within the Medad Valley in order to monitor potential changes in groundwater levels within the valley. Three of these, located on HRCA lands, were visited on November 3, 2022, with one located in a talus pile well above the groundwater table, a second near the upper limits of the groundwater table and the third within the groundwater table.

3.8.4 Professional Opinion

Issues arising from the proposed expansion application include:

- The role and functioning of a proposed infiltration pond located at the western boundary of the proposed western extension (Hydrogeology Table: Rows 44 and 52)
- The lack of monitoring (quantity and quality) of spring flows in springs known to be feeding the Medad Valley (Hydrogeology Table: Rows 56, 57 and 211)
- Use of 'simulation flows' to represent flows in Willoughby Creek at stations #7 and #14 (Hydrogeology Table: Rows 53, 54 and 55)
- Continued representation of hydraulic conductivity of the Halton Till (being 10^{-7} m/sec throughout the entire site/surface plain above the Medad Valley) (Hydrogeology Table: Row 21)
- The rehabilitation proposal to not fill the western extension excavation thereby permanently impacting groundwater flow to the Medad Valley (Hydrogeology Table: Row 76)

3.9 Natural Heritage – Terrestrial

North-South Environmental Inc. was commissioned to review technical reports, with a focus on terrestrial habitat and fisheries associated with the quarry expansion. Conservation Halton also reviewed technical reports with a focus on regulated wetlands. Review in this discipline was informed by collaboration and discussion with JART's groundwater and surface water experts.

Detailed technical comments and proponent replies are provided in Appendix K to this report.

3.9.1 Review Methodology

The natural environment, rehabilitation plans, and draft adaptive management plans were reviewed, along with the site plans at various stages of review.

Review compared the methods and protocols used by Nelson's consultants to protocols recommended by appropriate sources accepted as best practice within the Province of Ontario. North-South Environmental undertook this assessment of method and protocols utilizing experience obtained over 20 years of consulting practice in Ontario, with an understanding gained of standard practice during field surveys, analysis and reporting for private, municipal, provincial, and federal clients.

Survey methods utilized by the applicant's respective consultants were also reviewed, as these are critical factors in determining habitat function and detecting the presence of species at risk (SAR) and other indicator species of significant habitats. The analysis of significance was reviewed using an understanding of the protocols for interpreting the findings of field results according to the guidance from provincial and regional policies. Water balance analysis was reviewed using an understanding of the vernal pool hydroperiod requirements for breeding amphibians in general, and particularly Jefferson Salamanders which have documented habitat in proximity to the proposed extraction area. Review was undertaken to ensure a comprehensive understanding of the impacts of duration and depth of flooding on vegetation communities. Additional consultant expertise was gained in North-South's well-documented history in both drafting and applying Halton Region's Natural Heritage Reference Manual, which provides guidance on evaluation and delineation of natural heritage features.

Review in this discipline was informed by collaboration and discussion with JART's groundwater and surface water experts.

3.9.2 Original Findings

The initial wetland characterization summaries provided required additional information, including the addition of wetland 13015. Where available, reference should be made to functions determined from studies conducted during the previous investigations in the proposed south extension, as wetlands would likely continue to support these functions, and they are important to the understanding of wetland significance. More detail was requested on post-extraction water balances, particularly to describe what they imply for the hydroperiod of the wetland from an ecological perspective.

Eighteen additional issues remained based upon initial review:

1. Uncertainty regarding impacts of groundwater drawdown on off-site features has not been resolved, but that impacts of the drawdown could extend hundreds of metres off site. Concerns remain that there may be impacts on hydroperiods of wetlands and on habitat for wetland-dependent wildlife, including Jefferson Salamander, and of insufficiency of groundwater monitoring in breeding ponds (Natural Environment Table: Row 24; and Surface Water Table: Row 146).
2. Times, dates and weather conditions for amphibian, bird and reptile surveys should be summarized in a table for peer-review, as this is standard practice (Natural Environment Table: Row 27).
3. Concerns remain that salamander trapping was not conducted in the golf course ponds. The ponds should be trapped, as NSE's latest observations indicated that these ponds are similar to

other human-made ponds that have been observed by NSE staff to support Jefferson Salamander and/or other Ambystomatid salamanders (Natural Environment Table: Rows 25 and 51).

4. Surveys for Blanding's Turtle were apparently conducted in 2021. The results of these surveys should be provided to JART for review (Natural Environment Table: Row 26).
5. Snake surveys continue to be recommended, based on MNR Guelph District protocols for surveying Milksnake, which are recommended for snake species that are not at risk, and that information provided to JART (Natural Environment Table: Row 55).
6. A review of woodland significance is required, based on dripline surveying conducted during site visits in November and early December 2021, and based on concerns that the sampling protocols did not include large enough sampling plots to encompass the heterogeneity of the woodlands on the site (Natural Environment Table: Row 50).
7. The linkage function of the "non-significant" woodlands on the golf course, which are included within Halton's Natural Heritage System, has not been adequately analyzed, particularly the function of the woodlands to support connection between regionally significant features on and off-site (Natural Environment Table: Row 110).
8. Though the revised Rehabilitation Plan shows a connection between the retained Significant Woodlands and the landscape to the south, this connection will be removed during extraction south of the woodland, so the connectivity of the landscape potentially will be impaired for many years (the timing has not been provided). The proposed connection is narrow and mainly consists of steep slopes. The connection of the retained Significant Woodland to features within the natural heritage system on the north side of Colling Road is severed. The linkage is proposed to be "switched" during extraction from the south to the west and back to the south, which would likely be ineffective to provide connectivity between the retained woodlands and the surrounding natural heritage system (Natural Environment Table: Row 31).
9. Impacts of fragmentation within the retained significant woodland has been incompletely analyzed (Natural Environment Table: Row 30).
10. The Regional significance of wetland 13203 should be analyzed. As noted in item 1, the impacts of pumping water into this wetland during dewatering of the proposed south extension should be analyzed. The omission of some wildlife surveys from this wetland means that significant species may have been missed (Natural Environment Table: Row 33).
11. It should be clarified whether surveys of Wetland 13203 included surveys for Blanding's Turtle (Natural Environment Table: Rows 54 and 83).
12. Terrestrial cumulative impacts should be analyzed, as the current cumulative impact analysis only considers impacts from an aquatic ecology perspective (Natural Environment Table: Rows 30, 32, 34 and 97).
13. The impacts on significant wildlife habitat of pumping sump water into wetland 13203 should be discussed (Natural Environment Table: Row 33).
14. The proposed function of the infiltration pond should be clarified. There has been conflicting information regarding its function, with two explanations provided: 1) that it is needed to maintain seepage in the Medad Valley and to maintain hydroperiod in wetland 13201 north of No. 2 Side Road; or 2) it is proposed to replace the golf course ponds as an amenity (Natural Environment Table: Row 46). This clarification should be provided to JART.

15. Floristic Quality Analysis should be used to compare the quality of significant and non-significant woodlands on the golf course (Natural Environment Table: Row 49). This clarification should be provided to JART.
16. Searches should be conducted for turtle nesting habitat within the study area and the results shared with JART (Natural Environment Table: Row 54).
17. The location of Snapping Turtle, which is a Species at Risk with a status of Special Concern, should be shown on Figure 7a, as habitat for Special Concern species is considered a criterion for Significant Wildlife Habitat (Natural Environment Table: Row 54).
18. A restoration area for Jefferson Salamander has been proposed south of the proposed south extension. The restoration is proposed to respond to Regional policy. The Region should be circulated on details regarding this restoration area. There appears to be no technical support for the feasibility of restoring this area for Jefferson Salamander, since no background studies have been conducted to determine if salamanders move in this direction, or whether suitable habitat could be restored in this location. In addition, the restoration will be within the 120 metre zone of influence of the landfill, where impacts could be more significant, so we question whether this is an appropriate place for restoration of salamander habitat. Concerns remain that such a restoration area could become an ecological sink for Jefferson Salamander (Natural Environment Table: Row 113).

3.9.3 Summary of Changes through JART Review

The site plan has been revised to include Woodland E as part of the protected area. It was pointed out in previous comments that the dripline of Woodland E is less than 20.0 metres from the dripline of Woodland D, and that it should have been included in the complex of woodlands and wetlands that form Woodland D on the golf course when the initial assessments were completed. Its function as bat maternity roost habitat will contribute to the overall function of Woodland D as Significant Wildlife Habitat, and as habitat for Species at Risk.

Further details were included with respect to survey dates, times, and weather conditions, addressing an initial issue raised (Natural Environment Table: Rows 28 and 110). There was also additional staking undertaken on site to delineate feature boundaries on site, and additional features were proposed for protection.

Figure: *Woodlands Map*
This map has been prepared to help with geographic location identification for the reader.

Updated wetland characterizations were also provided by Nelson (Natural Environment Table: Row 24).

It was clarified that Blanding's Turtles were not found during additional investigations. Surveys for overwintering turtles were not conducted in the proposed south extension, where there is potential habitat for this species as well as other Species at Risk such as Snapping Turtle (Natural Environment Table: Rows 51 and 54).

Conservation Halton reviewed wetlands as per O.Reg 686/21 and O.Reg 162/06. As identified above, Conservation Halton regulates a distance of 120.0 metres from Provincially Significant Wetlands (PSW) and wetlands greater than 2 hectares in size and 30.0 metres from wetlands less than 2.0 hectares in size. The proposed extraction limits are outside of Conservation Halton's regulated areas for all wetlands except for wetland 13037 PSW complex. The proposed extraction limit is approximately 30.0 metres from the limit of this feature.

3.9.4 Professional Opinion

The inclusion of Woodland E in the Woodland D wetland/woodland complex improves the configuration of the retained woodland, will contribute to the woodland's function as extraction progresses, and will also contribute to its connection to the south following rehabilitation. However, while the inclusion of Woodland E contributes to the connectivity of woodlands along the east side, it does not complete the connection between Woodland M and the Woodland D/E complex, which will be severed during extraction. It is important that Woodland D/E remain connected both to the north and to the south, with linkages appropriate for the features on the site and the features to which they connect (Natural Environment Table: Row 28 and 29).

The lack of sufficient baseline data for some wetlands is concerning. The information concerning wetland fauna that was found in earlier studies (e.g., presence/absence of key amphibian species) should be included as part of this baseline. The fact that some wetlands adjacent to the quarry supported breeding habitat in past years should be acknowledged and used to inform monitoring thresholds and water level targets (Natural Environment Table: Rows 51, 52 and 120).

The golf course ponds should be sampled for Ambystomatid salamander breeding, particularly for Jefferson Salamander, as they resemble ponds where the peer reviewer has found breeding salamanders in the past (Natural Environment Table: Rows 51 and 52).

The current proposal to maintain linkage is first to maintain the linkage from Woodland D/E to the south, where it is currently connected through the golf course and the hedgerow, then switch the linkage to the west, through Phase 6, and then restore the southern linkage with a narrow, steep-sided ridge. There have been no animal movement studies to support the future effectiveness of these proposed routes. In NSE's professional opinion, this proposal is convoluted and potentially ineffective. In addition, the temporary linkage to the west will be impeded by the infiltration pond. The final linkage to the west (shown on the Site Plan) is still impeded by the infiltration pond as well as by a steep-sided valley. Studies on animal movement should be completed to establish the current direction of movement with more certainty. Animal movement is likely to occur to the south across the golf course, using the woodlands as stepping stones, but would likely not be restricted to the area of the woodlands. It also may occur to the

west through the golf course, but this corridor has not been planted or established (Natural Environment Table: Rows 28 and 97).

There is also concern with the width of the proposed final linkage to the south. To be effective, Regional corridors are recommended to be a minimum width of 60.0 to 100.0 metres. The proposed final linkage is less than the minimum width, with steep-sided slopes, and not likely to be effective in maintaining biodiversity of these woodlands in the long term (Natural Environment Table: Row 31).

3.10 Natural Heritage – Fish

Matrix Solutions was commissioned to review technical reports, with a focus on aquatic habitat and fisheries associated with the quarry expansion. As surface and groundwater disciplines are interrelated with fisheries and aquatic habitat, comments from surface water and the hydrogeology specialties were noted through discussions and provided as additional explanation (where warranted).

Detailed technical comments and proponent replies are provided in Appendix L to this report.

3.10.1 Review Methodology

In addition to review of submitted technical reports and the site plan, some documents related to the previous application were also reviewed:

- Biological Inventory of Nelson Quarry and Adjacent Property, City of Burlington, Nelson Aggregate Co., prepared by ESG International Inc. (October 2000)
- Summary of Natural Heritage Features, Nelson Quarry Company- Extension Lands, Burlington, prepared by Stantec Consulting Ltd. (August 2004)
- Level II Natural Environment Technical Report, Nelson Aggregate Quarry Expansion. Prepared by Stantec Consulting Ltd. (October 2004)
- Level II Natural Environment Technical Report, Nelson Aggregate Co. Burlington Proposed Extension Prepared by Stantec Consulting Ltd. (Revised May 2006)
- Summary of Terrestrial and Aquatic Field Investigations 2006: Addendum to "Level II Natural Environment Technical Report, Revised May 16, 2006", dated September 29, 2006

3.10.2 Original Findings

The Natural Environment Technical Report (Level 1 and 2) 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 metres of the proposed quarry expansion lands. Supporting studies, such as the Surface Water Assessment, as well as hydrogeology reports submitted as part of the application discuss other impacts that may be associated with fisheries beyond 120 metres (Natural Environment Table: Row 12).

EXISTING FISH HABITAT BACKGROUND CONDITIONS

The two proposed quarry expansion areas are categorized as the west extension, which primarily affects the outflow to the Willoughby Tributary and unnamed tributary which comes from the Medad Valley; and the south extension, which primarily affects the outflow to the Mount Nemo Tributary. The headwaters of the East Branch of Willoughby Creek originate from the pump water of the existing quarry and from the golf course located on the west side of the quarry. A pump at the northwest sump of the existing quarry discharges to a ditch along the southeast side of Colling Road. Approximately 55% of the off-site discharge from the existing quarry is directed to this tributary. The West Branch of Willoughby Creek arises in the Provincially Significant Medad Valley wetland/ESA. The creek exhibits groundwater discharge and significant forest cover from this headwater area all the way downstream to Colling Road. A large dam structure is located on the creek approximately 100 meters upstream of Bronte Creek proper.

In the proposed south extension, a tributary to Grindstone Creek originates on the north of No. 2 Side Road on Nelson-owned lands. This tributary is labelled as the West Arm of the West Branch of the Mount Nemo tributary. Baseflow to this tributary is provided by groundwater that is pumped from a holding pond during dewatering activities. This holding pond (known as the South Pond) is centrally located in the quarry and water being removed from quarry sump 0200 is directed through an underground pipe and released into a cattail marsh on the north side of No. 2 Side Road. Additional groundwater seepage may occur within the cattail marsh and this wetland community effectively forms the headwaters of the tributary. The tributary of Grindstone Creek is characterized as an intermittent, warmwater system. Flows in the vicinity of Cedar Springs Road usually cease around mid-summer. The tributary is classified as an intermittent, warmwater system, although the segment on the south subject lands appears to be permanent due to a consistent input from quarry activities.

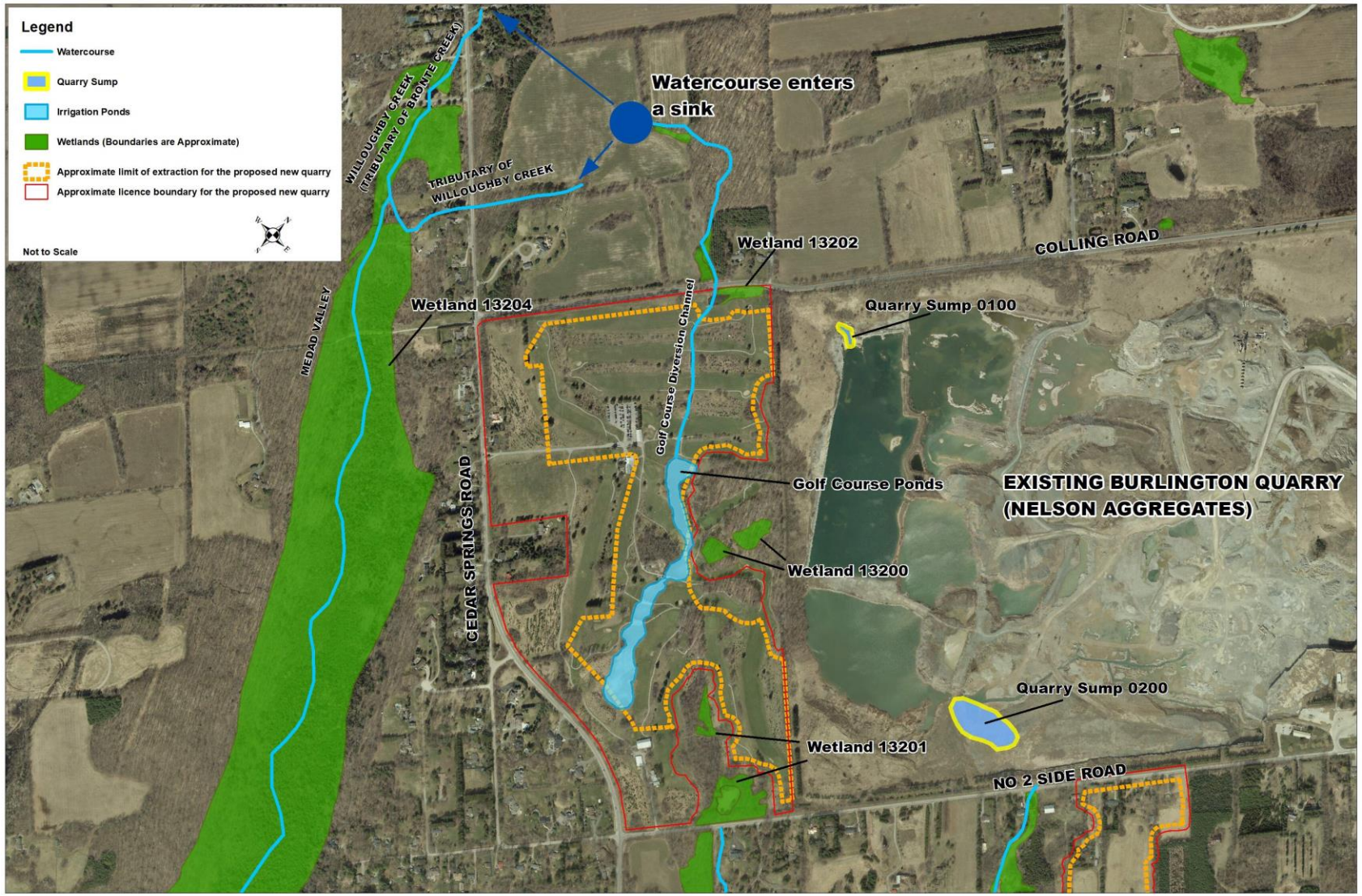

Figure: *watercourses and wetlands of the proposed west extension*
(This map has been prepared to help with geographic location identification for the reader.)

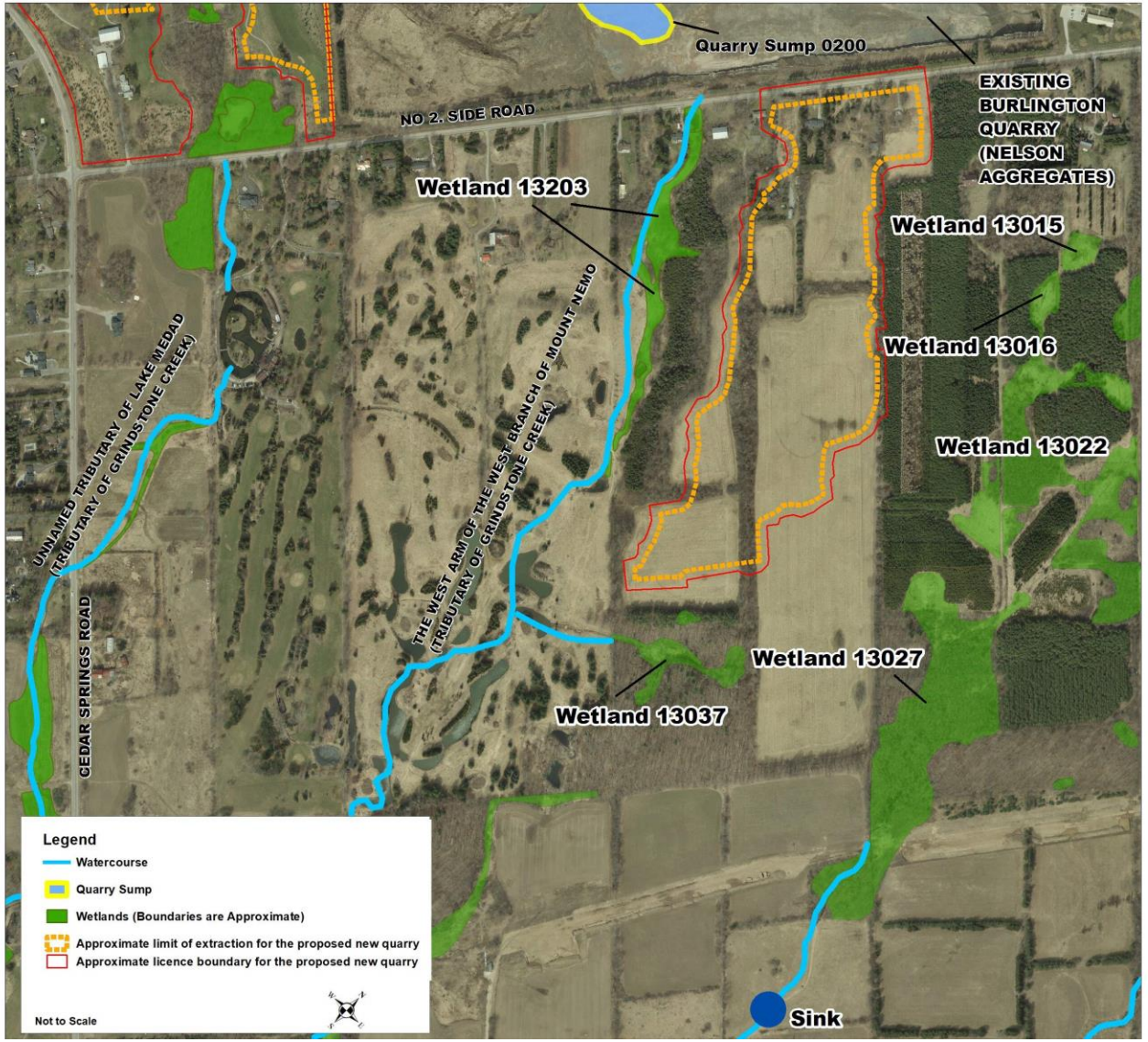

Figure: *watercourses and wetlands of the proposed south extension*
(This map has been prepared to help with geographic location identification for the reader.)

Internal to the existing Burlington Springs Golf Course are a series of irrigation ponds and connecting channels containing warm water species such as Largemouth Bass. The Natural Environment Technical Report (Level 1 and 2) also states that although that ponds and drainage features within the existing quarry and proposed expansion lands contain fish, these systems are not considered fish habitat due to their anthropogenic origin and their isolation from other features, and as a result support no recreational fishery. (Note: the Unnamed Tributary to Willoughby Creek is identified as fish habitat by Nelson in their studies and materials.)

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 licence for extraction has been surrendered.

KEY ISSUES RELATED TO FISH HABITAT

The concerns with respect to fisheries relate to the future land use scenarios where extraction activities will continue, and flows will be maintained artificially by pumping. As extraction proceeds to its later stages and progressive rehabilitation takes place, it is the applicant's position that pumping will continue in perpetuity to maintain the flows necessary to maintain the fish habitat that exists within the receiving waters downstream of the proposed west and south extensions (Natural Environment Table: Rows 15, 19, 20, 22 and 23; and AMP Table, Row 23).

Based on the information provided, the fish habitat associated with the proposed south extension appears to be marginal and may benefit from quarry discharge. However, the fish habitat associated with the proposed west extension is more sensitive, as prime salmonid reproductive habitat is present within a relatively short distance (roughly 1 kilometre) from the tributary confluence. Closer examination of the surface water report reveals that within the Willoughby Tributary, the flows within reaches in the vicinity of Colling Road and Cedar Springs Road are generally intermittent, and flows do not become more significant until much further downstream to the northwest to the vicinity of Britannia Road. Although discharge flows from the quarry will be continuing for the foreseeable future, the applicant has stated that continuing to do so is optional, and that the current licence allows the applicant to cease discharge if they chose to do so (Natural Environment Table: Rows 15 and 23).

The future phase of the proposed west extension envisions the creation of a landform and lake habitat that will transform much of the existing Burlington Springs Golf Course into new warm water fish habitat, once the quarrying activities have been completed.

3.10.3 SUMMARY OF CHANGES THROUGH JART REVIEW

The March 2022 version of the site plan includes more details on blasting and natural heritage on the "notes" section. In particular, the areas considered to be fish habitat have been defined and details on blasting monitoring and mitigation measures have been added where blasting may potentially impact fish habitat. The corresponding figures shown on the latest site plan include labelling of the tributaries and waterbodies outside of the quarry that are considered to be fish habitat (Natural Environment Table: Row 21).

3.10.4 Professional Opinion

The impacts to fish and aquatic habitat affected by proposed west and south extension discharges and within the internal quarry footprint vary in terms of sensitivity. The two least sensitive fish habitats are within the extraction footprint and the proposed south extension, and the most sensitive fish habitat is the Willoughby Creek Tributary. There is uncertainty to the classification of fish habitat within the proposed extraction footprint. The irrigation ponds and connecting watercourse system within the Burlington Springs Golf Course are anthropogenic, and therefore not considered fish habitat in the opinion of Nelson's consultant, Savanta. This conclusion requires justification according to the Federal Department of Fisheries and Oceans' definition of fish habitat, and verification that these features do not support habitat for Jefferson Salamander. The discharge outflows to Willoughby Creek Tributary have been part of the ongoing quarry operation, and the proposed west extension intends to maintain this discharge moving forward with the proposed west extension. Finally, the proposed south extension involves maintaining a quarry discharge to an intermittent creek system that supports a marginal fish population (Natural Environment Table: Row 61).

Fish Habitat within the West Extension Quarry Footprint (Burlington Springs Golf Course)

The applicant's view is 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.*" Although sampling efforts reveal the presence of fish, irrigation ponds and associated watercourses within the golf course are not considered to be fish habitat by Savanta. This statement is supported by an email provided by the DFO reviewer based on the artificial fishery created within the irrigation ponds but not in the DFO Letter of Advice. No policy definition is provided in support of this statement (Natural Environment Table: Row 43 and 61).

The Letter of Advice provides further guidance on controlling the quarry discharges to ensure that there is no harmful alteration, disruption, or destruction of fish habitat. Given that there is a hydrological connection to fish habitat downstream, the advice provided puts the onus on the applicant to ensure that discharges meet quality and quantity targets during construction works (Natural Environment Table: Row 43 and 61).

During field visits, firsthand observations reveal that the connecting watercourses and irrigation ponds have the potential to support populations of fish and other organisms such as amphibians. In the case of amphibians, the applicant's team have ruled out the potential for salamanders due to the presence of fish, and not through verification by trapping (Natural Environment Table: Row 61).

Fish Habitat within the Discharge Outflow to Willoughby Creek (West Extension)

The proposed 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 degree to which fish assessment is discussed is not only limited to within 120 metres, but the fish sampling is limited to areas where Savanta has been given land access, and where they have been able to sample. 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 and sampling records by Conservation Halton (Natural Environment Table: Row 68).

The concern is the age of the fish data and lack of fisheries information due to limited access to private waters at reaches immediately downstream of the discharge point. It is anticipated that quarrying along the proposed west extension will result in the loss of contributing groundwater to reaches of Willoughby Creek and Tributary near the quarry area. Without knowing more specific details of groundwater seepage habitat along those reaches, impacts to these habitats (including the hyporheic zone) that are dependent on the groundwater is not known. It should be noted that these reaches of Willoughby Creek immediately adjacent to the confluence of the Tributary and mainstem of Willoughby Creek is currently mapped as habitat for Redside Dace, classified as an "endangered "fish species in Ontario (NHIC, accessed in April 2023). Redside Dace are known to rely on groundwater-fed pools for refuge habitat during warm summer months (Natural Environment Table: Row 68).

Fish Habitat within the Discharge Outflow to Mount Nemo Tributary (South Extension)

The proposed south extension primarily affects the outflow to the Mount Nemo Tributary, which is part of the Grindstone Creek Watershed. This tributary is intermittent, and field visits reveal that fish habitat is isolated to a few pooled areas where water depths are sufficient to support fish populations. Due to the intermittent nature of this system, discharges from the proposed south extension may result in greater water residence time, which may be beneficial to fish habitat (Natural Environment Table: Row 47).

Impacts to Fish Habitat

The conclusion that no direct impacts are anticipated with the Limit of Extraction depends on the conclusion that the irrigation ponds and connecting waterbodies within the Burlington Springs Golf Course are not fish habitat under the *Fisheries Act*. Clarification from the applicant is requested with reference to the definitions in the *Fisheries Act* (Natural Environment Table: Rows 14, 61 and 80).

For the discharges to Willoughby Creek, the determination of impact is dependent on the applicant's ability to meet the Department of Fisheries and Oceans' letter of advice conditions for flow supplementation in terms of volume, water quality and quantity in the maintenance of downstream fish habitat. The surface water assessment (Tatham, 2020) acknowledges Willoughby Creek and West Arm as fish habitat, and that baseflows and water temperature are critical to the form and function of the watercourses from a natural heritage and fish spawning perspective. The proposed integrated surface water/groundwater analysis predicts a minor reduction in monthly streamflow due to the lowering of groundwater and suggests maintaining the discharge from the Quarry Sump 0100 to ensure that some reaches of Willoughby Creek does not run dry. The predictive water/groundwater model predicts a measurable reduction in flow of the unnamed tributary of Lake Medad during operations and quarrying.

For the proposed west extension, extraction activities will reduce the size of the sub catchments draining to several of its existing outlets. Extraction and quarry dewatering are predicted to lower groundwater levels surrounding the west extension within 350.0 metres of the extraction face.

Based on the AMP (Version 5.0) provided by the applicant, impacts to fish habitat are expected to be minimal as perpetual pumping from the quarry will maintain the form and function of fish habitat within the Unnamed Tributary of Willoughby Creek and downstream. Within these reaches, the applicant is also of the opinion that groundwater contributions under baseline conditions equate to 1.0 litre/second or less, and that no groundwater supplementation will be required.

For the reaches of Willoughby Creek upstream of the quarry discharge, and along the Lake Medad Valley, the wetlands and flow in the creek are both supplemented by groundwater discharge (seeps and springs) located on the flanks of the valley. It is not clear how the lowering of the groundwater in areas upstream of the confluence will maintain fish habitat or refugia where groundwater seepages currently exist (Natural Environment Table: Row 13). Potential impacts to seepage areas within the riparian zone are possible, due to changes in groundwater levels. The AMP proposes the construction of an infiltration pond to maintain the seeps and springs, which will aid in maintaining the functions of seepage areas within riparian zones of the Medad Valley. The updated AMP contains a monitoring program for water quality and quantity for surface and groundwater but currently does not include biological monitoring of fish habitat impacted by quarry discharges.

Study Areas to Benefit from Better Integration

To have a better understanding of the impacts to fisheries resources, it is recommended that the surface and groundwater studies be integrated with fish habitat descriptions. Challenges to interpreting fish habitat impacts include the following:

1. The fish information available in the downstream reaches such as in Willoughby Creek are based on older baseline data (2004) and no further recent information regarding the fish communities in these areas have been made available. Species at Risk occurrences within this creek should be confirmed (Natural Environment Table: Row 68).
2. Integration of fish habitat impacts as it relates to the receiving waters affected by future drainage and alterations to hydrology and hydrogeology from future expansion is necessary to determine the degree that discharges offset the reduction in groundwater contribution to the Willoughby system (Natural Environment Table: Row 23).
3. The applicant's ability to meet conditions from the Department of Fisheries and Oceans' Letter of Advice (Natural Environment Table: Rows, 23 and 45).

The AMP (Version 5.0) assumes that fish habitat impacts from the proposed west extension will be minimal as negative changes in water quality are not expected given that the watercourse will continue to receive its primary input from quarry discharge. In watercourses and fish habitat currently receiving quarry discharge, predicted decreases in streamflow are very minor and are not expected to have any negative impact on form and function of the watercourse. In areas upstream of the quarry discharge, the applicant has proposed the construction of an Infiltration Pond to maintain seepage in the vicinity of the west extension to maintain levels and groundwater discharge to the Medad Valley.

The applicant's AMP proposes surface and groundwater monitoring but also suggested a very limited biological monitoring program in the vicinity of Medad Valley for wetland vegetation. Specific information on the downstream reaches of Willoughby Creek, including locations of groundwater upwellings (and their significance to fisheries), species composition, species at risk occurrences, distribution, relative abundance, and life history of the fish would be useful to understand the effects of the groundwater drawdown with respect to fish populations. Identification of critical or sensitive habitat with respect to groundwater upwellings and seepages would also be useful in future monitoring programs (Natural Environment Table: Rows 45 and 68).

3.11 Natural Hazards

Conservation Halton reviewed the applications to confirm the following:

1) That the limits of regulated watercourses flooding and erosion hazards with associated regulatory allowances were appropriately delineated on the Site Plan and within the associated technical studies and that all proposed extraction areas were located outside of hazard lands and the associated regulatory allowances;
2) That the technical studies demonstrated that any risks related to natural hazards (flooding and erosion hazards as well as hazardous lands) were addressed, including the prevention or mitigation of those risks; and
3) That the technical studies demonstrated that there would be no risk to public health or safety or of property damage, and that the proposal will not create new or aggravate existing hazards.

Detailed technical comments related to natural hazards are provided in Appendix O (Surface Water Table, Comment Nos. 52, 58, 59, 85, 89, 98, 105, 128, and 151) and Appendix H (Hydrogeology Table, Comment Nos. 2, 213 and 215) to this report.

3.11.1 Review Methodology

Conservation Halton reviewed the following documents as part of the Natural Hazard review:

- Surface Water Assessment, prepared by Tatham Engineering
- Level 1 and Level 2 Hydrogeological Assessment, prepared by Earthfx
- Site Plan prepared by MHBC
- Memorandum Re: Nelson Quarry, Burlington Response to Comments, prepared by Tatham Engineering

3.11.2 Original Findings

Flood Hazards

It was unclear whether a diversion proposed along Colling Road would divert an upstream catchment area that currently drains to the quarry and instead outlet directly to the unnamed Tributary of Willoughby Creek. If this was the case, then there was the potential that it may increase flows and affect the flood hazards along the tributary. Conservation Halton had comments on the event-based model with regards to how the Regional Storm was modelled and inconsistencies on how the quarry discharges and diversion

discharges were applied in different scenarios. In addition, the impact assessment from the integrated model did not include the external catchment diversion.

EROSION HAZARDS

West Arm Tributary: Minimal erosion impact analysis was provided for the West Arm tributary near the proposed south extension. An erosion threshold analysis and/or modelling results (including the requested metrics) were needed to support the statement that there are no impacts to the watercourse in all the various scenarios. Cumulative impacts due to the development of the south extension were not analyzed (e.g., cumulative impacts to sediment transport/erosion when pumping from the existing quarry and from the extension, or during the lake filling scenario).

Willoughby Creek Tributary: Some information on continuous flows was provided for Willoughby Creek; however, the studies did not assess the proposed diversion along Colling Road. Erosion assessments with and without the diversion were requested unless it was confirmed the diversion was not required.

3.11.3 SUMMARY OF CHANGES THROUGH JART

Based on the information submitted, Conservation Halton is satisfied that the proposed development for extraction/excavation will be outside of all hazard lands and associated regulatory allowances.

Furthermore, Conservation Halton received a submission from Nelson, prepared by Tatham Engineering, dated April 13, 2023, which included confirmation that the Colling Road diversion was no longer being proposed, as well as that the Adaptive Management Plan (AMP), and the Site Plan would be updated accordingly. An erosion impact analysis for the West Arm tributary was also provided. After review of these items, Conservation Halton has no outstanding concerns related to flooding and erosion hazards. Full resolution would require the AMP, surface water assessment, hydrogeological assessment, and Site Plan all to be updated accordingly.

3.11.4 PROFESSIONAL OPINION

Conservation Halton staff are satisfied that that the limits of the regulated watercourse flooding and erosion hazards with associated allowances were appropriately delineated and that all proposed extraction areas will be located outside of hazard lands and associated regulatory allowances. Further, Conservation Halton staff is satisfied that any risks related to natural hazards (flooding and erosion hazards as well as hazardous lands) have been addressed, that there should be no risk to public health or safety or of property damage, and that the proposal will not create new or aggravate existing hazards.

3.12 NOISE IMPACT

J.E. Coulter Associates Limited conducted a peer review of the Noise Impact Assessment Study for the Nelson Aggregate Quarry Extension, prepared by HGC Ltd., dated November 15, 2021, and April 22, 2020. The Acoustic Assessment Report of the Halton Asphalt Supply, located in the quarry, dated April 27, 2021, and February 7, 2020, was also reviewed. The Site Plans were also reviewed.

Detailed technical comments and proponent replies are provided in Appendix M to this report.

3.12.1 Review Methodology

The Planning Justification Report and ARA Statement dated April 2020 mentions that Nelson Aggregate Co. is applying for a maximum tonnage of 2 million tonnes per year: however, they plan on extracting an average of 1 million tonnes per year. Per the Ministry of the Environment, Conservation and Parks' Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning (NPC-300) guideline, the evaluation should be for the predictable worst case, which would be the peak of the surge of 2 million tonnes per year.

The proposed south and west extensions of quarry were modelled in Computer Aided Noise Abatement (CadnaA) by HGC Ltd. to predict the future environmental noise generated by the quarry operations. The noise model was reviewed and checked to ensure that the sound power levels of the equipment and its corresponding operating time matched the values from the report. The location of the equipment in the quarry was checked to ensure it represented the worst-case operating scenario. The report and noise model were reviewed to ensure the predicted sound levels met the applicable NPC-300 criteria and, if needed, that mitigation measures were implemented to control the sound levels at the nearby receptors. The equipment used in the operations was also reviewed to ensure they met the maximum noise levels for construction equipment as set out in NPC-115 and NPC-118.

3.12.2 Original Findings

The initial review found the extraction volume was not explicitly specified and it was requested that the report clarify the operating tonnage the assessment was based on. For modelling purposes, the report used 83 dBA at 15m maximum for the quarry haul when operating in the quarry. The report did not address the sound levels of operations such as the haul trucks climbing the hill to the at-grade crossing when loaded. The report did not contain the location or heights of the berms that were proposed (Noise Table: Rows 15 and 17).

A quiet drill with a sound power of 109 dBA has been used in the analysis and was assumed to operate at all areas in the quarry. Detailed calculations of the ambient sound levels were not provided to justify the surrounding area designation as Class 2 (Noise Table: Rows 17 and 21).

The report also stated that no vibration was predicted on site. This is a very unlikely scenario during the blasting phase of work. During blasting in close proximity to the residences, it would be expected that certain vibration would be felt. This vibration could fall within the MECP draft vibration guideline and, as such, not be a concern, but it is very likely that some surrounding land uses, including residential land uses, will sense the pulses in the ground (Noise Table: Row 25).

3.12.3 Summary of Changes through JART Review

An updated report was issued by HGC Ltd., dated November 15, 2021. The report clarified the assessment was based on the peak extraction of 2 million tonnes per year. It also addressed the increased sound-level contributions of the haul trucks climbing out of the quarry (Noise Table: Rows 15 and 17).

The report also provided clearer and more detailed figures of the predicted sound levels around the site, including sound level contours for the worst-case operating scenario. The report also contained detailed

locations of heights of the additional berms in Appendix C that would be constructed prior to the commencement of extraction activities. Nelson Aggregate also confirmed that the use of compression release engine brakes (or Jacobs brakes) is not permitted on the site (Noise Table: Row 8).

An ECA was submitted for the hot mix plant on April 27, 2021. It has been noted that the MECP has completed their review of the Acoustic Assessment Report and will issue a certificate of approval, as evidenced by email communication from the MECP noise reviewer. It has been assumed that as MECP has issued a certificate of approval confirming the site is within a Class 2 area the nearby residences are subject to Class 2 exclusion limits (Noise Table: Row 1).

With the proposed mitigation measures in place the predicted sound levels are expected to meet the applicable MECP Class 2 exclusion limits at the nearby residences (Noise Table: Row 18).

3.12.4 Professional Opinion

Adding the licences of the south and west extension and increasing the asphalt plant workload and nighttime shipping operations will increase the sound levels at the nearest receptors around the site. To reduce the impacts at the nearby residences, mitigation measures such as berms, using broadband backup alarms, and quieter drill rigs have been proposed. It is necessary these mitigation measures are in place before either quarry extension is operational. Once either extension is operational, a noise monitoring program should be implemented to corroborate the predicted sound levels at the receptors selected in the report. A monitoring program for the predictable worst-case scenario should be prepared ahead of time and should account for wind direction. The monitoring should be conducted when the quarry is operating at full capacity. A similar monitoring program should be implemented once the other extension is operational. Additionally, if a noise complaint is received, the noise complaint will be responded to and investigated in a timely manner by the licencee in a manner commensurate to the specific context of the complaint (Noise Table: Rows 20, 21, 24, 32).

With the above mitigation measures in place the predicted sound levels are expected to meet the applicable MECP Class 2 exclusion limits at the nearby residences. It is our understanding that the MECP has issued a certificate of approval confirming the Hot Mix Plant is within a Class 2 area. The agreement with a Class 2 designation for the site is conditionally addressed upon receipt of the Certificate of Approval for the hot mix plant (Noise Table: Row 1).

3.13 Progressive and Final Rehabilitation Plan

As part of its application, in the section pertaining to rehabilitation of lands used for aggregate extraction, Nelson has proposed the rehabilitated quarry could be used as a large park in Halton. The Progressive and Final Rehabilitation Plan is a summary document that contains information already contained in the various reports prepared by Nelson. Therefore, comments provided in this summary may be replicated elsewhere in this report.

Multiple peer reviewers and agency technical staff reviewed the Progressive and Final Rehabilitation Plan. Review in this matter was informed by collaboration and discussion amongst peer reviewers and

applicable agency staff. Reviewers assessed whether the Progressive and Final Rehabilitation Plan was comprehensive, and appropriately derived from the findings of the reports.

Detailed technical comments and proponent replies are provided in Appendix N to this report.

3.13.1 Original Findings

Comments are organized by technical area.

Natural Heritage and Ecology

The rehabilitation monitoring plan includes only monitoring of surface and ground water – no terrestrial monitoring of habitat or monitoring of wildlife to determine if the rehabilitated wildlife habitat features are functioning according to their specified purposes. Monitoring of biota should be included.

The Plan relies heavily on pumping of water from the quarry to replace or replicate any surface water deficits that may affect wetlands and watercourses in the future. Given this approach to mitigation, the water quality of quarry water needs to be monitored, as quarry water may have high conductivity, and amphibian larvae are highly sensitive to increased conductivity. Conductivity should also be monitored in ponds maintained by quarry discharge.

The AMP proposes the inclusion of ecological monitoring of seepage dependent vegetation communities within the Medad Valley area in the headwater area of Willoughby Creek to provide water level targets for monitors MP41 to MP44. This concept should be expanded to include other seepage dependent communities such as habitats for terrestrial and aquatic fauna, rather than just wetland plant communities.

Little is known about the aquatic habitat and vegetation communities within the sections of Medad Valley upstream of the Unnamed Tributary of Willoughby Creek discharge confluence. As the reduction of groundwater contribution is anticipated during the extraction of the west extension, baseline inventory of biota should be conducted. The surface and groundwater monitoring should be used to validate the effectiveness of the Infiltration pond that has been included in the AMP.

Hydrogeology

The comparative impact analysis of the two rehabilitation scenarios is not complete. The cumulative impact of the existing quarry has not been considered in this analysis. RHB1 relies upon an unproven infiltration pond whose function has not been demonstrated nor have water quality impacts on down gradient wells been addressed (Rehabilitation Table: Row 11).

The proposed Rehabilitation Plan requires a change to the approved existing quarry rehabilitation plan. There is no discussion of the conformity between the two rehabilitation plans and the justification for changing the approved rehabilitation plan. Note that the assumptions provided in support of the preferred rehabilitation plan are questionable and require substantiation (Rehabilitation Table: Row 12).

The maintenance requirements of the rehabilitation scenario and resulting water quality impacts on surface water and groundwater have not been assessed (Rehabilitation Table: Row 13).

The financial implication of maintaining, in perpetuity, the proposed west extension dewatering, the existing quarry dewatering, infiltration pond system and associated pumping system to maintain wetlands, as well as seepage management beneath Side Road No.2 between the proposed south extension and the existing quarry have not been addressed. In addition, possible future well complaints may need to be addressed and a cost assigned to this possibility. Ongoing responsibilities to supply water to impacted residences will need to be accounted for, in the event of issues arising (Rehabilitation Table: Row 21).

AGRICULTURE

The proposed Rehabilitation Plan now includes a modification to the existing quarry with the addition of approximately 14.0 hectares of land to be rehabilitated to agriculture, an "*area equivalent to* [the] *proposed extraction area of the south extension lands"* (applicant response of June 2022, page 5). Based on the Progressive and Final Rehabilitation Plan as well as the cross-sections (Drawings 3, and 4, dated September 10, 2021), the agricultural lands to be created are isolated in an area to the central west within the existing quarry and surrounded relatively closely on three sides, and farther away on the fourth east side, by the lake.

The description of agricultural rehabilitation on Drawing 3 does not include specific information such as:

1. The variability in soil materials of the "A", "B", and "C" horizons to be transferred from licence number 626477 to the existing quarry (some variability is expected based on the soil surveys by DBH Soil Services, and previously by Stantec, which indicate that there are potentially different soil series that will provide the materials to be transferred to the existing quarry).
2. A discussion on the reasons for the statement that "no livestock operations shall be permitted".
3. Why the statement with respect to "no livestock operations shall be permitted" (#20, Drawing 3) with the Quarry Floor Agricultural Rehabilitation Sequence (Drawing 3) at step 9, *F*inal Implementation Phase, is identified as "Post Extraction Pasture/Crop".
4. The existing microbiome of soils from licence number 626477 relative to the microbiome probable on the lands to be rehabilitated within the existing quarry.
5. The monitoring and proposed methods available to remedy any changes associated with the microbiome.
6. The significance of micronutrients to agricultural crops and the differences in these micronutrients for "made land".
7. The lack of links with other disciplines to address factors such as whether crop and soil management are likely to be affected if the agricultural use of the rehabilitated lands results in changes in the surrounding groundwater.

3.13.2 SUMMARY OF CHANGES THROUGH JART REVIEW

No changes were proposed as a result of JART review. The revised Adaptive Management Plan did address some of these issues:

1. According to the Adaptive Management Plan, monitoring of surface and groundwater is still the only monitoring proposed. Monitoring of biota is not proposed.

2. The Plan continues to rely on pumping of quarry water to wetlands as the principal mitigation proposed for impacts on wetland hydroperiod.
3. The Plan proposes to rely on pumping to maintain streamflows to support aquatic habitat. This pumping does not address the loss of groundwater seepages associated with the proposed west extension. In the AMP, reductions in groundwater contribution with respect to the west extension is proposed to be offset by the construction of an infiltration pond. The ability of the infiltration pond to maintain the aquatic habitat within the upstream reaches of Willoughby Creek is not known.

3.13.3 Professional Opinion

Monitoring of biota should be conducted. Presence/absence and abundance of wetland-dependent wildlife integrates numerous variables related to wetland function. The baseline should include findings from amphibian surveys conducted between 2000 and 2011, since these encompass a range of amphibian species that have not been evident in more recent surveys.

Baseline information regarding seepage dependent terrestrial and aquatic habitat in the upstream reach of Willoughby Creek should be obtained and should be included as part of future monitoring.

Pumping in perpetuity remains a primary consideration for long-term rehabilitation, which requires a robust policy justification or more thorough exploration of alternatives to potentially avoid the uncertainty related to this type of mitigation.

Nelson has not demonstrated that extraction and water table lowering in the proposed west extension will not impact groundwater flow to the Medad Valley, particularly flows to the springs (Hydrogeology Table: Row 60).

Lastly, the Progressive and Final Rehabilitation Study should be revised to reflect the current AMP and Site Plan and the outstanding comments noted above should be addressed in the Progressive and Final Rehabilitation Plan.

3.14 Surface Water Assessment

Ron Scheckenberger, previously with Wood Environment & Infrastructure and now with Scheckenberger & Associates Ltd., was retained to conduct a peer review of the surface water assessment aspects of the application. Conservation Halton staff also conducted a review of the surface water assessment from a natural hazard perspective. This is summarized in the Natural Hazards section above.

Detailed technical comments and proponent replies are provided in Appendix O to this report.

3.14.1 Review Methodology

Mr. Scheckenberger reviewed the Terms of Reference for the Level 1 and 2 Hydrogeologic and Hydrologic Impact Assessment of the Proposed Burlington Quarry Extension report, the Surface Water Assessment itself, and other supporting documentation, including the Tatham VO Model. Mr. Scheckenberger reviewed the updated iterations of the site plan, undertook a site visit, and participated in meetings with both JART and the proponent.

3.14.2 Original Findings

A brief summary of initial findings is provided:

1. The rating curve development for the flow gauging sites is unclear. Given the importance to corroborating modelling results, the approach to establishing rating curves should be discussed in further detail including an indication of potential error bands (Surface Water Table: Row 36).
2. The proposed Colling Road water diversion and golf course weir are central to the future management of quarry water. Additional background information on this proposal is required to determine both feasibility of the approach and what backup strategy exists in the event it is not ultimately feasible or if problems arise during operation (Surface Water Table: Row 37).
3. Rationale as to why runoff parameters for the catchments to the wetlands were not adjusted for the wetland results calibration (validation) should be provided. Further, the methodology to establishing wetland "storage correction factors" should be expanded upon as this is a key aspect of validating the model's performance (Surface Water Table: Row 39).
4. The use of event-based modelling (based on the SCS technique) is more simplistic than a continuous modelling approach, which presents a challenge to ensuring that the potential impacts of the proposal are accurately reproduced in the analysis of surface water (Surface Water Table: Row 40).
5. The integration of the natural systems feature characteristics, and their water needs is not well established. The form and function of these features should be elaborated on and better connected to the results interpretation, including for the period where lake filling is occurring (Surface Water Table: Row 41).
6. The Surface Water Assessment did not demonstrate that the risks related to natural hazards were addressed (more fully explained in the Natural Hazards section above).

3.14.3 Summary of Changes through JART Review

Details on the stream gauge rating curve development were provided which was helpful in corroborating the results of the provided modelling. There remains information outstanding on the level of confidence prescribed to that data. Additional details were provided on the planned Colling Road water diversion pipe (the applicant has since proposed to remove this element from the proposal) and the related weir system, although impacts to the receiving system (with or without the diversion) remain and are not well explained.

It is also understood that model calibration will be updated by Nelson based on additional monitoring data and through the Adaptive Management Plan associated with an approved quarry. However, the risks and sensitivity of applying the current runoff parameters versus any future updated parameters remains outstanding and should be reviewed and discussed in the current reporting. To this end, the applicant was requested to consider a parametric sensitivity analysis to better frame uncertainty associated with the modelling outcomes. No comparison was provided between the event-based results and those derived through continuous modelling, including the use of common timesteps for corroboration of predicted flow responses (Surface Water Table: Rows 2, 36, 37, 48 and 65).

Nelson (through Tatham) provided a Technical Memorandum, dated April 13, 2023, to Conservation Halton which outlined that Nelson is now abandoning the proposal to divert flows along Colling Road in favour of maintaining the existing flow paths whereby the subject catchments would continue to discharge to the quarry and then be pumped to the Willoughby Tributary. Tatham states that the on-site lake has been designed to have sufficient storage to accommodate the system requirements in the absence of this diversion; calculations will be required to confirm this perspective, along with the requisite updates to the AMP (Surface Water Table: Rows 37 and 65).

3.14.4 Professional Opinion

As of the date of writing this report, there remain outstanding questions and concerns with the proposal from a surface water perspective, but not as it relates to natural hazards (see Section 3.13 above). Much of this revolves around a basic premise of documenting the responses provided to JART queries over the commenting period in a logical and consistent manner in the updated reporting to support traceability and moreover support the planned AMP activities. This is particularly evident in the Surface Water report which makes excessive cross-reference to the Hydrogeological Reporting information rather than incorporating this information logically and inherently in the Surface Water report. Another concern is that the action by Nelson to address the various inputs and the tracking of these changes against the Site Plan are not well documented (Surface Water Table: Rows 38 and 42).

A considerable amount of weight is given to the modelling to-date which, as noted by Nelson, is subject to change based upon planned data collection. This is particularly a concern in so far as the wetland storage correction factors used in the modelling which appear to be more of a calibration factor than a results-based or data driven parameter. While the collection of additional data is fully supported through the AMP, decision making without a sound database in place, fully corroborated and supported by the regulators, is not supported. Careful attention to the significance of new data (such as the proposed 3 years of data collection at the new locations cited in 2022) as they are received and the influence on the various management recommendations, will be critical considering the current data gaps. Furthermore, in terms of surface water gauging, high-quality rating curves are instrumental to the accurate and confident use of collected water level data. The applicant is encouraged to continually improve these relationships over the coming years so that the results and predictions can be refined and used accordingly (Surface Water Table: Rows 36, 39 and 49).

The reliance on the proposed infiltration pond as a primary means of impact mitigation remains uncertain and will therefore need to be further assessed as part of future project phases associated with the western extension, fully supported by contemporary data, including the associated threshold conditions for area features as they evolve from the data assessments/analyses (Surface Water Table: Row 115).

3.15 Traffic Impact

CIMA Canada Inc. was retained to provide peer review support related to traffic impact assessment and road safety analysis. To this purpose the following guidelines were considered as part of the review:

- Region of Halton's Transportation Impact Study Guidelines (January 2015)
- Region of Halton's Access Management Guidelines (January 2015)

- Region of Halton's Highway Dedication Guidelines (undated)
- Region of Halton's Aggregate Resources Reference Manual – Regional Official Plan Guidelines (undated)
- Transportation Association of Canada's Geometric Design Guide for Canadian Roads (2017)

Detailed technical comments and proponent replies are provided in Appendix P to this report.

3.15.1 Review Methodology

In February 2021, CIMA+ completed a peer review of the Burlington Quarry Extension Traffic Report and its appendix and provided comments related to items that could benefit from additional review. In response to CIMA+'s comments, Paradigm Transportation Solutions Limited (Paradigm) provided updates in the form or responses and additional attachments to the February 2020 report.

In addition, and following the request received from the Region in June 2021, CIMA+ conducted a peer review of the information contained in Section 5 – Traffic of the Site Plan. Final findings and recommendations were included as part of our letter report submitted to the Region on December 9, 2021.

Elements considered as part of the peer reviews included the following:

- Determination of guidelines, policies, manuals, bylaws, and procedures that the practitioner needed to consider for the preparation of the documentation under review;
- Confirmation that adequate explanation about assumptions made for the preparation of the documentation under review were included and referenced;
- Confirmation of the adequate use of software default values; and
- Confirmation of the consistency between information provided along the document(s) and any appendices or software outputs included supporting recommendations and findings.

In June 2022, a traffic response was provided by Paradigm to review alongside the June 2022 site plan. It should be noted that a revised TIS was not provided, only responses in the comment table.

3.15.2 Original Findings

As stated in the Burlington Quarry Extension Traffic Report, Paradigm reviewed the detailed shipping records containing shipping details from 2014 to 2018. Based on these shipping details, Paradigm estimated trucking levels for a 2,000,000 tonnes per annum scenario. The estimates were used to calculate the annual inbound and outbound truck trips from 2014 to 2018. Additionally, estimates of the future increase to truck volumes were calculated based on the details provided in the shipping records.

Based on the review of the detailed data provided by the proponent, CIMA+ verified that the estimated total future truck levels shown in Table 4.1 of the subject TIS are appropriate estimates for the future peak hour truck volumes.

To verify the estimated volumes CIMA+ examined the 2018 month-by-month total (aggregate, clean fills, and recycling trips) average daily trucks served in 2018. However, CIMA+ was unable to verify the distribution of the estimated total trips between the AM and PM peak hours.

3.15.3 Summary of Changes through JART Review

The responses provided by Paradigm answered a number of questions. An addendum letter was promised by Paradigm to outline potential mitigation measures for the road authorities. That correspondence had not arrived as of the date of writing this report. The detailed breakdown of traffic was provided.

3.15.4 Professional Opinion

Most of the issues identified through technical review have been identified and addressed by Paradigm. These issues had been identified by the peer reviewer just prior to Nelson's filing of appeals. As part of concluding technical review, the need for this information is confirmed. The following issues remain outstanding:

1. The outstanding addendum letter from Paradigm may address mitigation measures for consideration of managing traffic issues (Traffic Table: Row 15).
2. The required 220.0 metre sight distance as identified by the proponent in the TNS report should be included as part of the site plan (Traffic Table: Row 30).
3. The haul truck crossing approaches on No. 2 Side Road shall be designed and constructed to provide an approach sight distance (i.e., visibility triangle) extending, at a minimum of 25 m on each crossing approach to a point 50 m east and west on No. 2 Side Road. This should be reflected in the site plan (Traffic Table: Row 4).

3.16 Visual Impact Assessment (VIA)

MHBC Planning was retained by Nelson to prepare a Visual Impact Assessment (VIA) for Nelson's proposed Burlington quarry extension. NEC's Landscape Architect completed a technical review of the report.

Detailed technical comments and proponent replies are provided in Appendix Q to this report.

3.16.1 Review Methodology

NEC staff completed a review of the VIA submitted as part of the above noted application within the framework of the Niagara Escarpment Plan policies.

3.16.2 Original Findings

Review of the original VIA by Niagara Escarpment Commission staff identified the need for further documentation including details on photogrammetry, inclusion of pertinent Niagara Escarpment Plan policy and terminology, a more comprehensive inventory and analysis of visual impacts and mitigation in relation to Niagara Escarpment Plan policies, and more details and documentation on screening and planting methodology and locations.

3.16.3 Summary of Changes through JART Review

Some of these matters were addressed in the June 2021 submission, while additional requirements were identified relating to Minor Urban Centre overlays in mapping, details on the proposed at-grade crossing of No. 2 Side Road, a need to bring site plan mapping into conformity with the VIA, provision of justification for and documentation on methodology for the proposed landscape rehabilitation, the need for further and improved photo-documentation and photo simulations, and corrections of technical and textual elements in the reports. Comments the NEC provided on the June 2021 VIA submission have largely been addressed by the May 2022 VIA submission.

There remains a lack of details on how the mitigation measures will be implemented that needs to be addressed through a landscape plan and a vegetation protection plan to meet NEC standards. In addition, while the supplementary photo-simulations are suitable they need accompanying photos of exiting conditions and a key map of photo locations and directions. Finally, while formally part of the amended site plan application for the existing quarry, the proposed new entrance to the existing quarry on the north side of No. 2 Side Road is related to the proposed expansion and needs to be incorporated in these landscape and vegetation protection plans, and the ARA amended site plans brought into conformity with VIA guidelines.

3.16.4 Professional Opinion

No substantive outstanding issues remain with respect to the Visual Impact Assessment and NEC staff concur with the proponent that the landscape character requirements of the NEC have been addressed, subject to submission of the items identified in Section 3.16.3 above.

3.17 Adaptive Management Plan (AMP)

Multiple reviewers reviewed the draft Adaptive Management Plan. Review in this matter was informed by collaboration and discussion amongst peer reviewers and applicable agency staff. Therefore, comments provided in this summary may be replicated elsewhere in this report.

JART notes that many updates were made to this document in consultation with Provincial staff led by the Ministry of Natural Resources and Forestry, who have indicated there are no remaining issues with that proposed Plan.

Detailed technical comments and proponent replies are provided in Appendix R to this report.

3.17.1 Original Findings

Comments are organized by technical area.

Natural Heritage and Ecology

1. There was concern that the proposed triggers for groundwater monitoring are vague, and the time lag between the trigger and the response is not clear. The triggers should be more clearly explained by a graphic such as a flow chart. A clear indication of timelines between the trigger and the remedial action should be provided, as it appears the timeline could be a year or more.

2. The AMP does not contain any monitoring of any aspects other than groundwater and surface water. Biological monitoring of remaining woodland and wetland features should be proposed, as the issue of functionality of the wetlands in the vicinity of the quarry is of significant concern.
3. Actions proposed by the AMP are unclear. The AMP chart should clearly identify targets for monitoring (which should include biota), thresholds against which monitoring will be measured, and concrete, meaningful actions to be taken should there be a clear indication that the quarry is affecting biota through impacts on surface or groundwater. The actions should include potential cessation of extraction.
4. The most important, central mitigation technique proposed by the Adaptive Management Plan to mitigate future surface water deficits in wetlands or streams is to maintain them by pumping water from the quarry. This means that if there is uncertainty as to the ability to maintain the pumping in perpetuity then it affects the entire mitigation plan. Concerns remain surrounding the uncertainty of relying so heavily on the ability to maintain pumping, considering uncertainty regarding many factors (e.g., continued water supply and its quality, land ownership, financial viability) decades in the future.
5. The updated AMP contains a monitoring program for water quality and quantity for surface and groundwater but currently does not include biological monitoring of fish habitat impacted by quarry discharges. There is currently no plan to monitor or sample fish populations downstream of the quarry discharges due to the assumption that the current discharges will have similar quality and quantity as the existing flows.
6. Although quarry discharge will be used to maintain the flow regime necessary to maintain fish habitat at the Willoughby Tributary and confluence, it is not clear how the lowering of the groundwater in areas upstream of the confluence will maintain fish habitat or refugia where groundwater seepages currently exist.

HYDROGEOLOGY

1. The comparative impact analysis of the two rehabilitation scenarios is not complete. The cumulative impact of the existing quarry has not been considered in this analysis. RHB1 relies upon an unproven infiltration pond whose function has not been demonstrated nor have water quality impacts on down gradient wells been addressed (Rehabilitation Table: Row 11).
2. For the proposed west extension, no groundwater thresholds are proposed until enough groundwater monitoring data is collected to establish baseline conditions. The missing groundwater thresholds raises questions as to how to appropriately monitor and manage changes.
3. No water quality discussion or threshold levels for groundwater quality are included.
4. Nelson has not demonstrated that the infiltration pond will function as proposed nor that groundwater flows, including springs, to the Provincially Significant Medad Valley will not be impacted. As such, the western extension, should it be approved, must be refilled followed excavation and not maintained as a “shallow lake” as proposed. Further, phasing of the excavation of the western extension should be considered (as two cells) to allow for more rapid filling of at least part of the extension lands.

5. Prior to the surrender of the existing ARA licence, the licencee is required to provide confirmation that any long-term monitoring, pumping, or mitigation will not result in a financial liability to the public. Due to the uncertainty of the proposed mitigation measures for the proposed expansion, this should be confirmed prior to the issuance of the ARA licence.
6. Clarification is needed on what options are available and what process will be followed if a suitable replacement well cannot be installed on properties where adverse well interference from quarry operations has been confirmed.
7. Clarification is needed on how the effects of current climatic conditions on groundwater levels will be evaluated. Details of climatic data collection/monitoring are missing from the AMP.
8. No water level thresholds have been provided for shallow monitoring wells or for existing wells (shown on report figures 4 and 6) that have less than 5 metres of available drawdown.
9. The AMP should identify measures required to address the current decline in groundwater levels in the vicinity of sensitive receptors.
10. The AMP does not fully recognize the interests of local agencies and municipalities in the protection of private water supplies and ecological features. With respect to the proposed Stakeholder Liaison Committee, details are missing with respect to AMP implementation, oversight, and ongoing data access with these agencies.
11. The long-term financial implications of the recommended final site rehabilitation scenario involving perpetual pumping of water have not been addressed.
12. The use of available drawdown as criteria for implementation of mitigation measures does not consider existing well conditions such as well productivity or water quality issues. Available drawdown is relevant to well interference but, as sole criterion, is inadequate for assessing negative impact on private wells

3.17.2 Summary of Changes through JART Review

The AMP changed in many ways from initial submission to 2022. The 2022 AMP provided additional monitoring locations to be collected for a minimum three-year period to determine and provide the appropriate mitigation where necessary for watercourses and wetlands. An on-site climatic station is now proposed, although details are missing on the station and how climatic data collected will be used to assess quarry impacts.

The updated AMP includes proposed biological monitoring of the Medad Valley for vegetation communities within the seepage areas affected by the proposed west extension. Further details on this monitoring, as it relates to the operation of the infiltration pond and groundwater monitoring needs to be provided.

3.17.3 Professional Opinion

1. It is still unclear what the precise trigger is between discovering “confirmed decreasing trend in the bedrock aquifer” and the determination that the decrease is affecting the wetlands more than has been assumed. Development of triggers based on a precautionary approach to groundwater declines is a preferred approach to ensuring that the potential for changes to wetland hydrology

because of changes in groundwater is appropriately assessed. Precision should be applied to the proposed triggers.

2. Biological monitoring of wetland functions, particularly their ability to support breeding of Ambystomatid salamanders and frogs, is the preferred, precautionary approach to ensuring the early detection of changes to wetland function due to quarry activities. The baseline for monitoring should consider the ecological functions that were determined during surveys for the previous quarry extension that were conducted between 2000 and 2011.
3. As noted above, groundwater triggers should be established for wetlands as a precautionary approach. Surface water baseline monitoring should incorporate monitoring results in wetlands conducted between 2000 and 2011, not just use monitoring results for the most recent six years (as well as additional recent monitoring), as proposed.
4. Biological monitoring provides a chronic indication of the health of fish communities directly affected by surface water pumping discharges and should be considered in the AMP. Future impacts can be measured by changes to the fish community (i.e., Fish community diversity, sentinel species composition, SAR species occurrences). This type of study is recommended within the AMP, to determine if the water quality and quantity measures being recommended moving forward are working as intended.
5. For the west extension, extraction activities will reduce the size of the sub catchments draining to several of its existing outlets. Extraction and quarry dewatering are predicted to lower groundwater levels surrounding the west extension within 350.0 metres of the extraction face. Specific information on the downstream reaches of Willoughby Creek, including locations of groundwater upwellings (and their significance to fisheries), species composition, distribution, relative abundance, and life history of the fish would be useful to understand the effects of the groundwater drawdown with respect to fish populations. Identification of critical or sensitive habitat respect to groundwater upwellings and seepages would also be useful in future monitoring programs.
6. Alternatives to perpetual pumping should be fully considered to mitigate the uncertainty related to pumping as a solution.
7. There is sufficient on-site monitoring data and information to question the viability of the proposed mitigation measures for well interference resulting from the proposed quarry extensions. Alternative mitigation measures should be established in the event that the proposed well mitigation measures are insufficient or ineffective.
8. Groundwater quality thresholds should be identified to protect groundwater quality in nearby wells.
9. Within the AMP, identified groundwater and surface water monitoring locations and their respective threshold levels should be established, reviewed, and approved by relevant agencies prior to issuance of an ARA licence.
10. Details are required with respect to climatic conditions and on-site climate data and how these will be used in establishing groundwater and surface water threshold levels and impacts from the proposed quarry operations.

4. CONCLUSION AND NEXT STEPS

After considerable effort, JART has completed its technical review of the plans, studies, reports, and comments provided by Nelson.

Every attempt has been made to ensure a thorough and comprehensive analysis. The detailed record of JART work is contained in the various appendices to this report. JART notes again that any changes to the proposal or advancement on the issues above will require further investigation.

The blast impact, noise impact, and visual impact peer reviewers are generally satisfied with the information provided by the proponent, provided the proposed design measures and monitoring programs are secured.

Conservation Halton staff is satisfied that any risks related to natural hazards (flooding and erosion hazards as well as hazardous lands) have been addressed.

4.1 SUMMARY OF REMAINING ISSUES

In other issue areas, a number of technical issues remain with the proposal as currently designed:

CUMULATIVE EFFECTS AND THE BASELINE FOR ANALYSIS

Nelson's assessment of the cumulative impacts of the proposed quarry uses existing conditions as the baseline for its analysis. JART's peer reviewers have pointed out that, in order to assess cumulative impacts, Nelson must assess the impacts of the proposed expansion together with the impacts of existing development, including the existing quarry.

AGRICULTURAL IMPACT ASSESSMENT

The Nelson application will remove agricultural lands from production in a Prime Agricultural Area. There will be a loss of good agricultural land if the Nelson application is approved.

In the peer reviewer's opinion, the approach taken by Nelson with respect to alternative locations does not consider a broader range of alternative locations, from a soil capability perspective, or a cost-benefit analysis, for example, at various scales from the Province through to the sub-tier municipal level, and subsequently to the neighbours around the proposed expansion area. Therefore, the analysis of alternative locations, required by agricultural planning policy, is flawed.

AIR QUALITY ASSESSMENT

Updated analysis from Nelson is required to demonstrate that compliance with Provincial air quality criteria can be met. The peer reviewer notes that this updated analysis will likely confirm compliance, provided the correct data inputs are made and appropriate updates made to the Site Plan and notes (if required).

ARCHAEOLOGY AND CULTURAL HERITAGE

With respect to the proposed removal of the smaller outbuilding at 2280 No. 2 Side Road, and the stone Ontario Gothic Revival Cottage (golf club house) at 5235 Cedar Springs Road. In both cases, insufficient

evidence has been provided to clearly demonstrate a lack of cultural heritage value or interest. Based on the available information, both of these structures appear to have likely cultural heritage value or interest. Avoidance would mitigate this concern.

Hydrologic and Hydrogeologic Modelling

According to JART's peer reviewers, Nelson's analysis of water and natural environment impacts is highly dependent on predictions generated by a computer groundwater/surface water model. The model is driven by assumptions, as opposed to data generated in the field. JART's peer reviewers have a number of concerns with the validity of the model's predictions.

The cumulative effect of these issues calls into question the model's ability to predict impacts with sufficient accuracy to warrant approval of the proposed quarry expansion. Potential impacts not thoroughly assessed include impacts to wetlands, changes to streamflow in the Medad Valley and impacts to wells along Cedar Springs Road, including the availability of additional drawdown deeper in the aquifer to mitigate any impacts.

The conclusion that none of the wetlands in the immediate vicinity of the quarry receive significant groundwater inflows is contingent on the assumption that the wetlands are hydraulically isolated from the bedrock groundwater system. This has not been conclusively proven.

Impacts to the Medad Valley

The proposed west extension is predicted to cause reductions in flow in the Medad Valley, which is an important natural heritage feature. JART's peer reviewers believe that there is a high degree of uncertainty in these predicted changes and that the actual changes to the water budget for this feature may be significant.

Private Wells

Nelson's groundwater model predicts minor impacts to private wells downgradient from the site. In order to mitigate these impacts, an infiltration pond is proposed. There has been no data or testing to confirm that the infiltration pond will function as proposed. If there are serious impacts to private wells, Nelson proposes to deepen those wells to obtain additional water. However, JART's peer reviewers point out that deeper rock formations in the area likely do not contain sufficient water flow for this to work, and questions remain regarding potentially poor groundwater quality from deeper wells.

Karst Hydrogeology

The Halton Till does not have a uniform hydraulic conductivity (known as "K" in technical literature), is not an aquitard, and has not been appropriately characterized with regard to wetland hydrology and model layer input.

Groundwater flows to the Medad Valley have not been adequately characterized. These flows involve flow through discrete karst conduits (not an equivalent porous medium, or EPM), and impacts to the valley and its wetlands have not been adequately defined.

Golf Course Ponds and Fish

Nelson proposes to remove several human-made irrigation ponds and channels from the area of the west extension. These ponds are known to contain fish. While the Department of Fisheries has not raised concerns with their removal, Nelson has not provided policy justification for doing so. Nelson has also failed to survey these ponds for salamanders, including Jefferson salamanders. Considering these issues, removal of the ponds in question has not been justified. Should ponds and connecting channels be removed, a plan for the relocation and salvage of fish populations and other wildlife should be provided.

Nelson proposes to pump water from the proposed quarry to continue to provide flow to offsite watercourses, which will lose groundwater contributions as a result of the quarry. This will effectively convert groundwater flow to surface water flow. This may not be effective in preserving fish habitat.

The applicant needs to integrate surface and groundwater studies with fish habitat descriptions. Specific information on the downstream reaches of Willoughby Creek, including locations of groundwater upwellings (and their significance to fisheries), species composition, species at risk occurrences, distribution, relative abundance, and life history of the fish would be useful to understand the effects of the groundwater drawdown with respect to fish populations. Identification of critical or sensitive habitat with respect to groundwater upwellings and seepages would also be useful in future monitoring programs.

Perpetual Pumping

Nelson proposes to pump water perpetually in order to maintain the rehabilitated quarry in a dewatered state. This would also maintain the existing flows within the Willoughby Creek and West Arm tributaries. This is a departure from the approved rehabilitation plan for the existing quarry which would stop perpetual pumping and allow the quarry to slowly fill over time. Nelson has not provided sufficient technical justification that perpetual pumping will result in net socio-economic or environmental benefits.

Natural Heritage – Terrestrial

The uncertainty in groundwater impacts leads to uncertainty in impacts on water dependent natural heritage features, including wetlands and fish habitat. There is also a lack of baseline data in certain areas.

The proposed west extension will break the connectivity between a series of woodlands that constitute part of the Regional natural heritage system. Nelson proposes to maintain partial connections to off-site woodlands, but the effectiveness of these connections in maintaining the functions of the woodlands is questionable. The linkage function of the “non-significant” woodlands on the golf course, which are included within Halton’s Natural Heritage System, has not been adequately analyzed, particularly the function of the woodlands to support connection between regionally significant features on and off-site.

Though the revised Rehabilitation Plan shows a connection between the retained Significant Woodlands and the landscape to the south, this connection will be removed during extraction south of the woodland, so the connectivity of the landscape potentially will be impaired for many years (the timing has not been provided). The proposed restoration of the connection is narrow and mainly consists of steep slopes. The connection of the retained Significant Woodland to features within the NHS on the north side of Colling

Road is severed. Impacts of fragmentation within the retained significant woodland have been incompletely analyzed.

Surveys for Blanding's Turtle were conducted in 2021. However, these surveys were conducted only along the proposed west extension. There is potential habitat in the proposed south extension. Snake surveys continue to be recommended, based on MNRF Guelph District protocols for surveying Milksnake, which are recommended for snake species that are not at risk. Concerns remain that salamander trapping was not conducted in the golf course ponds. The ponds should be trapped, as the JART reviewer's latest observations indicated that they are similar to other human-made ponds that have been observed by NSE staff to support Jefferson Salamander and/or other Ambystomatid salamanders. Searches should be conducted for turtle nesting habitat within the study area.

The location of Snapping Turtle, which is a Species at Risk with a status of Special Concern, should be shown in the supporting report, as habitat for Special Concern species is considered a criterion for Significant Wildlife Habitat.

A restoration area for Jefferson Salamander has been proposed south of the south extension. Details regarding this restoration area are minimal within the submission materials. There appears to be no technical support for the feasibility of restoring this area for Jefferson Salamander, since no background studies have been conducted to determine if salamanders move in this direction, or whether suitable habitat could be restored in this location. In addition, the restoration will be within the 120 metre zone of influence of the proposed quarry, where impacts could be more significant, so the JART peer reviewer questions whether this is an appropriate place for restoration of salamander habitat. Concerns remain that such a restoration area could become an ecological sink for Jefferson Salamander.

Progressive and Final Rehabilitation Plan

Monitoring of biota should be conducted. Presence/absence and abundance of wetland-dependent wildlife integrates numerous variables related to wetland function. The baseline should include findings from amphibian surveys conducted between 2000 and 2011, since these encompass a range of amphibian species that have not been evident in more recent surveys.

Baseline information regarding seepage dependent terrestrial and aquatic habitat in the upstream reach of Willoughby Creek should be obtained and should be included as part of future monitoring.

Pumping in perpetuity remains a primary consideration for long-term rehabilitation, which requires a robust policy justification or more thorough exploration of alternatives to potentially avoid the uncertainty related to this type of mitigation.

Lastly, the Progressive and Final Rehabilitation Study should be revised to reflect the current AMP and Site Plan and the outstanding comments noted above should be addressed in the Progressive and Final Rehabilitation Plan.

Surface Water Assessment

The surface water assessment has been conducted in two forms supported by monitoring data, an event based hydrologic model for flooding (regulatory focus) and an integrated surface water – ground water model, to support impact assessment to natural features (water balance). The results of these model exercises have not been cross-checked which is considered a deficiency when interpreting the results. Furthermore, there are several impact management recommendations which are contingent on future monitoring data collection which will be used to set feature-based threshold conditions. These thresholds will then guide the point at which mitigation is required along with the degree of mitigation, which in most cases relates to the need for artificial pumping of storm/groundwater to affected features including area wetlands and watercourses. In the absence of these data at the present time, many of the recommendations and their quantum can only be considered speculative until such time as detailed information is available to corroborate the recommendations, as part of the Adaptive Management Plan.

The assessment places considerable reliance on a replica infiltration pond to offset the loss of recharge associated with the existing golf course ponds, as part of the western extraction. While it is acknowledged that this is several years away (Phases 3 through 6), detailed data collection and associated interpretation is vital in the intervening years to ensure that the database of flow records and water levels is sufficiently robust to support the implementation of the replica pond and also to determine that it will be effective in mitigating predicted impacts. Furthermore, it is unclear as to why the proposed replica infiltration pond is not shown on the Red-lined Site Plan; it is suggested that this be addressed accordingly.

Traffic Impact Assessment

The addendum letter clarification promised by Paradigm should address potential mitigation measures to consider. Points of clarification are requested on the site plan and associated notes with respect to sightline distances along No. 2 Side Road and the appropriate design and construction of the proposed haul truck crossings on No. 2 Side Road.

Visual Impact Assessment

There remains a need for details on how the mitigation measures will be implemented that are to be addressed through a landscape plan and a vegetation protection plan. In addition, while formally part of the amended site plan application for the existing quarry, the proposed new entrance to the existing quarry on the north side of No. 2 Side Road is related to the proposed expansion, and should be incorporated in these landscape and vegetation protection plans.

Adaptive Management Plan (AMP)

Multiple points in the draft AMP call for triggers for intervention based upon post-approvals monitoring. Development of triggers based on a precautionary approach is a preferred approach. There are multiple sources of existing data, including from the previous application, that can inform earlier development of such figures.

Specific information on the downstream reaches of Willoughby Creek, including locations of groundwater upwellings (and their significance to fisheries), species composition, distribution, relative abundance, and life history of the fish would be useful to understand the effects of the groundwater drawdown with

respect to fish populations. Identification of critical or sensitive habitats in respect to groundwater upwellings and seepages would also be useful in future monitoring programs.

Groundwater quality thresholds should be identified to protect groundwater quality in nearby wells.

Within the AMP, identified groundwater and surface water monitoring locations and their respective threshold levels should be established, reviewed, and approved by relevant agencies prior to issuance of an ARA licence.

Details are required with respect to climatic conditions and on-site climate data and how these will be used in establishing groundwater and surface water threshold levels and impacts from the proposed quarry operations.

4.2 Additional Research Areas

A number of technical areas generated greater amounts of public interest relative to other issue areas. The technical reviewers have provided the following additional information for consideration.

4.2.1 Flyrock

Explotech incorporated a section in their updated BIA report of June 16, 2021, under the heading "FLYROCK", pages 22-25 to provide a detailed explanation of mitigation measures and procedures used to address the potential for flyrock from existing the quarry site. Explotech has used the well-known and widely used United States Bureau of Mines model (USBM model) for predicting flyrock range under normal blasting operation at the proposed quarry extension. It must be noted that the potential flyrock distance range is a function of blast design parameters. For any specified range, the blast design parameters can be modified and calibrated to meet the specified range.

Although this flyrock range prediction model is a useful tool used in proper blast design and planning to mitigate flyrock from escaping the site, visual inspection of the rock face, top bench, and communications between the drilling crew and the blasting crew plays a more crucial role. This is because the parameters in the USBM model do not include unexpected sources that may play a major role in the generation of flyrock in each blast. These potential sources include burden depletion along the rock face, loose rock on the top bench, and void(s) within boreholes created during drilling.

These sources of potential flyrock generation can easily be mitigated by visual survey of the site and actions taken by the blaster-in-charge and the quarry operator to eliminate the hazard prior to explosive loading and blasting operations. Nelson's proposal incorporates operational planning for blasting.

4.2.2 Dust Leaving the Nelson Site

Residents have submitted, both to JART and the Ministry of Northern Development, Mines, Natural Resources and Forestry's enforcement team, complaints related to dust leaving the Nelson lands following blasts and excessive dirt on local and Regional Roads. The typical approach for addressing dust management at quarries is through a properly applied dust management plan and appropriate blasting techniques (design/size of blast, plus timing associated with favourable weather conditions).

Residents with complaints about any licenced mineral aggregate operation should be forwarded to the Natural Resources Information Support Centre (1-800-667-1940 or NRISC@ontario.ca), who will direct the complaint to the appropriate enforcement team.

4.3 Future Use and Reliance on this Report

JART member agencies will use the completed JART technical report to support the preparation of planning opinions on Nelson's proposal.

Technical conversations may continue with the proponent by individual agencies to address the remaining issues. This work, or any revisions to the Nelson proposal to address any other objector concerns, will require review and may necessitate updated analysis to be completed.

JART wishes to thank all those who have participated and provided input, including the proponent and members of the public, into the various application process.