

SUMMARY REPORT, APPLICATION FOR PIT AND QUARRY LICENCE, MACLEOD III AND V QUARRIES



Project No.: OCP-16-0280

Prepared for:

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August 16, 2017

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1.0 INTRODUCTION

This report is submitted in conjunction with an Application for a Pit and Quarry Licence (Appendix A), as required by the Aggregate Resources of Ontario, Provincial Standards, Version 1.0; Category 1 – Class “A” Pit Below Water; and Category 2 – Class “A” Quarry below Water; for the following project:

Applicant

Cornwall Gravel Company Ltd.
390 Eleventh Street West
Cornwall, Ontario K6J 3B2

Project

Category 1 – Class “A” Pit below Water and Category 2 – Class “A” Quarry below Water

Pit Name

MacLeod III and MacLeod V

Pit Location

17631 South Branch Road, South Stormont, Ontario, K5H 5R6 - Part of Lot 6, Concession 4 (MacLeod III), and Part of Lot 2, Concession 4 (MacLeod V), Geographic Township of Cornwall, United Counties of Stormont, Dundas and Glengarry

Property Owners

Cornwall Gravel Company Ltd., 390 Eleventh Street West, Cornwall, Ontario K6J 3B2

2.0 KEY PLAN

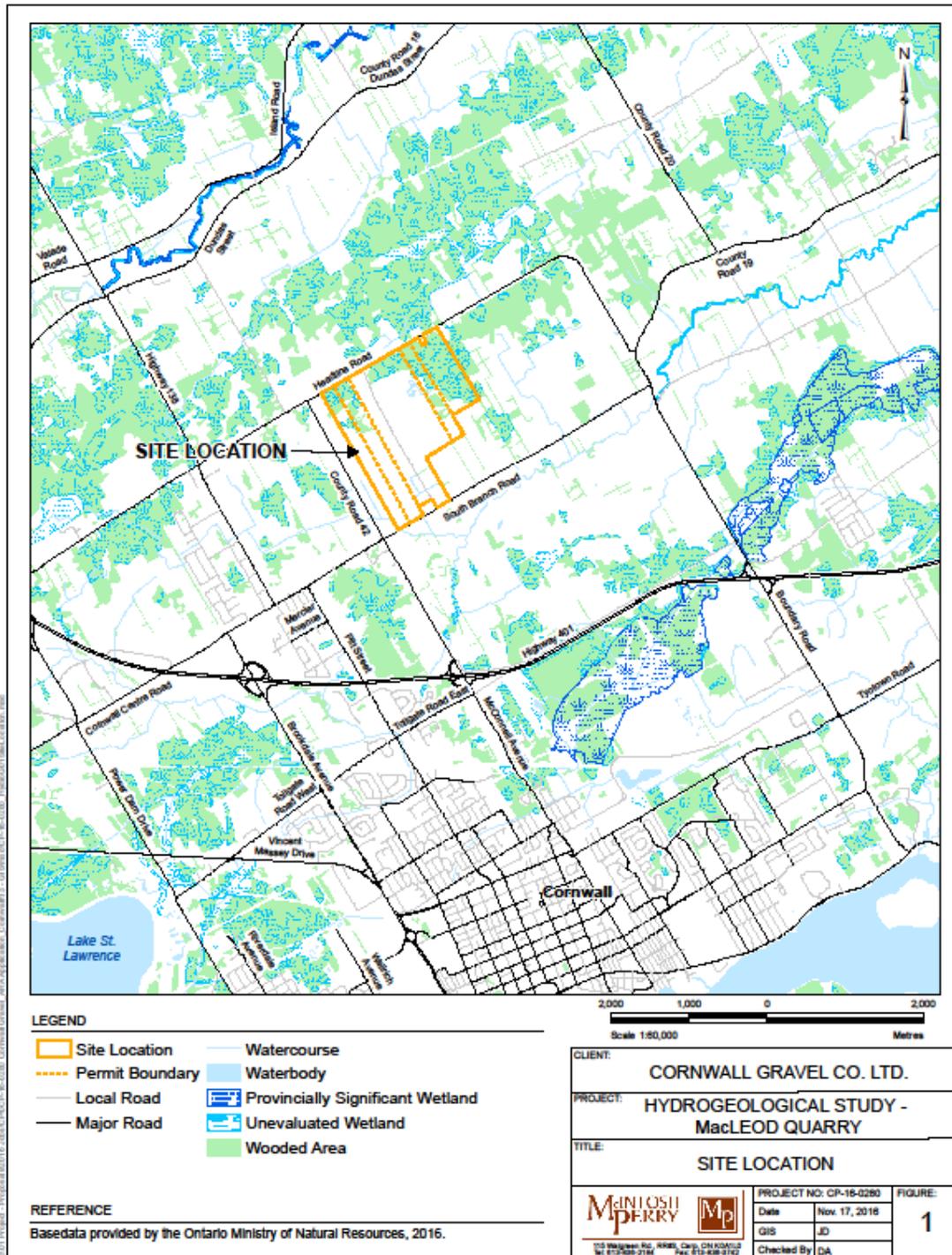


Figure 1: Key Map of Proposed Quarry

3.0 SITE PLAN STANDARDS FOR CATEGORY 1 AND 2 CLASS “A” LICENCES

Site Plans for the MacLeod III and MacLeod V quarry sites have been prepared in accordance with Aggregate Resources of Ontario, Provincial Standards (AROPS), Version 1.0 - Category 1 Class “A” Pit below Water and Category 2 Class “A” Quarry below Water. The Site Plans contain all information required by the AROPS, and are included with this submission.

4.0 REPORT STANDARDS FOR CATEGORY 1 AND 2 CLASS “A” LICENCES

A brief summary of relevant information and recommendations from the technical reports prepared in support of this application are provided below.

4.1 Summary Statement

The proposed quarry property is owned by Cornwall Gravel Company Ltd. (Cornwall Gravel) and is located at 17631 South Branch Road, South Stormont, Ontario, K5H5R6. This property is currently severed into 5 distinct lots; three of these (MacLeod I, -II, and -IV) are included in an existing aggregate licence. The legal descriptions for the lots forming part of this application are: Part of Lot 6, Concession 4 (MacLeod III), and Part of Lot 2, Concession 4 (MacLeod V), Geographic Township of Cornwall, United Counties of Stormont, Dundas and Glengarry. The MacLeod III property is approximately 37.8 hectares in area, with a proposed extraction area of 29.5 hectares. The MacLeod V property is approximately 40.5 hectares in area, with a proposed extraction area of 32.4 hectares.

4.1.1 Planning and Land Use Considerations

Land use in the immediate vicinity of the subject site is generally agricultural or vacant/wooded, although various homes and businesses are present along Headline Road, McConnell Avenue, and South Branch Road. Land use of surrounding properties is generally designated as Agricultural Resource Lands or Rural District, with the exception of a property located at 17703 Headline Road (to the northeast of MacLeod III and to the northwest of MacLeod V), which is designated as Salvage Yard District (a salvage yard is currently operating at this property). Areas along Headline Road west of McConnell Avenue are designated as a Rural Settlement Area.

No Provincially Significant Wetlands (PSWs) or other Areas of Natural or Scientific Interest (ANSIs) were noted in the vicinity of the Site.

4.1.2 Provincial Policy Statement (2014)

The Provincial Policy Statement (2014) protects mineral aggregate resources for their long-term use. Section 2.5.2.1 states that:

“As much of the mineral aggregate resource as is realistically possible shall be made available as close to markets as possible. Demonstration of need for mineral aggregate resources, including any type of supply/demand analysis, shall not be required, notwithstanding the availability, designation or licensing for extraction of mineral aggregate resources locally or elsewhere.”

The Policy Statement also states that extraction shall occur in a manner which minimizes social and environmental impacts. This will be achieved through implementing the recommendations included within the supporting studies conducted by a variety of professionals and indicated on the Operations Plan.

The Provincial Policy Statement also contains policies addressing progressive and final rehabilitation. As part of the Aggregate Resources Act, a Rehabilitation Plan is to be provided with the licence application submission

indicating how and when the site is to be rehabilitated. The site will be progressively rehabilitated and the final rehabilitation will be an open pond.

4.1.3 Official Plan

The current licensed area of the MacLeod Quarry (I, II and IV) is designated as Extractive Resource Lands (Licensed Pit & Quarry) under the Official Plan of the United Counties of Stormont, Dundas and Glengarry. The MacLeod III and MacLeod V properties are currently designated as Extractive Resource Lands (Mineral Aggregate Reserve). Properties directly surrounding the subject properties are designated primarily as Agricultural Resource Land to the north, and Rural District in all other directions. A property located at 17703 Headline Road (to the northeast of MacLeod III and to the northwest of MacLeod V), which is designated as Salvage Yard District (a salvage yard is currently operating at this property). Areas along Headline Road west of McConnell Avenue are designated as a Rural Settlement Area.

An application for an Official Plan Amendment (OPA) to designate the MacLeod III and V properties as Extractive Resource Lands (Licensed Pit and Quarry) is being submitted to the United Counties of Stormont, Dundas and Glengarry concurrently with this application.

The Constraints Plan, Schedule B4 to the County Official Plan, shows both MacLeod III and V lands as “Extractive Resource Lands (Bedrock Overlay)” except the southern approximately one fifth of the MacLeod III lands. That same portion of MacLeod III generally coincides with an area of the property lying within the “Regulatory Floodline” overlay. Minor changes to the configuration of the floodplain overlay are proposed, based on updated floodplain mapping completed by McIntosh Perry and a proposed cut/fill strategy to be implemented at the Site. Accordingly, the proposed OPA will include an amendment to the Land Use Schedule A4 to redesignate a portion of the “Rural District” lands to “Extractive Resource Lands” to generally follow the revised flood line. A separate submission to re-designate the floodplain is in progress.

In addition, a cut/fill strategy is proposed to revise the floodplain limits to maximize the area of aggregate extraction at the Site, and as such, the Constraints Plan Schedule B4 is proposed to be amended to show the “Regulatory Floodline” following cut and fill activities. Further details are provided in McIntosh Perry’s memorandum regarding the Eastman Drain Floodplain, discussed below.

The large majority of the MacLeod V lands also lies with the “Woodlands” overlay. The area of woodland observed at the time of this submission is shown in the Natural Environment report.

4.1.4 Zoning

The MacLeod III property is zoned “Mineral Extraction, Reserve Special Exception Two (MXR-2).” The special exception provisions prohibit new buildings within 150 metres of lands zoned “Mineral Extraction, Quarry Special Exception One (MXQ-1)”. Part of MacLeod III at the south end next to the Eastman Drain is zoned “Flood Plain (FP).” There is also a small area on the west side of the property that is zoned “Rural (RU)” recognizing the small cemetery noted in the Archaeological study. MacLeod V lands are currently zoned “Mineral Extraction, Reserve (MXR).” Lands surrounding both properties are generally Rural to the south, east and west, and “Agricultural” to the north.

Concurrently with the OPA being sought, a Zoning By-law Amendment (ZBLA) application is being submitted to the Township of South Stormont, to re-zone the subject property to the Mineral Aggregate Extractive – Quarry Special Exception (MXQ-?) zone (the Special Exception number is to be determined). The purpose of the MXQ Zone is to allow for the use of the site for mineral aggregate extraction and related uses, as per the general provisions for MXQ property use in the zoning bylaw, with any special provisions as may be determined necessary for the site.

Considering the sensitive residential uses to the north and south of the proposed quarry, a site specific By-Law amendment is proposed. Considering the sensitive residential uses to the south, and notwithstanding provision to the contrary, the front yard setback for aggregate extraction (note: extraction limits, not property boundary of licensed lands) shall be 110 metres.

4.1.5 Agricultural Classification of Site

The proposed extraction zone consists of the following soil types, as classified by the Canadian Land Use Inventory:

Class 2P – Moderately severe limitations that restrict the range of crops or require special conservation practices. The soils are deep and hold moisture well, and there are moderate limitations on managing and cropping them. Under good management the soils are of moderately high to high in productivity for a fairly wide range of crops (subclass P for stoniness – these soils are sufficiently stony to hinder tillage, planting and harvesting operations)

Class 2W – Moderately severe limitations that restrict the range of crops or require special conservation practices. The soils are deep and hold moisture well, and there are moderate limitations on managing and cropping them. Under good management the soils are of moderately high to high in productivity for a fairly wide range of crops (subclass W for Excess Water – subclass is made up of soils where excess water other than brought about by inundation is a limitation to agricultural use)

Class 5I – Severe limitations that restrict the range of crops or require special conservation practices, or both. The limitations seriously affect one or more of the following practices: timing and ease of tillage, planting and harvesting, choice of crops, and methods of conservation. The soils are low to fair in productivity for a fair range of crops, but may have high productivity for a specially adapted crop. (Subclass I for inundation by lakes and streams – this subclass includes soils subject to inundation causing crop damage or restricting agricultural use)

Class O – Organic Soils

4.1.6 Quality and Quantity of Aggregate on the Site

The investigation of the overburden material at the site showed that the overburden thickness ranges from approximately 0.4 m to 17.6 m on MacLeod III and 8.3 m to 25.4 m on MacLeod V. Overburden material is generally composed of a dense boulder till with a silty sand matrix, ranging to a very dense and compact till with a sandy silt matrix with an intermittent gravel layer between these two units. It is estimated that there is

6.68 million m³ (1,825,650m³ within MacLeod 3, and 4,851,780m³ within MacLeod 5) of overburden material within the proposed extraction areas. This material is suitable for the use as aggregate for construction, concrete production, and other related purposes. Hence, the proponent is applying for both a pit and quarry licence. The maximum amount of aggregate to be removed from the site in any calendar year is not to exceed 3,400,000 tonnes.

4.1.7 Haulage Routes and Truck Traffic

The haul route has been depicted on the Operations Plan. The proposed operations are expected to split traffic approximately equally between the existing northern (Headline Road) and southern (South Branch Road) access and egress points – along Plant Road. These roadways shall be equipped with lockable gates that shall be closed and locked outside of the hours of operations.

4.1.8 Rehabilitation

As part of the Aggregate Resources Act, a Rehabilitation Plan is to be provided with the licence application submission indicating how and when the site is to be rehabilitated. The site will be progressively rehabilitated and the final rehabilitation will be an open pond as noted on the Site Plan included herein.

Progressive rehabilitation will follow the direction of operations. All disturbed areas will be progressively rehabilitated as the resource is depleted and the area is no longer needed for operations (e.g., Phase 1 will be rehabilitated while Phase 2 is operating).

No buildings or structures will remain on the site. All existing buildings and structures erected during the operation will be removed. No internal haul roads will remain on the site.

Final rehabilitation of the extracted quarry will include the formation of the pond. It is anticipated that it will stabilize at an elevation of approximately 58 m ASL.

All above-water disturbed areas will be rehabilitated when the material is depleted and the area is no longer required for extraction. Where possible, natural vegetation will be allowed to take root everywhere around the pond.

4.1.9 Surface Water

A portion of the Eastman Drain, a tributary of the South Raisin River, crosses the southwest portion of the MacLeod III property. While some areas currently draining into this surface water body will drain into the quarry sump as excavation progresses, water from the quarry sump is eventually pumped back into a ditch contributing to the Eastman Drain. Potential impacts on surrounding surface water bodies can be managed to meet the requirements of the municipality, conservation authority and other regulatory agencies.

Following final extraction, as part of the quarry closure, the cessation of pumping may result in a temporary reduction of flows to the surrounding surface water bodies. Grading measures will be undertaken as part of the closure to direct surface water runoff away from the quarry footprint, and towards surface water features. Capping of shallow bedrock seepage faces with lower permeability soils should limit the dewatering of

overburden and shallow bedrock layers, which will contribute to the preservation of the baseflow in surface water features.

No wetland features were identified on the subject property during field visits. It is the understanding of project scientists that wetland features and/or low wet areas in the vicinity of the property are the result of poor drainage and overburden soils of low permeability. Following a review of the overburden soils in the vicinity of the subject property, it was determined that the interaction between wetland features and groundwater in the bedrock unit is expected to be negligible. Since there are currently no on-site wetland features, it was determined that any impacts to off-site wetland features can be prevented by site grading and development controls, as discussed in the site plans.

It is proposed that a cut/fill strategy be completed within the floodplain of the Eastman Drain to allow for floodplain improvements and maximize the amount of aggregate available for extraction, consistent with Provincial policy. Further details are provided in a technical memorandum prepared by McIntosh Perry, the details of which are provided below.

4.1.10 Elevation of Groundwater Table

Field investigations have shown that on the MacLeod III property:

- The groundwater levels vary between 60.57 and 68.11 m ASL in the shallow bedrock unit; and
- The groundwater levels vary between 48.15 and 67.72 m ASL in the deeper bedrock unit.

On the MacLeod V study area, three distinct water bearing features were noted as follows:

- Groundwater elevations in wells completed in the shallow bedrock varies between 44.1 and 71.84 m ASL;
- Groundwater elevations in wells completed in the deep bedrock unit vary between 35.39 and 66.04 m ASL; and
- The groundwater elevation in the overburden was 71.32 m BGS

For the purposes of estimating a stable long-term groundwater table upon full development of MacLeod III, MacLeod V, and existing licensed quarries, and based on site geology, topography, and historical measurements, the long-term average water table elevation at the site is estimated at 58 m ASL.

The site is suitable for both a Category 1, Class "A" pit (below water, >20,000 tonnes/year) and a Category 2, Class "A" quarry (below water, >20,000 tonnes/year) from a hydrogeological perspective, subject to the recommendations of the Hydrogeology Report, provided in subsequent sections.

4.2 Technical Reports

4.2.1 Natural Environment Level 1 & 2 Report

McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) was retained by Cornwall Gravel Company Ltd. (Proponent), to provide services for a licence under the *Aggregate Resources Act (ARA)*. As part of these

services McIntosh Perry has conducted a Level 1 & 2 Natural Environment Assessment (Appendix B) of the property described as part of Lot 6 – Concession 4 (MacLeod III) and Part of Lot 2 – Concession 4 (MacLeod V), Township of Cornwall, United Counties of Stormont, Dundas and Glengarry. As part of these services, McIntosh Perry has conducted a level 1 & 2 Natural Environment Assessment of the subject properties.

In addition to a comprehensive desktop analysis of the study area, McIntosh Perry carried out field assessments on September 13, 2016, and November 1, 2016. The following background information pertaining to the study area was provided by the Ministry of Natural Resources and Forestry (MNRF) – Kemptville District:

Fish and Fish Habitat

Impacts to fish and fish habitat are not anticipated as part of the proposed quarry activities within the MacLeod V property as no fish habitat exists within the parcel or within 120 m of the parcel.

The unnamed drain (a tributary of the Eastman Drain) located in the southwest corner of the MacLeod III property represents fish habitat which supports baitfish species and provides important and exceptional habitat (e.g. spawning and nursery habitat) for these species. It is not anticipated that fish and fish habitat associated with the Eastman Drain will be impacted by the proposed quarry development. Any activity that occurs within 30 m of top of bank must ensure that appropriate erosion and sediment control measures are installed prior to work commencing and maintained until work is completed. Should de-watering activities of the future quarry development discharge water to the Eastman Drain at a different location than is currently approved, it is recommended that impacts to fish and fish habitat be assessed at that time following current legislative requirements. If a new discharge location to the Eastman Drain is considered, it is recommended that provisions be put in place to ensure fish and fish habitat is not impacted by quarry discharge. This may include but is not limited to the use of storm water ponds to attenuate sediment, temperature and water quality.

Cutlip Minnow

At this time it is not anticipated that the Cutlip Minnow will be impacted by the proposed quarry development.

General Recommendations

The area within 30 m of the existing Eastman Drain is currently bordered by a narrow strip of wooded area (5 m on either watercourse bank) with agricultural row crops planted from 5 m to 30 m from the watercourse. Though it is generally recommended that a 30 m setback be maintained from a fish habitat (e.g. the watercourse), as a part of this ARA application, Cornwall Gravel has requested to perform a cut/fill in the flood plain to create a retention pond in order to maximize the amount of aggregate available. It is proposed that the cut area be located within 30 m of the Eastman Drain. Given the long lifespan of this project, impacts to the Eastman Drain and associated fish habitat (e.g. work within 30 m of the watercourse) should be addressed in accordance with all relevant policies and legislation as outlined by DFO prior to construction of the retention pond.

Woodlands

MacLeod III

Based on the findings of the report, no *Significant Woodlands*, rare vegetation species or rare vegetation communities exist within the MacLeod III property or within 120 m of the property at this time. As such, it is not anticipated that proposed quarry activities will negatively impact *Significant Woodlands*, rare vegetation species or rare vegetation communities. Existing woodland communities found within the parcel should be maintained where possible.

MacLeod V

No rare vegetation communities were observed within the MacLeod V parcel. One rare vegetation species, the endangered Butternut, was observed within the parcel and impacts to this endangered species are outlined in subsequent sections. Based on Stormont, Dundas and Glengarry mapping, *Significant Woodlands* exist adjacent to the MacLeod V property. Woodland present within the MacLeod V property represents *Significant Woodland* due to the connection with adjacent woodlands and the function of *Significant Woodlands* within the parcel is to provide supporting function to interior forest habitat within the larger woodland parcel (e.g. interior forest habitat is located to the north and east of the subject property). Clearing of the site has already occurred and based on the site investigations conducted by McIntosh Perry on September 13, 2016 and November 1, 2016 impacts to interior forest habitat (e.g. creation of edge effect) have already occurred.

General Recommendations

It is anticipated that berms will be constructed within the setback areas (e.g. from property boundaries) of the two subject properties (MacLeod III or MacLeod V). These setback areas within the two subject properties should be maintained as areas of native plant communities, where possible. Where transition zones between existing woodlands and cleared areas exist within the setback areas, these locations should be re-planted **or**, given the timeframe of operation, allowed to naturally re-vegetate with native vegetation to provide transitional edge effect between the quarry development and the adjacent woodland feature. The use of native seed mixes is encouraged where seed is used to stabilize exposed soils or re-vegetate setback areas.

Wildlife Habitat

Due to the existing site conditions observed during the September 13, 2016 and November 1, 2016 site visits conducted by McIntosh Perry, it is not anticipated that the proposed quarry development of MacLeod III or MacLeod V will result in significant impacts to wildlife within the parcels.

The migratory bird nesting window for this location is March 15 to August 15 of any year. A screening of the study area is recommended for the presence of migratory birds, or their nests, prior to any disturbance of vegetation (woody and herbaceous vegetation) between April 25 to August 5 of any year, as this period corresponds to the core nesting period for migratory observed within the study area. If breeding birds and/or their nests are encountered, works should not continue in the location of the nest until it has been determined by an avian specialist that the young have fledged and vacated the nest and works area.

Candidate Significant Wildlife Habitat exists for the Eastern Wood-Pewee (special concern) within the MacLeod V parcel. As vegetation clearing has already occurred it is not anticipated that future development of the site would impact this *Candidate Significant Wildlife habitat*. As the natural function of woodlands within the MacLeod V property is to provide support to interior forest habitat (e.g. forest edge habitat) and the Eastern Wood-Pewee is adapted to utilize forest edges and fencerows for nesting, it is unlikely that the Eastern Wood-Pewee or its *Candidate Significant Wildlife Habitat* will be impacted by the proposed MacLeod V quarry at this time. Due to the long lifespan of the proposed quarry, maintaining the outside slope of all noise barriers/berms adjacent to the *Significant Woodland* area (**Figure 3** of the Natural Environment report) as naturally vegetated areas (e.g. through natural succession) would also provide benefit to the Eastern Wood-Pewee and its habitat by providing a “soft” edge effect (e.g. gradual transition between open habitat and woodland habitat) and increased habitat diversity along the woodland edge. If further clearing of woodlands is to occur within the MacLeod V parcel it should be confirmed whether identified *Candidate Significant Wildlife Habitat* for the Eastern Wood-Pewee is occupied by the species prior to vegetation removal and appropriate mitigation measures if required be prescribed and implemented at that time.

Regionally appropriate milkweed species should be included in all seed mixes used to re-vegetate setback areas within the MacLeod III and MacLeod V properties to provide host plants for larval Monarchs.

Wetlands

Revised wetland mapping was done through desktop review and based on existing wetland layers (LIO GIS layers), satellite interpretation and field investigations. Wetland habitat is found within both the MacLeod III (0.22 hectares total) and MacLeod V properties (1.19 hectares total). All existing wetland habitats (based on 2016 field investigations completed by McIntosh Perry) are located within setback areas outlined in the quarry site plans for both MacLeod III and MacLeod V. Additional wetland areas (extension of existing wetland areas found within the parcel) are found to the east of MacLeod V.

A wetland evaluation was not completed for wetlands within the subject lands and it is unlikely that on their own these wetland parcels would score sufficient points in a wetland evaluation (OWES) to be listed as *PSWs*. Land within much of the subject properties (both MacLeod III and MacLeod V) has been recently disturbed. As impacts to wetlands (e.g. impacts within 120 m of wetland boundaries) have already occurred, it is not anticipated that future development of the site as an aggregate extraction site will impact the remaining wetland areas as these wetland areas are located within setback areas from existing property boundaries and other sensitive features.

Species at Risk Habitat

The following section outlines specific concerns and mitigation measures related to Threatened and Endangered species known or suspected to occur within the immediate vicinity of the MacLeod III and MacLeod V study sites.

Eastern Whip-poor-will and Common Nighthawk

The Eastern Whip-poor-will and Common Nighthawk were not observed during targeted field surveys for these species. As such, given the current conditions of the MacLeod III and MacLeod V study sites, it is not anticipated that the proposed quarry development would pose adverse impacts to these species or their habitat at this time. Should these species be encountered within the properties (MacLeod III or MacLeod V) during the quarries long lifespan, impacts to these species and their habitat should be addressed in accordance with all current and relevant policies and legislation as required.

Bobolink and Eastern Meadowlark

The Bobolink and Eastern Meadowlark were not observed during targeted field surveys for these species. As such, given the current conditions of the MacLeod V study sites, it is not anticipated that the proposed quarry development would pose adverse impacts to these species or their habitat at this time. Suitable habitat does exist within the MacLeod III study site for the Eastern Meadowlark however absence of the species at the time of targeted field surveys indicates that this habitat is unoccupied at this time and as such no impacts are anticipated to the Eastern Meadowlark or its habitat as a result of the proposed quarry development. Should these species be encountered within the properties (MacLeod III or MacLeod V) during the quarries' long lifespan, impacts to these species and their habitat should be addressed in accordance with all current and relevant policies and legislation as required.

Butternut

No Butternuts were observed on or within 50 m of the MacLeod III lands. It is not anticipated that development of this site will result in impacts to the species or its habitat.

A notice of butternut impact form under Section 23.7 of O.Reg. 242/08 was submitted to MNRF on July 19, 2017 by Bowfin Environmental and a Confirmation of Registration (**Appendix E** of the Natural Environment report) was received which allows the kill, harm or take of the following ten (10) Category 2 as outlined in **Table 2** of the Natural Environment report: Tree # 2, 3, 7, 8, 9, 10, 11, 13, 15 and 16. The following three (3) trees were also assessed during the June 15, 2017 BHA conducted by Bowfin Environmental Consulting and were found to be Category 1 trees which are not afforded protection under the ESA and its regulations. Based on this, it is not anticipated that development of this site will result in impacts to the species or its habitat.

Species at Risk Bats

It is not anticipated that the proposed extraction will result in adverse impacts to bat hibernacula as habitat found within MacLeod III and MacLeod V does not appear suitable to support the overwintering requirements of at-risk bats. It is not anticipated that the proposed quarry development will result in negative impacts to maternity colony habitat for at-risk bats as the proposed extraction area is mostly devoid of cavity trees at this time. Remaining woodland habitat found within the northern extents of MacLeod III (**Figure 4** of the Natural Environment report) and MacLeod V (**Figure 5** of the Natural Environment report) was found to contain suitable features required by at risk bats during the April 28, 2017 habitat inventory. The extraction area does not require the removal of these treed areas at this time and as such no acoustic monitoring surveys were conducted during the 2017 season. In the event that vegetation alteration or removal be required within these

treed areas targeted acoustic surveys should be conducted prior to any site alteration within these wooded areas (**Figure 4** and **5** of the Natural Environment report) to determine if SAR bats are present within suitable habitat. If present, suitable mitigation measures should be prescribed and all current legislative requirements be followed to ensure impacts to SAR bats are avoided or minimized.

4.2.2 Hydrogeology Level 1 & 2 Study

A Hydrogeological Level 1 and 2 Study (Appendix C) was prepared in support of a Class A, Category 1 and 2 Licence (pit and quarry below the water table, with proposed extraction of over 20,000 tonnes per year) for the properties designated as MacLeod III (immediately to the west of MacLeod II) and MacLeod V (immediately to the east of MacLeod IV).

The purpose of the hydrogeological assessment was to determine the suitability of the site for the proposed aggregate extraction operation, from a hydrogeological perspective. Impacts to surrounding water supply wells, natural features, surface water bodies, and drainage patterns were considered. Mitigation measures for the protection of surface water and groundwater quality were considered based on the findings of the study. The scope of work consisted of a review of available background information, including hydrogeological assessments completed for previous licence areas, followed by the drilling, monitoring, and hydraulic conductivity testing of monitoring wells on the proposed MacLeod III and V properties. Results of previous assessments and ongoing groundwater monitoring activities at the subject site were incorporated into the conclusions of the report.

The majority of surrounding water supply wells in the area are completed in the upper fractured bedrock, which is considered hydraulically connected to the lower glacial till (previous reports refer to the shallow bedrock aquifer as the overburden interface aquifer). Monitoring wells were completed in the shallow bedrock aquifer, the deep bedrock aquifer (intended to represent the full proposed extraction depth of the quarry), and in the gravel layer, where encountered. Pumping tests were completed at one location on MacLeod III and one location on MacLeod V. Hydrogeological testing results indicated that the influence of pumping from wells completed in the deep bedrock aquifer will have a minimal effect on wells completed in the shallow bedrock aquifer.

Although the development of the quarry will affect drainage patterns on the subject site, proposed developmental controls and ongoing pumping from the quarry sump to surrounding drainage ditches will ensure that no significant impacts to surrounding surface water bodies occur. Based on observations from the existing quarry face, the shallow bedrock aquifer is being recharged on a localized scale from a drainage ditch into which water pumped from the quarry sump is being discharged. On a larger scale, recharge to the shallow bedrock aquifer is interpreted to occur in upland areas, and the low-permeability overburden deposits on the site are interpreted to limit localized recharge in areas of thicker overburden. Following quarry extraction, site grading and the capping of seepage faces with lower permeability soils will serve to preserve baseflow in surrounding surface water features and recharge into the shallow bedrock aquifer unit.

The hydrogeological study concluded that the site is suitable for the proposed development, as long as it is developed under the terms and conditions of the Site Plans as approved by the MNRF. Recommendations for

semi-annual monitoring of on-site wells, the development of an off-site monitoring program, site operations, and contingency measures as summarized in the report will be reflected on the site plans.

4.2.3 Stage 1 Archaeological Assessment

A Stage 1 Archaeological Assessment of the MacLeod V study area (Appendix E) was conducted by Past Recovery Archaeological Services in the fall of 2016. The purpose of this report was to evaluate the archaeological potential of the study area, and present recommendations for the mitigation of any significant known or potential archaeological resources. Historical, environmental and archaeological research was conducted in order to make a determination of this potential. A Stage 1 report had been completed in February 2000 on the MacLeod III property. The findings of this report are also detailed below.

The Stage 1 Archaeological Assessment of MacLeod V comprised of a study area totalling 38.92 hectares. The study area does not exhibit characteristics that indicate potential for the presence of archaeological resources associated with pre- and post-Contact First Nations settlement and/or land uses. There are no topographic or physiological features, waterbodies or favourable soil deposits on or adjacent to the property that would trigger a determination of First Nations archaeological potential.

The study area also does not indicate the potential for the presence of archaeological resources associated with Euro-Canadian settlement and/or land uses. The only road in the vicinity adjacent to the north half of Lot 2 was not opened until the twentieth century, and all of the historic farm buildings were concentrated at the south end of the lot. There also does not appear to be historic quarrying or other industrial activity at the area.

The results of the Stage 1 Archaeological Assessment conducted on the MacLeod V study area indicate that there is no potential for the presence of significant archaeological resources within the study area, and therefore no further archaeological assessment is required.

The previously conducted Stage 1 Archaeological Assessment completed on MacLeod III (Appendix D) found that the proposed quarry site was first settled in the 1780s. While the property was cleared for agriculture with initial settlement and is still farmed at present, two significant historical developments occurred on the east half of Lot 6. The first of these was the establishment of a small graveyard in the late 18th century. It was noted in the report that this graveyard has not been officially surveyed, and only two formal headstones, as well as 18 small fieldstone markers remain, with no record of the number of burials interred in the cemetery, nor is it known the dates for either the first or last burial.

As a component of the topographical and legal survey of the Site and the preparation of Site Plans, a survey of the graveyard was undertaken by McIntosh Perry Surveying Inc. The limits of the graveyard are shown on the Site Plan, and a 15 m setback has been applied from the surveyed limits of the graveyard.

The MacLeod III study area contains a second historical development, namely the 19th century quarrying for building stone. It was noted that there is no indication of in situ machinery from these historic operations, and that it was therefore unlikely that any further investigation would yield meaningful insight into the nature of these operations.

4.2.4 Noise Assessment Report

A Noise Impact Study was prepared for McIntosh Perry Consulting Engineers, by D. Flake, P.Eng. of Aeroustics Engineering Ltd (Appendix E). This report identifies operations associated with the proposed quarry including excavation, rock drilling, aggregate haulage/shipping, and processing with a portable processing plant (crushing, screening and washing) that possess acoustical significance. An annual tonnage limit of 3,400,000 tonnes is proposed.

The report identifies thirty-eight (38) noise sensitive receptors in the area surrounding the study area. Points of noise reception were found to be located in acoustical environments consistent with either the Class 2 (Urban) designations or Class 3 (Rural) designation, as defined by MOECC Publication NPC-300. In Class 2 areas, the background sound levels during the day are primarily defined by man-made sources, whereas in the nighttime periods, dominant sounds are natural in occurrence. In Class 3 areas, the prevailing acoustical environment is one dominated by natural sounds, with little to no man made sound. Using the locations of these receptors, and their designations, a series of sound level limits were developed and summarized throughout the Report.

A noise prediction model was generated. The basis of this model was a design case where the quarry was running at full capacity with all equipment operating simultaneously and at locations where noise impact would prove highest for each receptor. The noise prediction model assumes a worst case scenario for the allowable equipment, including existing topography under downwind propagation, with hard ground in the quarry and soft ground conditions near the points of reception. The noise impact of the operation was predicted; where the MOECC sound level limits were calculated to be exceeded, noise control measures were modelled and the noise impact recalculated. This process was repeated until the sound level limits were satisfied.

With the incorporation of the recommended noise controls, the predicted noise impact will satisfy the MOECC sound level limits.

4.2.5 Blast Impact Assessment

Blast Impact Assessments were prepared for McIntosh Perry Consulting Engineers, by R. Cyr (P.Eng.) and M. Morling of Explotech Engineering Ltd (Appendix F). The purpose of these studies (MacLeod III and V were prepared separately) was to provide an assessment of the potential effects of the sound waves (overpressure) and ground vibration that will be produced by the proposed quarry's blasting operations on nearby receptors.

Overpressure and vibration due to blasting has been evaluated on the basis of the Ontario Ministry of the Environment and Climate Change (MOECC) Model Municipal Noise Control By-law (NPC-119) with regard to Guidelines for Blasting in Mines and Quarries. The impact of sound and vibration from blasting can be successfully controlled by optimizing the blast design parameters. Specifically, this is done by controlling the maximum allowable weight of charge per minimum delay period within specific setback distances.

Overpressure and vibration sound level limits, based on the MOECC guidelines were determined. The limits suggested by the MOECC are 12.5 mm/sec peak particle velocity (PPV) for vibration, and 128 dB peak sound pressure level (PSPL) for overpressure. Calculations were then carried out to determine that blasting operations

can be performed throughout the property while maintaining compliance with the MOECC guidelines. The acceptable setback distances corresponding to maximum allowable charge weights per delay for various distances to receptors were provided.

4.2.6 Traffic Impact Study

A Traffic Impact Study (Appendix G) was commissioned to determine the traffic-related impacts of the proposed Pit/Quarry located at 17631 South Branch Road, 6.5 km north of downtown Cornwall, Ontario. Analysis of the surrounding road network was completed for the following scenarios:

- 2016 Existing Conditions,
- 2021 5-Year Horizon Conditions (Background and Total Traffic),
- 2026 10-Year Horizon Conditions (Background and Total Traffic).

The results of this analysis indicates that the network is anticipated to operate at acceptable levels of service, however capacity and delay deficiencies are expected to occur at the east and westbound approach at the intersection of Headline Rd & Hwy 138 during the peak hours for both the 2021 and 2026 horizon years.

Deficiencies were observed under background as well as total traffic conditions, suggesting that poor levels of service will occur in the horizon years regardless of site generated traffic. Intersection performance is expected to improve with the proposed upgrades presented in the 2016 Highway 138 Study completed by Stantec Consulting Ltd. in conjunction with the MTO. As such, McIntosh Perry recommends that traffic volumes and performance at the intersection of Headline Rd. & Hwy 138 be monitored in the future and that consideration continue be given to upgrades.

The existing site accesses are both anticipated to operate at high levels of service for all conditions through to the 10-year horizon year 2026. Similarly, both signalized intersections in proximity to the subject site are anticipated to operate at overall acceptable levels of service under anticipated total future traffic conditions. Left-turn and signalization warrants were considered for the site entrances and it has been determined that neither are warranted. As such, no roadway modifications are recommended as a result of the proposed quarry expansion.

4.2.7 Floodplain Memorandum

McIntosh Perry has been retained by the Cornwall Gravel Company Limited to review and confirm the floodplain limit north of South Branch Road in the Township of South Stormont, County of Stormont, Dundas and Glengarry. This work was undertaken in support of a Licence application under the Aggregate Resources Act for a part of Lot 6, Concession 4, referred to as the MacLeod III property. The existing floodplain elevations developed in the 1980s by Crysler & Lathem Ltd. in this immediate area appeared to extend a significant distance from the watercourse, which based on the Owner's previous knowledge of the site, appeared to be conservative. A reduction in the floodplain elevation would provide the potential to expand their current application's extraction boundary south towards South Branch Road, providing an opportunity for additional resource material.

McIntosh Perry's memorandum consisted of a review of existing floodplain modelling and the modification of the HEC-RAS model for the Eastman Drain in the vicinity of the Site, as provided by the Raisin River Conservation Authority. Based on the results of the modelling, the 100-year floodplain elevation was calculated as 57.92 m, revised from the regulatory flood limit of 58.22 m.

It is proposed that a cut/fill strategy be undertaken at the south end of the MacLeod III property to move the limits of the floodplain for the purpose of maximizing aggregate extraction area. The details of the proposed cut/fill and associated stormwater management measures within the floodplain are shown on the Site Plans.

4.2.8 Qualifications/Experience:

Applicant:

Cornwall Gravel Co. Ltd.
390 Eleventh St.
West Cornwall, ON K6J 3B2

Technical Specialists:

Application and Summary Report

Mark Priddle, P.Geo., Senior Hydrogeologist
Vice-President, Sustainable Communities
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road
R.R. 3 Carp, ON K0A 1L0
Tel.: (613) 836-2184 ext. 2236 Fax: (613)836-3742

Ontario Land Surveyor

Brian Kerr, O.L.S., C.L.S., OLIP
McIntosh Perry Surveying Inc.
3240 Drummond Concession 5A
R.R. 7 Perth, ON K7H 3C9
Tel: (613) 267-6524, ext. 203 Fax: (613) 267-7992

Natural Environment Evaluation:

Matthew Wheeler, B.A. Hons, Ecologist
McIntosh Perry Consulting Engineers Ltd.
3240 Drummond Concession 5A,
R.R. 7 Perth, ON K7H 3C9
Tel: (613) 267-6524, ext. 211 Fax: (613) 267-7992

Hydrogeological Evaluation

Mark Priddle, P.Ge., Senior Hydrogeologist,
Vice-President, Sustainable Communities
McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road
R.R. 3 Carp, ON K0A 1L0
Tel.: (613) 836-2184 ext. 2236 Fax: (613)836-3742

Archaeological Assessment

Stage I and II (MacLeod III)

Brenda Kennett – Associate Archaeologist
Heritage Quest Inc. (Now Golder Associates)

Stage I (MacLeod V)

Adam Pollock
Staff Archaeologist
Past Recovery Archaeological Services Inc.
4534 Bolingbroke Road
R.R. #3, Maberly, Ontario K0h 2B0
Tel.: (613) 267-7028

Noise Impact Study:

Derek Flake, M.Sc., P.Eng.
Aeroustics Engineering Ltd.
50 Ronson Drive, Suite 165
Toronto, ON M9W 1B3
Tel.: (416) 249-3361 Fax: (416) 249-3613

Blast Impact Assessment:

Robert Cyr, P.Eng.
Explotech Engineering Ltd.
58 Antares Drive
Nepean, ON K2E 7W6
Tel.: (613) 723-2494

Traffic Operations Study:

Thomas Gryz, P.Eng., Transportation Engineer
 McIntosh Perry Consulting Engineers Ltd.
 115 Walgreen Road
 R.R. 3 Carp, ON K0A 1L0
 Tel.: (613) 836-2184 ext. 2222 Fax: (613)836-3742

4.3 Other Information

4.3.1 Adjacent Properties

Properties located within 120m (393.7') of the proposed permit boundary must be circulated in accordance with the Aggregate Resources of Ontario, Provincial Standards, Version 1.0 - Section 4.1 Notification.

There are thirty (30) assessed properties within 120 m of the MacLeod III and V permit boundaries, not including the MacLeod I, II, and IV properties. The following table lists the assessed owners and their addresses. This information was obtained from Land Registry Office # 4.

Property Owner	Mailing Address
Mark Anthony Amell, Kimberly Jayne Amell	3434 Patrick, Monkland ON K0C 1V0
Herman Joseph Jarvo Johane Anne Mona Clarisse Jarvo	5696 Richmond Drive, Long Sault ON, K0C 1P0
Charles William Robert Branchaud Laurie Ann Kathleen Branchaud	17723 Headline Road, Cornwall ON, K0C 1P0
MacLeod Towing	17681 Headline Road Long Sault ON, K0C 1P0
David Cameron Ferguson	17845A South Branch Road Cornwall, ON K6H 0C8
Christopher Jennings Holly Jennings	17764 Country Road 44 Cornwall, ON K0C 1P0
Marlene Pettinella Tony Pettinella	1123 Paul Street, Cornwall, ON K6H 4E2
Thomas Dunne Lia Eliashvili	17840 Country Road 44, Long Sault, ON K0C 1P0
Tracey Martel	17850 Country Road 44, Long Sault, ON K0C 1P0
Andrea-Ray Ladouceur	5515 McConnell Avenue Cornwall, ON K6H 5R6
Joseph Gerald Daniel Lacroix Marie Suzanne Yvonne Lacroix	17589 Headline Road, Long Sault ON, K0C 1P0
K. Maxwell Irwin Patricia Irwin Heather Elizabeth Irwin	17547 Headline Road – Unit B Long Sault ON, K0C 1P0
Occupant	17769 Headline Road, Long Sault ON, K0C 1P0

Property Owner	Mailing Address
Occupant	17751 Headline Road Long Sault ON, K0C 1P0
Occupant	17735 Headline Road Long Sault ON, K0C 1P0
Muriel Maloney Nancy Maloney	5661 McConnell Avenue, RR#2 Cornwall, ON K6H 5R6
Marc Robert Fortier Debra-Anne Theresa Ferguson	5575 McConnell Avenue, Cornwall ON, K6H 5R5
Kirsten Alexa Lalonde	APT 4 - 62 Dickeson Road, Ingleside ON, K0C 1M0
Kirsten Alexa Lalonde Timothy Kevin Lalonde	5555 Country Road 42, Long Sault ON, K0C 1P0
Diane Rita Theoret Gilled Edouard Theoret	17550 Headline Road East, Cornwall, ON K0C 1P0
Darran Cowan Susan Lemaire	5525 McConnell St., Long Sault ON, K0C 1P0
Cain Douglas Cameron Donna Lee Cameron	RR#2, PO BOX 1273 Cornwall, ON K6H 5V3
Donna Lee Cameron Paige Serge Robert Dupuis	5537 County Road 42, Long Sault ON K0C 1P0
Chris Cameron Debbie Cameron	1747 St. Catherine Road, Russell ON, K4R 1E5
Francois Chartrand Christine Chartrand	1105 Lasalle Road, Cornwall, ON K6H 2W2
574941 Ontario Inc.	3250 McConnell Avenue Cornwall, ON K6H 5R6
Summer Heights Golf Links Ltd.	1160 S Branch Rd, Cornwall, ON K6H 5R6
Jamie Albert Clark	17555 South Branch Road, Cornwall, ON K6H 5R6
Riel Pilon Suzanne Pilon	17830 Country Road 44 Long Sault ON, K0C 1P0
Newell Brown Eleanor Brown	17751 South Branch Road, Cornwall ON, K6H 5R6

4.4 Recommendations

4.4.1 General Recommendations

The contractor shall perform regular site inspections of the pit and quarry to ensure that immediate action is taken to correct any deficiencies, malfunctions or accidents. A log will be kept to record any actions taken to correct and eliminate deficiencies, malfunctions or accidents.

If, through regular monitoring, it is discovered that sediment is traveling off site, silt fences and straw bale check dams will be employed.

The applicant shall be proactive in ensuring there are no negative impacts on wells in the vicinity of the property. The applicant shall develop an action plan to deal with problems should they arise, including investigating complaints and implementing appropriate testing and mitigation measures at their own cost.

4.4.2 Natural Environment Level 1 & 2 Recommendations

The Natural Environment Level 1 and 2 report makes the following recommendations for the proposed quarry expansion:

- All setback areas and berms should be allowed to naturally regenerate with vegetation where possible;
- No further removal of existing *Significant Woodlands* or wetland areas should occur. If further removal of woody vegetation from *Significant Woodlands* or removal of wetland areas be required, an additional impact assessment should be completed to demonstrate the work will not impact the feature **OR** that sufficient mitigation can be implemented to prevent adverse impacts to the natural function of the feature;
- Acoustic surveys must be completed prior to vegetation removal within remaining wooded areas (**Figure 4** and **5** of the Natural Environment report) prior any site alteration within the treed areas to determine if species at risk bats are present within suitable habitat;
- Given the long time frame of quarry development, legislative requirements pertaining to species at risk and their habitat must be adhered to through the lifespan of the quarry;
- Should de-watering activities of the future quarry development discharge water to the Eastman Drain at a different location than is currently approved, it is recommended that impacts to fish and fish habitat be assessed at that time following current legislative requirements, and
- Any activity that occurs within 30 m of top of bank must ensure that appropriate erosion and sediment control

4.4.3 Hydrogeology Study Level 1 & 2 Recommendations

The hydrogeological assessment makes the following recommendations for the mitigation of potential impacts at the proposed quarry expansion.

Well Inventory

It is our understanding that the MacLeod III and V properties will not be developed for a significant period of time. Prior to proposed extraction in these areas, it is recommended that a well inventory update for any water wells within 200 m of the proposed excavation limits. The well inventory update should include a site visit to meet with the well owners to identify any historical issues and confirm well construction details, as well as the collection of at least one baseline water quality sample.

Groundwater Monitoring

In addition to the existing on-site monitoring network, the current investigation has added several monitoring wells to the on-site monitoring network. It is recommended that ongoing monitoring of existing wells continue as per the current program, and that the new wells be added to the monitoring program. Water levels are currently measured at on-site monitoring wells twice yearly, in May and August, as a condition of the Permit To Take Water (PTTW) for the site and to assess the effects of quarry operations on surrounding groundwater conditions. Regular review of monitoring data is a component of the trigger mechanism identified below.

Trigger Mechanism

The current trigger mechanism for action regarding well-related complaints at MacLeod I will be retained as extraction progresses to MacLeod III and V. The trigger mechanism is outlined below.

Impact Predicted from Monitoring Data

Monitoring data from the above-noted annual groundwater monitoring events will be reviewed on an annual basis by a qualified professional. The purpose of the analysis will be to evaluate ongoing impacts and predict anticipated problems. For instance, if consistent water level lowering is observed at an on-site well completed in the shallow bedrock unit, special attention will be given to the potential for drawdown effects at nearby domestic wells completed in the same unit.

Unexpected Well Issues

An emergency response program is proposed for well issues within an area within 500 m of the property boundary. If an unexpected well issue is reported within this radius, an accelerated remedial program will be triggered. Cornwall Gravel or any other designated operator of the quarry, upon receipt of notification of a well issue, either by the owner, MNRF, or MOECC, will:

- Within 500 m of the site, provide an interim potable water supply within 24 hours and notify MOECC of the complaint.
- Within 1 km of the site, notify MOECC of the complaint.
- Retain a qualified professional at the operator's expense to conduct a site investigation, determine the cause, and within 30 days provide a report with recommendations on the best way to remediate the well issue.

Contingency Plan

It is recommended that a contingency plan be implemented in the event of actual or potential adverse effects as a result of quarry operations. If, upon review of annual monitoring data, off-site impacts are forecasted, quarry operations will be reviewed and modified as necessary to prevent the anticipated problem from occurring.

If a water well complaint is received, and the subsequent investigation by a qualified professional determines that quarry operations are responsible, the quarry operator will be responsible for restoring the water supply to its original condition at the operator's expense.

Protection of Water Quality

Various quarry operational procedures have the potential to impact the water quality in the quarry sump, and correspondingly, water quality in the discharge ditch and shallow bedrock and overburden aquifers. It is our understanding that equipment maintenance, fuelling, and repair, as well as the operation of an asphalt plant, will continue to occur on the subject site, either in the MacLeod III or V footprints or more likely in their existing locations within the MacLeod I footprint.

The first and most important step to ensuring the protection of water quality will be through the management of operations and equipment in accordance with industry standards and best practices, as well as legislative requirements. Wherever possible, equipment or operations with the potential to result in impacts, such as the asphalt plant, fuelling areas, or materials storage, will be situated on natural or constructed impervious platforms, with secondary containment. Regulatory requirements of the Technical Standards and Safety Authority (TSSA) will be adhered to as part of operational practice. A minimum 30 m separation will be maintained between the asphalt plant and any surface water source, including the quarry sump, settling pond(s), and/or the culvert/ditch system used for quarry discharge.

Emergency Spills Procedure

An emergency spills procedure, with emergency employee contact information, is currently in place for the site. The site manager is trained in the emergency spills procedure.

All unexplained losses of fuel or other contaminants will be immediately reported to the main office of Cornwall Gravel, which will be responsible for completing any required cleanup. A quantity of appropriate cleanup material, such as absorbent mats and granular absorbent material, is kept on-site at all times. If a spill occurs, action will immediately be taken to contain and absorb any spilled material.

Water Conservation Measures

While dewatering is necessary for quarry operation, the following best management practices (as proposed by the Ontario Stone, Sand, and Gravel Association) will be followed at the site to the extent possible:

- Conduct hydrogeological and hydrological investigations to a sufficient level of detail to evaluate the impacts of dewatering, identify the sensitive receptors and provide a satisfactory monitoring plan, trigger mechanism and contingency plan
- Make the best effort to return discharged water to its source
- Ensure that equipment is functioning efficiently (i.e. crushers, wash plants, etc.) to minimize water use in processing
- Reuse process water where possible (i.e. closed-loop systems)
- Ensure that natural water quality is restored as closely as possible to receiver before discharging
- Only remove water from the excavation as required for operations

Detailed information on all mitigation measures proposed for the quarry are contained in the Site Plans, appended to this report.

The hydrogeological assessment shows that a pit/quarry can be developed under the following conditions:

- It is developed, operated, and rehabilitated as per site plans (Figure 8).
- An appropriate separation exists between the extraction area and permanent water bodies, based on floodplain mapping.
- No consumptive water taking or transfer occurs without a valid Permit to Take Water.

McIntosh Perry has made the following recommendations to ensure ongoing compliance should the site be developed:

- Semi-annual water level monitoring should continue on-site in all accessible monitoring well locations.
- Discharge from the quarry sump should continue to be directed to the Eastman Drain, in compliance with the terms of the PTTW.
- Re-evaluation of the surrounding domestic water supply well network within 200 m of the extraction boundary should be completed prior to extraction beginning at MacLeod III and MacLeod V, with a door-to-door domestic water well survey completed at all wells within this radius.

In order to protect groundwater:

- There will be no storage of liquid fuels at the site within 30 m of a water body.
- Mobile equipment will be serviced off-site or in designated shop areas on-site. No servicing of mobile equipment will occur in the extraction area, where practical.
- All petroleum waste liquids generated on-site will be collected and transported off-site by a licensed liquid waste transportation and disposal contractor.
- The immediate reporting of any fuel and lubricant spills to the Ministry of the Environment and Climate Change is mandatory.

The well monitoring data are to be reviewed as per conditions in the PTTW for the site by a qualified professional (P.Geo. or P.Eng.) to assess possible impacts to the groundwater/surface water regime. Water

supply and/or monitoring wells within the extraction area are to be abandoned as per O.Reg. 903 when extraction at the water table occurs within 15 m of them, or they otherwise interfere with aggregate extraction.

4.4.4 Stage 1 and 2 Archaeological Assessment Recommendations

MacLeod III Stage 1:

A Stage 1 & 2 Archaeological Assessment was conducted by Heritage Quest Inc., dated October 27, 2000. The recommendations of this study are as follows:

- No further archaeological assessment of other areas of the properties is required.
- The Cameron Cemetery, as defined in the present study, should be preserved from any disturbance. In addition, public access to the cemetery from either South Branch Road or Headline Road should be maintained. As the Township of South Stormont is responsible for maintaining the cemetery, they should be consulted concerning appropriate access to the cemetery.
- Should deeply buried archaeological remains be found on the property during soil stripping, the Ministry of Citizenship, Culture and Recreation (now known as the Ministry of Tourism, Culture and Sport) should be notified immediately.

MacLeod V Stage 1:

The results of the background research discussed in the report indicate that none of the study are exhibits potential for the presence of significant archaeological resources. Accordingly, it was recommended that:

- No further archaeological assessment of the study area as defined within the report is required. As a result, clearance of the archaeological conditions placed on the property was requested.

Both of the above reports including their recommendations have been entered into the Ontario Public Register of Archaeological Reports

4.4.5 Noise Impact Studies Recommendations

The recommended noise controls presented in the report have been determined through noise impact predictions to be effective in controlling the noise generated by the aggregate quarry activity, satisfying the MOECC sound level limits. It should be noted that there may be other effective noise controls that could replace or revise some of the recommended controls of this report. Prior to implementing any changes to the noise controls, appropriate studies should be undertaken to demonstrate that the MOECC sound level limits will be satisfied.

An acoustic barrier is required to be solid, with no gaps or openings, and shall satisfy a minimum area density of 20 kg/m².

The Aercoustics report shows the predictive models used for the noise assessment of the MacLeod quarry properties, as well as proposed timing and implementation of noise controls, which have been incorporated into the Site Plans. In particular, the top-of-berm elevations recommended by the noise report have been

incorporated into the berms shown on the site plans. It is noted that the berm referred to in the noise report as Berm H, which is required in the final phase of the MacLeod III quarry, is proposed on the eastern perimeter of the MacLeod II lands. It is understood that that proposed amendments to the MacLeod II licence are being submitted concurrently with the subject application, and that the Berm H requirements will be included in the MacLeod II amendments.

General Recommendations

The following bulleted list presents a comprehensive summary of the recommended noise controls for both the MacLeod III and V properties, as they appear on the Site Plans:

- The hours of operation shall be as follows:
 - Loading and Transport Only (to MacLeod I): 07:00 to 07:00 (24 hours), Monday to Sunday
 - Full Operation – Extraction, Processing, Rock Drilling, Loading and Transport: 07:00 to 19:00, Monday to Sunday
- The extraction, processing and transport equipment operating simultaneously in both the MacLeod 3 and MacLeod 5 quarries shall be limited to:
 - One (1) Portable Processing Plant
 - One (1) Portable Asphalt Plant
 - One (1) Rock Drill
 - Two (2) Extraction Loaders
 - Two (2) Shipment/Asphalt Plant Loaders
 - 20 Off-road truck trips/hour (40 passes/hour)
- The aggregate quarry equipment shall satisfy the noise emission levels listed below:

Equipment	Reference Sound Pressure Level at 30 m (dBA)
Portable Processing Plant (crushing, screening and washing)	85
Portable Asphalt Plant	73
Rock Drill	79
Extraction Loader	74
Shipment or Asphalt Plant Loader	70 ¹
Off-Road Truck	75

1 – The shipment loaders were assumed to operate at a 50% duty cycle.

- The sound emissions of all construction equipment involved in site preparation and rehabilitation activities shall comply with the sound level limits specified in MOECC publication NPC-115 “Construction Equipment”.
- New equipment technology or different configurations may allow proposed changes to any portion of the extraction and processing operations including additional equipment to operate on the site, equipment to be substituted, and/or different berm heights, while still meeting the applicable sound

level limits. Changes may be permitted to the site operations and noise controls provided that the changes still meet the sound level limits, as confirmed through documentation prepared by a Professional Engineer specializing in noise control. Prior to any modification, notification shall be given to the MNRF.

- The quarry floor shall have an elevation of 52 m ASL or lower
- The phasing order and direction of extraction shall be as indicated on the drawings/Site Plans.

MacLeod III

The following list presents a comprehensive summary of the recommended noise controls specific to the MacLeod III property, as they appear on the Site Plans:

- Perimeter berms shall be constructed as indicated on the Site Plans. The minimum required top-of-berm elevations are specified. Berm E shall be constructed prior to Phase 2a. Berm F, Berm G, and Berm H shall be constructed prior to Phase 2b. Once constructed, the berms shall remain in place for the project lifetime.
- Operation of the portable asphalt plant in the MacLeod 3 lands above an elevation of 30 m ASL is prohibited.
- The first bench working face shall have a minimum height of 15 m from the quarry floor. During the first lift, all equipment (with the exception of the rock drill) shall remain on the quarry floor within 60 m of the working face.
- During the first lift of operations within Phase 2a, the portable processing plant shall not operate when the rock drill is operating within 200 m of the north extraction limit.
- During the first lift of operations within Phase 2b, the portable processing plant shall not operate when the rock drill is operating within 450 m of the south extraction limit.
- During the first lift of operations within Phase 2b, the portable processing plant shall not operate within 450 m of the south extraction limit. Once the working face has progressed 60 m past where the plant may operate, a local acoustic barrier with a minimum height of 8 m shall be located between the processing equipment and receptors R33 to R36 (residential dwellings along the north side of South Branch Road), and be within 60 m of the plant equipment. This local acoustic barrier requirement may be satisfied with stockpiles maintaining the minimum height requirement.

MacLeod V

The following list presents a comprehensive summary of the recommended noise controls specific to the MacLeod V property, as they appear on the Site Plans:

- Perimeter berms shall be constructed as indicated on the Site Plans. The minimum required top-of-berm elevations are specified. Berm C shall be constructed prior to extraction in Phase 1. Berms A and B shall be constructed prior to Phase 2. Once constructed, the berms shall remain in place for the project lifetime.
- During the first lift, the portable asphalt plant shall not operate within 300 m of the north extraction limit.
- The first bench working face shall have a minimum height of 12 m from the quarry floor. During the first lift, all equipment (with the exception of the rock drill) shall remain on the quarry floor within 80 m of the working face.
- During the first lift, the portable processing plant shall not operate when the rock drill is operating within 200 m of the north extraction limit.

4.4.6 Blast Impact Assessment Recommendations

The site plans outline the phases of extraction along with the sequence and direction of operations in each phase. In the case of MacLeod III, the blasting will occur with the working face moving westward from MacLeod II, then north and south from the central portion of the site. In the case of MacLeod V, the blasting will occur with the working face moving eastward from MacLeod IV, and then north towards Headline Road. Earth berms for acoustical and visual screening are proposed along the exterior boundaries of the site. The elevations of these berms are shown on the Site Plans and are developed in accordance with the recommendations of the Noise Report. It is expected that these berms will reduce the impact of the overpressure on surrounding receptors.

The following list of conditions was compiled by Explotech regarding any blasting operations at the proposed Cornwall Gravel MacLeod III/V Quarry new licence application areas:

- All blasts shall be monitored for both vibration and overpressure at the closest privately owned sensitive receptors adjacent to the site, or closer, with a minimum of two (2) seismographs – one installed in front of the blast and one behind. Monitoring shall be performed by a competent, accredited individual with specialized training in blasting and monitoring.
- Orientation of the mineral extraction operation will be designed and maintained to that the direction of the overpressure propagation and flyrock from the face will be away from structures as much as possible
- Blast designs shall be continually reviewed with respect to fragmentation, ground vibration and overpressure. Blast designs shall be modified as required to ensure compliance with applicable guidelines and regulations. Decking, reduced hole diameters and sequential blasting techniques will be used to ensure minimal explosives per delay period initiated.

- Once blasting progress reaches 250 m separation distances from any offsite structure or residence, accumulated blast data and designs shall be reviewed by a qualified blast consultant prior to proceeding close in order to ensure suitable parameters are employed.
- All blasts shall be designed to ensure compliance with NPC-119 limits for ground vibrations (12.5mm/s) and overpressure (128dBL).
- Clear crushed stone shall be used for stemming
- Blasting procedures such as drilling and loading shall be reviewed on a yearly basis and modified as required to ensure compliance with industry standards.
- Detailed blast records shall be maintained as per the recommendations of the MOE (1985), providing at a minimum the following information:
 - Location, date and time of the blast
 - Dimensional sketch including photographs, if necessary, or the locations of the blasting operation and the nearest point of reception.
 - Physical and topographical description of the ground between the source and the receptor location
 - Type of material being blasted
 - Sub-soil conditions, if known.
 - Prevailing meteorological conditions, including wind speed in m/s, wind direction, air temperature in °C, relative humidity, degree of cloud cover and ground moisture content.
 - Number of drill holes.
 - Pattern and pitch of drill holes.
 - Size of holes.
 - Depth of drilling
 - Depth of collar (or stemming)
 - Depth of toe-load.
 - Weight of charge per delay.
 - Number and time of delays.
 - The result and calculated value of Peak Pressure Level in dB and Peak Particle Velocity in mm/s.
 - Applicable limits.
 - The excess if any, over the prescribed limit.

It was concluded that the blasting operations at the proposed Cornwall Gravel MacLeod Quarries can be carried out safely and well within governing guidelines set by the MOECC. Modern blasting techniques will permit blasting to take place with explosives charges below allowable charge weights ensuring that blast vibrations and overpressure will remain minimal at the nearest receptors.

4.4.7 Traffic Impact Study Recommendations

In completing this traffic impact study for the proposed pit/quarry operations at 17631 South Branch Road in the geographic Township of Cornwall, analysis of the surrounding road network was completed for the following scenarios:

- 2016 Existing Conditions,
- 2021 5-Year Horizon Conditions (Background and Total Traffic),
- 2026 10-Year Horizon Conditions (Background and Total Traffic).

The results of this analysis indicates that the network is anticipated to operate at acceptable levels of service, however capacity and delay deficiencies are expected to occur at the east and westbound approach at the intersection of Headline Rd & Hwy 138 during the peak hours for both the 2021 and 2026 horizon years.

Deficiencies were observed under background as well as total traffic conditions, suggesting that poor levels of service will occur in the horizon years regardless of site generated traffic. Intersection performance is expected to improve with the proposed upgrades presented in the 2016 Highway 138 Study completed by Stantec Consulting Ltd. in conjunction with the MTO. As such, McIntosh Perry recommends that traffic volumes and performance at the intersection of Headline Rd. & Hwy 138 be monitored in the future and that consideration continue be given to upgrades.

The existing site accesses are both anticipated to operate at high levels of service for all conditions through to the 10-year horizon year 2026. Similarly, both signalized intersections in proximity to the subject site are anticipated to operate at overall acceptable levels of service under anticipated total future traffic conditions. Left-turn and signalization warrants were considered for the site entrances and it has been determined that neither are warranted. As such, no roadway modifications are recommended as a result of the proposed quarry expansion. Left-turn and signalization warrants were considered for the site entrances and it has been determined that neither are warranted. As such, no roadway modifications are recommended as a result of the proposed quarry expansion.

5.0 CONCLUSION

Utilization of this site is considered to be wise management of a natural resource. The material will be used for construction projects in the vicinity of the subject property. The lands will be returned to a modified natural state. We therefore conclude that the cumulative impacts of this operation are minimal.

6.0 PRESCRIBED CONDITIONS THAT APPLY TO CATEGORY 1 AND 2 LICENCES

This permit is subject to conditions pursuant to Aggregate Resources of Ontario, Provincial Standards, Version 1.0 - Category 1 Class "A" Pit below Water and Category 2 Class "A" Quarry below Water.

7.0 NOTIFICATION AND CONSULTATION STANDARDS FOR CATEGORY 1 AND 2 LICENCES

Pursuant to Aggregate Resources of Ontario, Provincial Standards, Version 1.0 - Category 1 Class "A" Pit below Water and Category 2 Class "A" Quarry below Water

All Notification will follow the requirements of the Aggregate Resources of Ontario, Provincial Standards, Version 1.0 - Category 1 Class "A" Pit below Water and Category 2 Class "A" Quarry below Water.

Notification and Consultation Standards for Category 1 and 2 Applications requires the applicant (applicant's agent) to determine the appropriate contact office and person:

1. The local Ministry of Natural Resources office;

Ministry of Natural Resources, Kemptville District
Postal Bag 2002, 10 Campus Drive
Kemptville, Ontario K0G 1J0
Attention: Christopher Bierman, Aggregate Inspector
Tel.: (613) 258-8207 Fax: (613) 258-3920

2. The local municipality in which the site is located (upper-tier);

Alison McDonald
Manager of Planning - Transportation and Planning Services
The United Counties of Stormont, Dundas and Glengarry
26 Pitt Street
Cornwall ON, K6J 3P2
Tel.: (613) 932-1515 Fax: (613) 936-2913

3. The local municipality in which the site is located (lower-tier);

Peter Young
Director of Planning
Township of South Stormont
2 Mille Roches Road
Long Sault, ON, K0C 1P0
Tel.: (613) 534-8889 ext. 205 Fax: (613) 534-2280

4. Ministry of Environment and Climate Change (MOECC) (only if a Hydrogeological Level 2 is required);

Steve Burns
District Manager
Ministry of the Environment and Climate Change
103-2430 Don Reid Drive

Ottawa, Ontario, K1H 1E1
Tel: (613) 521-3450 ext 224 Fax: (613) 521-5437

5. Ministry of Agriculture, Food & Rural Affairs (OMAFRA)

John O'Neill
Rural Planner
Ontario Ministry of Agriculture and Food Ontario Ministry of Rural Affairs Box 2004
59 Ministry Road
Kemptville, Ontario
K0G 1J0
Telephone - 613-258-8341 Fax - 613-258-8392
Email - john.o'neill@ontario.ca

6. Niagara Escarpment Commission (NEC) (if within their jurisdiction);

The proposed site does not fall within NEC jurisdiction; therefore the Niagara Escarpment Commission is not applicable and will not be circulated.

7. Raisin Region Conservation Authority;

ATTN: Kimberly MacDonald
Planner
18045 County Road 2
Cornwall, ON, K6H 5R5
Tel.: (613) 938-3611 Fax: (613) 938-3221

8.0 OPERATIONAL STANDARDS THAT APPLY TO LICENCES

Pursuant to Aggregate Resources of Ontario, Provincial Standards, Version 1.0 - Licences.

The licensee must comply with Operational Standards pursuant to the Aggregate Resources of Ontario, Provincial Standards, Version 1.0 – Licences, unless otherwise identified on the site plan.

9.0 REPORTING ANNUAL COMPLIANCE FOR LICENCES

Pursuant to Aggregate Resources of Ontario, Provincial Standards, Version 1.0 - Licences.

The licensee must comply with Operational Standards pursuant to the Aggregate Resources of Ontario, Provincial Standards, Version 1.0 – Licences, unless otherwise identified on the site plan.

10.0 REPORT DATED AND SUBMITTED

This report is respectfully submitted,

McIntosh Perry Consulting Engineers Ltd.



Mark Priddle, P.Ge.
Project Manager/Senior Hydrogeologist



Mathew Ojoleck, EIT
Project Scientist



Daniel J. Arnott, P.Eng.
Geo-Environmental Engineer