

# **SAGEWILL LIMESTONE QUARRY EIA – Addendum: New Access Road**

French Village, New Brunswick  
TE181001

Prepared for:

**Sagewill Enterprises Ltd.**

French Village, New Brunswick

10-May-19

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**Prepared for:**

Sagewill Enterprises Ltd.  
French Village, New Brunswick

**Prepared by:**

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**10-May-19**

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## 1.0 Introduction

As part of the ongoing Environmental Impact Assessment for the proposed Sagewill Limestone Quarry (the Project), a new access road is being proposed. The Project is located in French Village, New Brunswick (NB) (Figure 1). The overall Project impacts were described in the Sagewill Limestone Quarry Mining Plan (2018). This change in the access road alignment warranted supplementary field studies to account for the slight change in Project footprint. The proposed new access road will be constructed on Crown land parcels, as shown in Figure 2. Environmental field surveys have been conducted along the new route to identify site characteristics and sensitive environmental features. The potential impacts have been considered and additional mitigation is described in this addendum. Environmental features identified by the field surveys are shown in Figure 3.

The reason for this change is that the private landowner where the original proposed access road was located (PID 00197640 – owned by Hammond River Aggregates Ltd.) has refused to agree to a long-term quarry access road on their property. In addition, the landowner where the Sagewill Quarry will be located (PID's 30115471 and 00196626 – owned by Meadow Brook Farms Ltd.) has also declared they will not agree to an alternative access road leading from the quarry out to the existing Porter Road. Therefore, the only remaining option is to create a new access road on Crown land (PID's 30272652, 30272660, and 30115463) along the southeast edge of the Hammond River Aggregates (HRA) property to bypass the existing quarry lands and connect to the public road section which passes under the Route 1 bridge to the intersection at Route 860 (Figure 2).

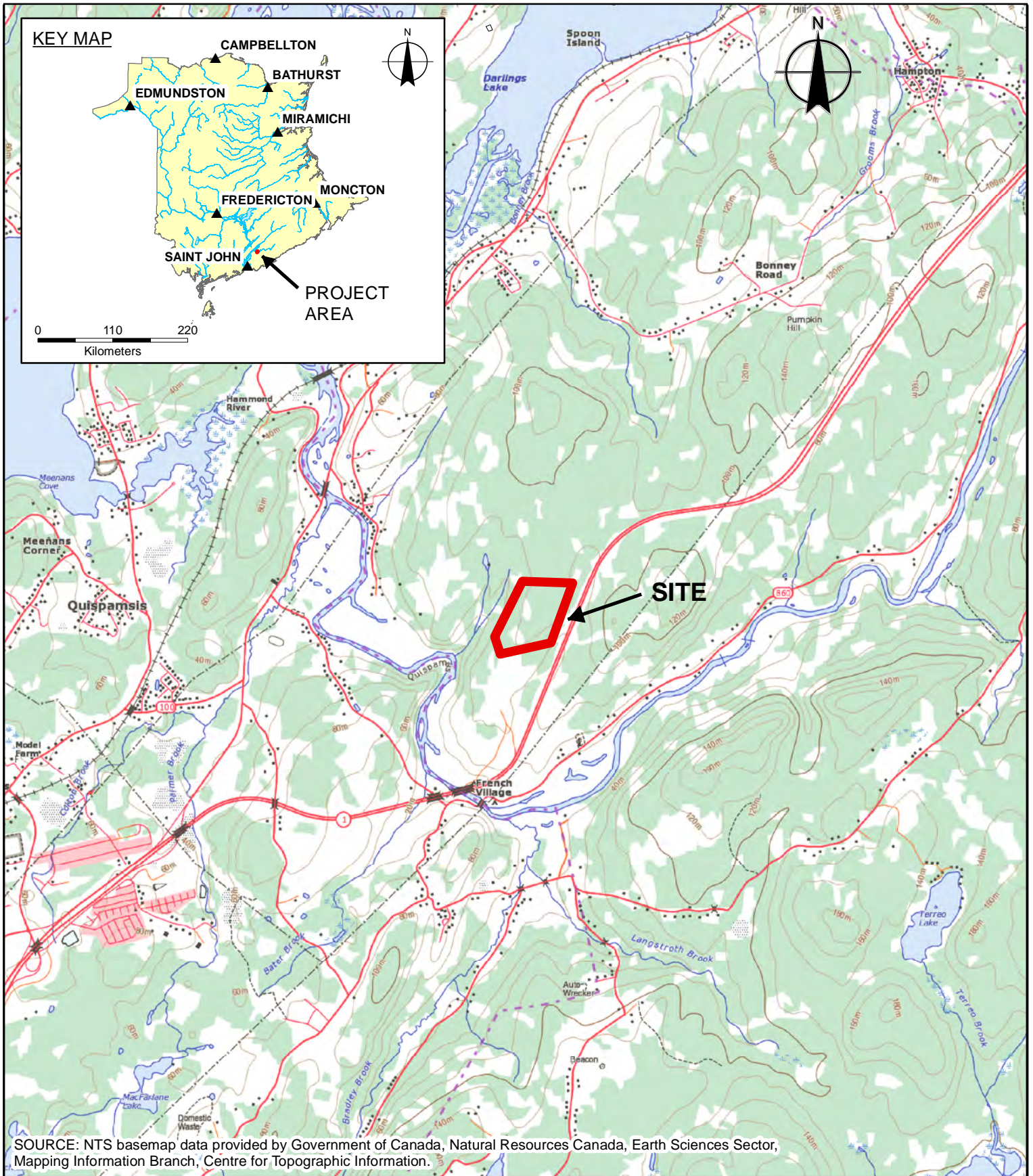
The new access road will be used during both the development and the working lifetime of the proposed Sagewill Quarry, including a planned Bulk Sample to be conducted in the fall of 2019. The Bulk Sample is an advanced exploration activity conducted by the Mineral Claim holder permitted under the *Mining Act*. This addendum will also support applications for multiple permits required prior to the Bulk Sample activity.

## 2.0 Access Road Construction


The new access road will be approximately 1,650 metres long, with a typical width of 15-20 m, and a maximum width of 25-30 m, including a road embankment 15 m wide at the base, drainage ditches along both sides (as required), and a berm made with grub spoil along the east side of the road. The purpose of the berm is to screen the access road from the Trans-Canada Highway, and it will be an efficient way to stockpile unusable soil. The road construction will require vegetation clearing, grubbing and minor excavation, followed by earth moving (building the embankment) and installation of permanent drainage features such as cross-drain culverts, take-off ditches, and small catch basins ("splash pools") and/or spreader ditches to disperse and re-infiltrate storm water run-off. The road will be unpaved, made of competent fill, suitable for heavy vehicles. The fill will be obtained on-site from excavated areas (cut-and-fill, or local borrow-pit) and perhaps from an existing approved off-site quarry (to be determined). It is assumed that shallow bedrock will be rippable and no blasting will be needed. However, if non-rippable bedrock is encountered, some small areas of blasting may be required. This limited blasting would be done by a certified blasting professional according to standard guidelines.

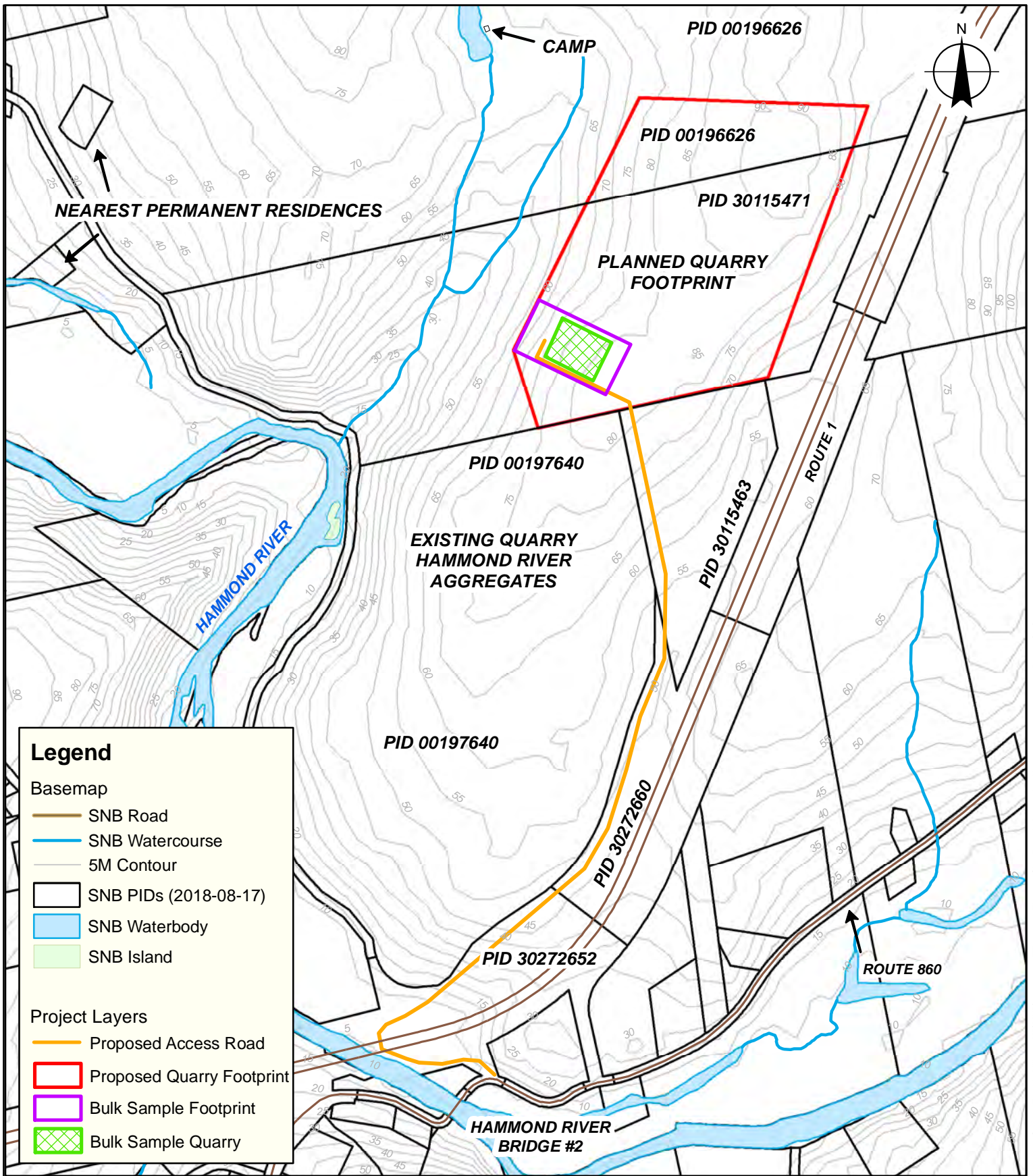
Clearing and construction would commence in the fall of 2019, after September 30, to avoid the bird nesting period. Prior to any ground disturbing activity within 30 m of the watercourses (WC1 & WC4) or the wetland (WL1), temporary erosion and sedimentation control measures would be installed; mainly silt-fence and additional features as needed, such as check-dams, or catch basins. The work will be done in accordance with all regulatory conditions of approval and required permits. If dust becomes a problem, water will be used for dust suppression. The water would be from an approved municipal water source.

Merchantable timber within the footprint will be harvested and the stumpage fee provided to the landowner. Non-merchantable trees and shrubs will be mulched on-site.



SOURCE: NTS basemap data provided by Government of Canada, Natural Resources Canada, Earth Sciences Sector, Mapping Information Branch, Centre for Topographic Information.

CLIENT:  <b>Sagewill Enterprises Ltd.</b>	SCALE:  <b>1:50,000</b>	PROJECT: <b>Sagewill Limestone Quarry          French Village          New Brunswick</b>	DWN BY: SM	DSG'N'D BY: SM
	DATUM: NAD 83 CSRS	TITLE:  <b>GENERAL SITE LOCATION</b>	CHK'D BY: CD	CHK'D (LEAD): CD
PROJECTION: UTM Zone 20 North	PROJECT NO: TE181001		REV. DATE: 2019/05/05	REV. NO: 1
			FIGURE NO: 1	



**Legend**

**Basemap**

- SNB Road
- SNB Watercourse
- 5M Contour
- SNB PIDs (2018-08-17)
- SNB Waterbody
- SNB Island

**Project Layers**

- Proposed Access Road
- Proposed Quarry Footprint
- Bulk Sample Footprint
- Bulk Sample Quarry

CLIENT:  
**Sagewill Enterprises Ltd.**

SCALE:  
**1:11000**

PROJECT:  
**Sagewill Limestone Quarry  
French Village  
New Brunswick**

DWN BY: SM	DSGND BY: SM
CHK'D BY: CD	CHK'D (LEAD): CD
PROJECT NO: TE181001	

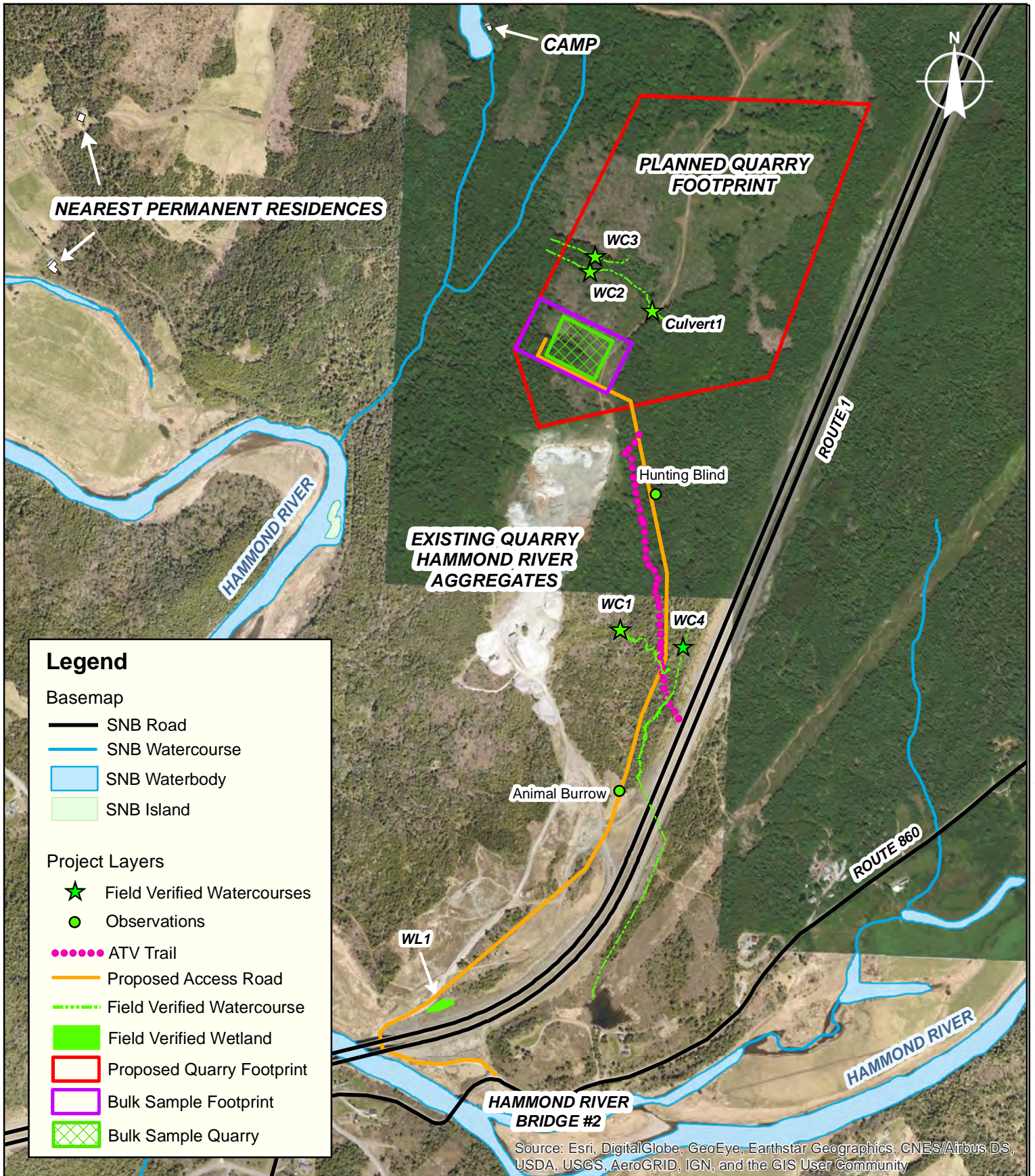


DATUM:  
NAD 83 CSRS

PROJECTION:  
UTM Zone 20 North

TITLE:  
**Site Description**

REV. DATE: 2019/05/10	REV NO: 1
FIGURE NO: 2	



CLIENT:  
Sagewill Enterprises Ltd.

SCALE:  
1:11000

PROJECT:  
Sagewill Limestone Quarry  
French Village  
New Brunswick

DWN BY: SM	DSGND BY: SM
CHK'D BY: CD	CHK'D (LEAD): CD
PROJECT NO: TE181001	



DATUM:  
NAD 83 CSRS

PROJECTION:  
UTM Zone 20 North

TITLE:  
Supplementary  
Field Studies

REV. DATE: 2019/05/10	REV. NO: 1
FIGURE NO: 3	

### 3.0 Vegetation & Wildlife

The supplementary biophysical field survey was conducted on October 30, 2019. The new access road footprint will be approximately 2.5 hectares (ha) in total area. Of this, 40% has been previously disturbed by past earthworks and quarrying (Attachment A, Photos 1 to 8). There are a few small patches of remnant forest within this disturbed landscape consisting of mixed hardwood and softwood of varying ages from young to mature. The rest of the access road area, east of the disturbed landscape, is mature mixed (conifer dominant) forest (Attachment A, Photos 9 to 14). All forest areas showed signs of past timber harvesting, including old stumps and overgrown roads, and there is an actively used ATV trail along the property boundary (Figure 3). There were some older trees on steeper parts of the hill, but no concentrations of over-mature forest were observed.

The bank width of watercourses (WC1 and WC4) and the wetland (WL1) transition zone are relatively narrow, due to the generally high relief, so there is no distinct riparian zone. The ground cover is a little more lush than surrounding upland but essentially the same species. The watercourses had little aquatic vegetation, possibly due to the variable high flows.

#### Disturbed Landscape (1 ha)

Regenerating vegetation present within the disturbed landscape included:

- abundant tree saplings of white birch (*Betula papyrifera*), red maple (*Acer rubrum*), balsam fir (*Abies balsamea*), red spruce (*Picea rubens*), eastern cedar (*Thuja occidentalis*), trembling aspen (*Populus tremula*), striped maple (*Acer pensylvanicum*), white pine (*Pinus strobus*), pin cherry (*Prunus pensylvanica*), mountain ash (*Sorbus americana*), and gray birch (*Betula populifolia*);
- dense shrubs including alder (*Alnus incana*), choke cherry (*Prunus virginiana*), red-osier dogwood (*Cornus sericea*), fragrant fern (*Comptonia peregrina*), wild raisin (*Viburnum nudum*), mountain holly (*Nemopanthus mucronate*), meadow-sweet (*Spiraea alba*), low-bush blueberry (*Vaccinium angustifolium*), and common blackberry (*Rubus alleghaniensis*); and
- herbs such as raspberries (*Rubus idaeus*), colts foot (*Tussilago farfara*), common cinquefoil (*Potentilla simplex*), bracken fern (*Pteridium aquilinum*), interrupted fern (*Osmunda claytoniana*), asters (*Aster/Symphotrichum* sp.) and goldenrods (*Solidago* sp.).

#### Mature mixed (conifer dominant) forest (1.5 ha)

The mature mixed forest is composed mainly of red spruce, balsam fir, white birch, eastern cedar (*Thuja occidentalis*), and red maple; with scattered yellow birch (*Betula alleghaniensis*), mountain ash (*Sorbus americana*), white pine (*Pinus strobus*), and pin cherry (*Prunus pensylvanica*) (Attachment A, Photos 15 and 16). The forest floor was sparsely vegetated with common temperate forest herbs (as above), with the addition of hay-scented fern (*Dennstaedtia punctilobula*) in openings, gold-thread (*Coptis trifolia*), poverty grass (*Danthonia spicata*), hair-cap moss (*Polytrichum commune*), whorled wood aster (*Oclemena acuminata*), and wild strawberry (*Fragaria vesca*).

#### Overall Vegetation Diversity and Plant Species at Risk

Habitat diversity along the new access route can be divided between the eastern half covered by previously disturbed regenerating forest with many openings and diverse structure, and the west half covered by very uniform mature mixed forest. Bedrock outcrops were very common throughout the site and no areas of saturated soil were observed outside the banks of the two identified watercourses (WC1 & WC4). No plant species at risk (SAR) were observed. Extra time was devoted to searching the banks of WC1 and WC4 but did not yield any unique plant species. No other areas of elevated potential to support plant SAR were identified.

## Wildlife

Deer and porcupine tracks were observed, and red squirrels were abundant. It is also likely that other wildlife use the area, such as black bear, coyote, red fox, racoon, skunk, and snowshoe hare. No reptiles or amphibians were observed but snakes could be present. There is little high-quality amphibian habitat onsite, with the exception of WL1. The site lies within an identified wood turtle and snapping turtle watershed (the Hammond River), so turtles could potentially wander into the Project footprint. The river is located approximately 200 m of the southwest end of the access road; the edge of the floodplain approximately 100 m. The discovered watercourses within the Project footprint (WC1 and WC4) are not typical or high-quality turtle habitat (WC4 marginally so), and the turtles would have to traverse an extended culvert in the Route 1 highway and some considerable other terrain to reach this point. It is more likely that turtles could be encountered on the existing access road under the Trans-Canada bridge, next to the river.

No potential bat hibernacula were observed (no ground openings or large trees). No potential habitat for invertebrate SAR (cobblestone tiger beetle, maritime ringlet butterfly, skillet clubtail, or pygmy snaketail) was observed, and no monarch butterfly (or milkweeds (*Asclepia* sp.)).

## 4.0 Wetlands & Watercourses

The wetland and watercourse survey for the new access road was conducted on 30 October, 2018, by Garrett Bell, an experienced field biologist and recognized wetland delineator in NB for almost 20 years.

### Wetlands

The field-verified wetland (WL1) discovered at the south end of the proposed access road (Figure 3), may be within 30 m of the construction footprint. There are no other wetlands within 30 m of the proposed access road.

The wetland was delineated using the methodology developed by the US Army Corps of Engineers; which has been generally adopted by Canadian regulators and practitioners. This method uses paired data points (one in the wetland and one outside the wetland) to establish the vegetative boundary; which is then used to mark the edge of the wetland. In WL1, the boundary is largely defined by the base of the steep embankment slopes (i.e., topographically confined) (Figure WL-1, Attachment A). The wetland determination is based on a three-part test that requires the presence of wetland vegetation, hydric soil, and signs of wetland hydrology. The wetland boundary was marked in the field using pink flagging tape and recorded using a high-resolution Global Positioning System (GPS). The completed wetland data forms and wetland photos are presented in Attachment B, including a large-scale map. A wetland functional assessment was also completed according to the Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC). The completed assessment forms and resulting scores are also included in Attachment B.

This small wetland (approximately 0.07 ha) appears to have formed as a result of the impoundment of intercepted slope drainage by Route 1 and the existing quarry access road. The wetland is dominated almost exclusively by cattails (*Typha latifolia*). The wetland receives intermittent drainage from the adjacent roadways and a relatively small catchment area upslope. The wetland drains through a culvert in the existing quarry access road into the Hammond River floodplain meadow. There is no channel in the wetland and there was no surface water flow at the time of the survey, although there was about 1 cm of standing water. The wetland appears to receive considerable amounts of sediment from quarry road run-off, but it is unclear whether the assimilative capacity of the wetland will be exceeded. It is likely that the wetland traps and filters sediment and other road related contaminants, such as road-salt and petroleum products, and reduces concentrations that reach the Hammond River floodplain. No wildlife was observed in the wetland, although it is possible that birds, amphibians, turtles, and pollinators (butterflies) use this habitat. There was no apparent fish habitat in the wetland, but small fish may enter the wetland during brief high-volume flows. No invasive species were observed. The



wetland is not visible from Route 1 and is difficult to access, since it is well below the road grade surrounded by steep rocky embankments. Therefore, there are no potential social or aesthetic functions.

### Watercourses

Two unmapped watercourses are present in the area along the proposed access road (Figure 3). Watercourse 1 (WC1) was previously visited during the initial field survey in July 2018. Watercourses 2 and 3 (WC2 and WC3) were also previously identified in July 2018, further north within the proposed quarry boundaries (Figure 3) and are described in the Addendum Field Survey Report (dated 31 August 2018). One new unmapped watercourse was identified, Watercourse 4 (WC4), that runs along the edge of the Route 1 highway. The proposed new access road will be located west of WC4, along the edge of the property. Both WC1 and WC4 will be within 30 m of the new access road construction footprint, and WC1 will be crossed. Both watercourses were visited in October 2018 and the precise locations (Figure 3 Point Observations) were recorded using a high-resolution GPS within the potential Project footprint. The following is a description of each watercourse. Site photos are in Attachment A.

**WC1** drains from the steep hillside east of the existing quarry and flows eastward, downhill, across the path of the proposed access road. WC1 has a highly variable channel but averages 0.5 m wet-width and a bank width of about 2 m; the bank height about 0.2 m. The water depth was about 5 cm in July and was almost dry in October. The stream bed is composed of very coarse cobbles with medium sand and gravel, showing signs of short term high seasonal flow (Photos 17 and 18). WC1 separates into multiple channels as it comes to the base of the slope and is intercepted by the existing ATV trail (Photos 19 and 20) and then dissipates into the forest floor within a few metres beyond the ATV trail (Photo 21). WC1 completely disappears before it reaches WC4, and it is not considered to provide fish passage.

**WC4** flows southward, roughly parallel to the Route 1 highway. It flows along the west side of the highway adjacent to the proposed new access road for 300 m before crossing the highway through a large culvert. WC4 appears to be a permanent fast flowing stream, with a wet width of 1.5 - 2.0 m and a depth of 30 - 40 cm. The channel is well defined within the mature forest habitat (Photos 22 and 23). The substrate is a relatively coarse mixture of gravel, cobble, and boulders. Some sand is deposited in bends, but embeddedness is generally low. There is good structure, with high woody debris content. The bank width is variable from 2 - 5 m. Some of the channel has been reconstructed during highway construction (Photos 24 and 25). There are signs of seasonal high flows such as sediment drifts above the regular banks and hanging floated debris. No fish were observed, but it is assumed that there is connectivity to the Hammond River and that any associated aquatic species may be present. WC4 is crossed by the existing ATV trail at an unconfined fording location, where the channel has spread out across an 8 m wide bedrock riffle.

## 5.0 Migratory Birds

The initial bird survey undertaken in July 2018 included the proposed quarry footprint and a previous alternative access route east of the existing quarry that was partly on HRA property and partly on DTI land. That survey area was relatively close to the currently proposed route and partly overlaps it. Compared to the previous survey, the western end of the new access road route is shifted about 120 m southeast, onto land that has been disturbed by past roadway construction activities. The new proposed route was surveyed on October 30, 2018; which is not an ideal time of year to record bird activity. The habitat is the same and the locations are very near, however, so the previous survey data is considered representative of the new route. The detailed methodology and previous results are presented in the 2018 Addendum Field Survey Report (dated 31 August 2018).

The October survey was conducted in the early morning, and the weather at the time was cool and overcast, with occasional light precipitation. Habitat along the western half of the new access route consists of regenerating clear-cut with patches of young to mature deciduous forest in a landscape of

former road related borrow pits, stockpiles, and old roads and trails. The eastern half of the new access road route was included in the previous bird survey. Avian activity was absent during the October survey. The previous bird survey results for the entire site are presented in Table 1; the Point Count (PC) results representing the access road route being PC5 and PC6. It is expected that bird activity along the new access road will be identical.

There was no suitable habitat for avian species at risk observed along the new access road, although the disturbed landscape has some open areas that may provide nesting habitat for Common Nighthawk and/or Bank Swallow which are listed as Threatened under both the federal *Species at Risk Act* (SARA) and the NB Provincial *Species at Risk Act* (NBSRA).

During the public consultation period, comments received from local birders indicated that a small Great Blue Heron colony is located some distance north of the site. A known location about 1 km north was found unused in 2017 but is suspected to have been reestablished in the general area. This colony was active during the operation of the existing quarry and would be fairly close to the Trans-Canada Highway.

**Table 1 Bird Species Observed during 20 July 2018 Site Visit**

Common Name	Scientific Name	Point Count (PC) Observations*						Incidental Sightings
		PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	
Alder Flycatcher	<i>Empidonax alnorum</i>			1				
American Crow	<i>Corvus brachyrhynchos</i>	1	1					
American Goldfinch	<i>Spinus tristis</i>	1		1	2			
American Redstart	<i>Setophaga ruticilla</i>				1			
American Robin	<i>Turdus migratorius</i>	1				1	1	1
Black-and-white Warbler	<i>Mniotilta varia</i>	1	1				1	1
Black-capped Chickadee	<i>Poecile atricapillus</i>	2	2 (FY)	1				
Black-throated Green Warbler	<i>Setophaga virens</i>	2	1	2	2		1	
Cedar Waxwing	<i>Bombycilla cedrorum</i>	1	1		1 (FY)			1
Common Yellowthroat	<i>Geothlypis trichas</i>	2	2	1	2 (FY)			
Downy Woodpecker	<i>Picoides pubescens</i>							1
Great Blue Heron	<i>Ardea herodias</i>							1 (flying over)
Hermit Thrush	<i>Catharus guttatus</i>		1			2	2	
Magnolia Warbler	<i>Setophaga magnolia</i>					1	1	
Mourning Dove	<i>Zenaida macroura</i>							1
Northern Flicker	<i>Colaptes auratus</i>							1
Northern Parula	<i>Setophaga americana</i>				1			
Pileated Woodpecker	<i>Dryocopus pileatus</i>					1		
Purple Finch	<i>Haemorhous purpureus</i>		1					
Red-breasted Nuthatch	<i>Sitta canadensis</i>	1				1		
Red-eyed Vireo	<i>Vireo olivaceus</i>		1	1	2	1		1
Rock Pigeon	<i>Columba livia</i>							1
Song Sparrow	<i>Melospiza melodia</i>		2 (FY)	1	1			
White-throated Sparrow	<i>Zonotrichia albicollis</i>	2	3	4	2			
Winter Wren	<i>Troglodytes hiemalis</i>					1		

\* (FY) indicates presence of fledged young, indicating confirmed breeding in the area.



## 6.0 Archaeological & Heritage Resources

The initial archaeological investigations for the Project included a desktop review of the entire Project area and vicinity, including the property on which the presently proposed access road is located. Therefore, no additional desktop research was required for the archaeological investigations for the presently proposed new access road routing. The results for the desktop review was included in the environmental assessment within the Sagewill Limestone Quarry Mining Plan.

An initial visual survey of the Project area was conducted on June 21, 2018, under Archaeological Field Research Permit (AFRP) 2018NB24 by Wood Archaeologist Darcy Dignam and Project Manager, Garrett Bell. This field examination included both the Planned Quarry Footprint and the initially proposed access road to the east of the existing quarry. On December 5, 2018 a second field survey was conducted by the Wood Archaeology Team (Darcy Dignam and Lisa Atkinson) to visually examine the revised routing for the Project access road, also conducted under AFRP 2018NB24. The initial field survey results have previously been reported in the Project's Mining Plan. This Addendum presents only the results of the archaeological field activities conducted for the new alignment for the Project access road.

The surficial survey was conducted on foot, along the alignment of the proposed new access road, beginning at the south end (Figure 3). The survey included a 50 m width corridor, within which the proposed footprint of the access road will be located. The two archaeological field assessors walked abreast, approximately 25 m apart along the access road routing, in order to visually cover the entire 50 m wide corridor. Each field worker used a hand-held GPS device and collected line, point, and track log data to identify areas of interest and to track the survey route. The survey involved a close examination of the surface of the proposed impact areas and vicinity, with particular attention to subsurface exposures, watercourse erosional faces, forest clearings, and other areas that could indicate elevated potential for archaeological resources from the archaeological potential modelling and desktop review.

The visual archaeological survey for the new access road identified occasional scattered pieces of 20th-21st century refuse along the survey corridor, particularly along the sides of the existing road going towards the present mine site. These included discarded building materials, a mattress, and a barbecue. These are not considered to be archaeological resources. There were, however, four observed items which are worthy of note:

- a large and deep animal burrow,
- field identification/confirmation of Watercourses 1 & 4,
- a hunting blind, and
- a previously unidentified ATV trail.

### Animal Burrow

While not an archaeological or even a cultural feature, a large and deep animal burrow was noted in the field. The reason for this identification was for health & safety reasons, since the burrow hole was located in the centre of the survey corridor and was obscured by tall grasses and shrubs. This potential hazard was identified at 45.43640°N, 65.88193°W (DD, NAD83) and was marked in the field with orange flagging tape (Photo 26) (Figure 3).

### Watercourses 1 & 4

As stated previously in Section 4.0 Wetlands and Watercourses, a newly identified unmapped watercourse was detected (WC4) within the survey area of the new access road. In addition, the continuation of a previously identified watercourse (WC1) is also located within the survey area for the access road (Figure 3). Both WC4 and WC1 will be within 30 m of the new access road construction

footprint, and WC1 will be crossed. While descriptions of these two unmapped field identified watercourses can be found in Section 4.0, they must be assessed for archaeological potential.

WC4 appears to be a permanent stream, with a width of 1.5 to 2.0 m, a depth of 30 to 40 cm, and a substrate of gravel, cobble, and boulders. The bank width varies from 2 to 5 m, with some of the present channel apparently reconstructed during past Route 1 highway construction. The shorelines were observed to be low-lying and very rocky (boulders) and vegetated predominantly with cedars. While there are signs of high seasonal flows (freshet), the watercourse is relatively shallow. While a permanent stream, WC4 has low potential for archaeological resources as it has been altered by Route 1 construction, is located in a low-lying rocky area, and is too small to be navigable by watercraft.

WC1 was assessed at a different location on the Project site during the initial field survey and is described in Section 4.0. It appears to be an intermittent stream that shows physical signs of having a short term high seasonal flow as it separates into multiple channels as it approaches the base of the slope. As an intermittent first-order stream, WC1 has low potential for archaeological resources.

### **Hunting Blind**

A hunting blind was observed within the survey corridor for the access road (Photo 27) (Figure 3). This structure is not considered an archaeological resource, but rather a "cultural feature". The presence of this structure within the Project area simply indicates that there has been relatively recent use of this property for hunting purposes. This cultural feature was located at 45.44216°N, 65.88122°W.

### **ATV Trail**

The field identification of an additional ATV trail is another indication of historic use of the property for recreational purposes (Photo 28). The small section of this trail, identified within the survey corridor, appears to branch east from the previously identified ATV trail (Wood 2018) at the northeast corner of the Project area (Figure 3). While this is a cultural feature worth noting, it is not considered to be an archaeological resource.

## **7.0 Conclusions & Additional Mitigation**

The new access road area was surveyed to confirm the actual habitat on site, and the presence or absence of sensitive environmental features. The following sections provide the component-specific conclusions and mitigation measures that will be implemented to minimize impacts of the proposed access road, including construction, operation, and decommissioning.

### **7.1 Vegetation & Wildlife**

Approximately 40% of the new access road footprint is comprised of previously disturbed landscape. The condition of the disturbed landscape ranges from unvegetated gravel pit and quarry to shrubby clearings and patches of immature to mature mixed forest. The remaining area is predominantly mature mixed forest (softwood dominant). There were some older trees, but no concentrations of over-mature forest were observed. All forest areas showed signs of past timber harvesting, including old stumps and overgrown roads. No plant SAR were observed, and no habitat with elevated potential to support plant SAR was identified within the Project footprint.

The forest and disturbed landscape habitats do support common woodland wildlife species, including deer, porcupine, red squirrel, and likely black bear, coyote, red fox, racoon, skunk, and snowshoe hare. Snakes could be present, but none were observed. Some potential amphibian and turtle habitat may exist in the field-verified wetland (see next section, below). Snapping turtle and wood turtle are reported in the Hammond River watershed and may occur incidentally within the Project footprint. The discovered watercourses in the new access road footprint (WC1 & WC4) are not typical or high-quality turtle habitat, and are difficult to access. It is more likely that turtles could be encountered on the

existing access road under the Trans-Canada bridge, next to the river. No potential bat hibernacula were observed. No potential habitat for invertebrate species at risk was observed.

The new access road construction will displace up to 1.5 ha of mature mixed forest habitat and 1 ha of disturbed landscape habitat (mainly shrubby meadow).

Additional Mitigation:

- Encounters with any wildlife species at risk will be reported to the Department of Energy and Resource Development (NBDERD, Fish and Wildlife).
- All staff will be instructed to watch for turtles on the access road to avoid collisions and to report sighting of turtles anywhere within the Project footprint. Turtles discovered in the Project footprint will be carefully moved to a vegetated area near the Hammond River.
- Site housekeeping and waste management practices will be used to reduce attraction of wildlife.

These measures have been included in the revised Environmental Management Plan & Reclamation Plan (EMP & RP) that will apply to the Bulk Sample activity and the ultimate future quarry, which includes the new access road.

## 7.2 Wetlands & Watercourses

There is one wetland (WL1) near the south end of the new access road that will likely be within 30 m of the Project footprint. Any work within 30 m of WL1 will require a permit under the Watercourse and Wetland Alteration (WAWA) Regulation. The road's construction and operation has the potential to generate stormwater runoff that may enter the wetland, and the new access road will be located within the catchment area and potentially interfere with current drainage into the wetland. Care will be taken during design to ensure that current drainage patterns are preserved and that excessive stormwater velocities are checked.

Two watercourses are located within 30 m of the new access road footprint (WC1 & WC4), and WC1 will be crossed. WC1 is a small, seasonal intermittent watercourse that is not a tributary of a fish bearing waterbody and is not considered fish habitat. WC4, however, is presumed to be connected to the Hammond River and represents fish habitat, potentially including salmonids. The crossing of WC1 and work within 30 m of WC4 will require a WAWA Permit, including coordination with Fisheries and Oceans Canada (DFO). All work would be subject to conditions of the WAWA Permit, and possibly additional requirements stipulated by DFO. Stormwater runoff from the site could enter the two watercourses and standard mitigation will be required.

Additional Mitigation:

- No clearing or ground disturbing activities will take place within 30 m of WL1, WC1 and WC4 without a WAWA Permit.
- Site runoff will be controlled so that no sediment laden water is released into any wetland or waterbody, including the Hammond River floodplain meadow, located approximately 100 m from the south end of the new access road.
- Fuel and chemicals will be stored and handled in an appropriate manner to prevent accidental spills, and a spill response plan will be communicated to all employees.
- Site / operational requirements and notifications that are identified in the Provincial Approval to Operate (both for the Bulk Sample and future quarry) will be followed.

These measures have been included in the revised EMP & RP that will apply to the Bulk Sample activity and the ultimate future quarry, which includes the new access road.

### 7.3 Migratory Birds

A number of common bird species were observed within the Project footprint that are typical of disturbed habitats and mixed forest, and no species at risk or species of conservation concern were observed. There was no suitable habitat for avian SAR observed within the surveyed area, although the disturbed landscape may provide nesting habitat for Common Nighthawk (SARA and NBSRA: Threatened) and/or Bank Swallow (SARA and NBSRA: Threatened). A suspected Great Blue Heron colony north of the proposed ultimate quarry boundary would be located beyond the potential impact zone of the new access road construction; which will be directly adjacent to, and consistent with, the existing operating HRA quarry site, and the Trans-Canada Highway.

Additional Mitigation:

- No clearing will be conducted during the breeding bird season, from April 8 to August 31.
- Earthmoving and overburden stockpiles will be managed to discourage nesting by burrowing species, such as Bank Swallows, by reducing final slopes to less than 70%.
- Should migratory birds be discovered nesting in the Project footprint or within the quarry, the nest will be buffered until the young have fledged (setback distances will follow advice provided by Environment and Climate Change Canada (ECCC), based on species and site-specific conditions).
- Potential contaminants (fuel, oil wastes, chemicals, site runoff) will be controlled to prevent releases into areas of migratory bird habitat, and in the event of an accidental spill, measures will be taken to prevent birds from contact with spilled substances.
- All equipment / structures will be inspected daily prior to start-up for presence of birds/nests.

The above measures have been included in the revised EMP & RP that will apply to the Bulk Sample activity and the ultimate future quarry.

### 7.4 Archaeological & Heritage Resources

Both the initial archaeological field examination of the Project area on June 21st, 2018, and the survey of the new access road footprint, support the results from the desktop review. There are no archaeological or heritage resources identified within the Project area and there are no areas assessed to have elevated potential for archaeological resources. Thus, there is low potential for undocumented heritage or archaeological resources within the Project area. No further archaeological investigations are recommended for the Project.

#### Additional Mitigation

Since archaeological investigations and potential determination are based on modeling, there always remains some potential in any project area to encounter buried archaeological features that do not fit present models. Therefore, during future construction activities for the Project, it is recommended that:

- Construction crews should be made aware of the potential for archaeological resources within their construction area.
- Archaeological resources protocols should be in place and adhered to during any subsurface construction activities, in the event that possible archaeological resources or human remains are discovered. An accidental discovery protocol has been included in the revised Project EMP & RP that will apply to the Bulk Sample activity and the ultimate future quarry.

### 7.5 Reclamation

The proposed new access road, along with the Bulk Sample and future quarry mining activities will be subject to the requirement, under the *Mining Act*, to restore the site following the end of exploration and mining activities. A description of planned reclamation activities is provided in the revised Project

EMP & RP. The proposed final site condition after reclamation (either for the Bulk Sample or the ultimate future quarry, including the access road) will require that all equipment and infrastructure be removed, slopes contoured to a safe angle (3 horizontal to 1 vertical), overburden and topsoil placed on the surface, and revegetated with grass and trees. Therefore, the long-term objective for site reclamation will be to restore the pre-construction land use as private woodlot or unmanaged forest (on Crown land). The Project impacts on wildlife habitat will be temporary, during the exploration and mining development, and forest habitat would be restored after the mining activity is complete.



## **ATTACHMENT A**

### **Site Photos**





Photo 1. Looking south along the existing access road from the approximate take-off point for the new access road.



Photo 2. Looking south from the approximate new access road corridor in the previously disturbed landscape.



Photo 3. Looking west from the location above, unauthorized ATV recreational use, burning, and trash disposal is ongoing in the disturbed landscape.



Photo 4. Looking southwest; parts of the disturbed area have not significantly revegetated and are effectively old gravel-pit and quarry areas.



Photo 5. Looking north in the disturbed landscape, along an abandoned road that is overgrown with shrubs and flanked by small patches of mature trees.



Photo 6. Looking south in the disturbed landscape (quarry), associated with the Route 1 construction activity. The abandoned road (Photo 5) is located in the patch of trees at upper left.



Photo 7. Looking east from the location above, toward the highway. The new access road will be located in this area.



Photo 8. Looking northeast in the new access corridor toward the transition into forest habitat.



Photo 9. There are patches of immature to mature mixed forest in former small clearings, perhaps related to past timber harvesting. Red maple, white birch, and poplar are dominant with fewer yellow birch, and occasionally beech.



Photo 10. In open areas, ferns are the dominant ground cover with bracken and wood ferns on lower slopes and hay-scented fern on upper slopes where soil is thinner and better drained. The ferns are all brown here, due to the late season (October 30) of this survey.



Photo 11. More mature trees occur on steeper slopes where timber harvesting is somewhat less intense.



Photo 12. Groundcover is predominantly tree saplings with scattered terrestrial mosses and low herbs.



Photo 13. Mature coniferous dominant forest including red spruce, balsam fir, eastern cedar and some older red maples and white birch.



Photo 14. Signs of past timber harvesting are common everywhere in the new access road footprint.



Photo 15. Habitat at the northern end of the new access road (just inside the Meadow Brook Farms property) is mixed mature forest, dominated somewhat by red spruce and white birch.



Photo 16. The forest floor within the mature forest habitats along the new access road are sparsely vegetated.





Photo 17. Watercourse 1 (WC1) has maximum bank width of about 2 m and height of 0.2 m. The water flow was almost dry in October.



Photo 18. Looking downstream along WC1, there are signs of high seasonal flow causing severe erosion.



Photo 19. WC1 is intercepted by the ATV trail near the bottom of the slope where it also spreads out into several smaller channels.



Photo 20. WC1 has deposited coarse material into the ATV trail, during high volume run-off events. Photo facing upslope, where the sub-channel enters the trail.



Photo 21. Within a few metres downgradient from the ATV trail, all parts of WC1 dwindle into separate pools and infiltrate into the ground.



Photo 22. Watercourse 4 (WC4) was almost bank full, following intense rain the previous day. WC4 has a maximum bank width of 4 - 5 m and bank height of 0.5 m.



Photo 23. WC4 has good shade and structure for fish habitat with much woody material in the channel.



Photo 24. Parts of WC4 near the highway have been reconstructed.



Photo 25. The substrate in WC4 is coarse with sparse aquatic vegetation.



Photo 26. Flagged Animal Burrow



Photo 27. Hunting Blind "Cultural Feature"



Photo 28. Field Identified ATV Trail

**ATTACHMENT B**  
**Wetland Data Sheets and Mapping**

# Wetland Habitat Form WL1

Name of Investigator: Garrett Bell & Mike Lewey  
Date: October 30, 2018  
Wetland Form: Linked Basin Marsh  
Wetland size: ~ 0.07 ha  
Associated Watercourse: NA  
Weather: Overcast, cool, rain previous day

Topographic Sheet: 21 H/5  
General Location: French Village, NB  
County: Kings  
PID No.: 30272652  
Wetland Atlas Number: NA

## Wetland Type:

- |  |  |
|--|--|
| 1. Aquatic bed/unconsolidated bottom (AB) <input type="checkbox"/> | 4. Emergent wetland (EW) <input checked="" type="checkbox"/> |
| 2. Bog (BO) <input type="checkbox"/>                               | 5. Shrub wetland (SB) <input type="checkbox"/>               |
| 3. Fen (FE) <input type="checkbox"/>                               | 6. Forested wetland (FW) <input type="checkbox"/>            |

## Wetland Class:

- |  |  |
|--|--|
| 1. Open water <input type="checkbox"/>               | 5. Meadow <input type="checkbox"/>       |
| 2. Deep marsh <input type="checkbox"/>               | 6. Shrub swamp <input type="checkbox"/>  |
| 3. Shallow marsh <input checked="" type="checkbox"/> | 7. Wooded swamp <input type="checkbox"/> |
| 4. Seasonally flooded flats <input type="checkbox"/> | 8. Bog <input type="checkbox"/>          |

## Wetland Subclass:

- |  |  |
|--|--|
| 1. Vegetated open water <input type="checkbox"/>         | 19. Floating leaved SM <input type="checkbox"/>                |
| 2. Non-vegetated OW <input type="checkbox"/>             | 20. Rooted floating leaved SM <input type="checkbox"/>         |
| 3. Floating leaved OW <input type="checkbox"/>           | 21. Non-vegetated SM <input type="checkbox"/>                  |
| 4. Rooted floating leaved OW <input type="checkbox"/>    | 22. Emergent seasonally flooded flats <input type="checkbox"/> |
| 5. Dead woody OW <input type="checkbox"/>                | 23. Shrubby SFF <input type="checkbox"/>                       |
| 6. Vegetated deep marsh <input type="checkbox"/>         | 24. Grazed meadow <input type="checkbox"/>                     |
| 7. Non-vegetated DM <input type="checkbox"/>             | 25. Ungrazed M <input type="checkbox"/>                        |
| 8. Dead woody DM <input type="checkbox"/>                | 26. Sedge M <input type="checkbox"/>                           |
| 9. Sub-shrub DM <input type="checkbox"/>                 | 27. Sapling shrub swamp <input type="checkbox"/>               |
| 10. Floating leaved DM <input type="checkbox"/>          | 28. Bushy SS <input type="checkbox"/>                          |
| 11. Rooted floating leaved DM <input type="checkbox"/>   | 29. Compact SS <input type="checkbox"/>                        |
| 12. Robust DM <input type="checkbox"/>                   | 30. Low sparse SS <input type="checkbox"/>                     |
| 13. Narrow-leaved DM <input type="checkbox"/>            | 31. Deciduous wooded swamp <input type="checkbox"/>            |
| 14. Broad-leaved DM <input type="checkbox"/>             | 32. Evergreen WS <input type="checkbox"/>                      |
| 15. Dead woody shallow marsh <input type="checkbox"/>    | 33. Wooded bog <input type="checkbox"/>                        |
| 16. Robust SM <input type="checkbox"/>                   | 34. Shrubby B <input type="checkbox"/>                         |
| 17. Narrow leaved SM <input checked="" type="checkbox"/> | 35. Open B <input type="checkbox"/>                            |
| 18. Broad leaved SM <input type="checkbox"/>             |  |

## Water Regime Indicator:

- |   |   |
|---|---|
| 1. Permanently flooded <input type="checkbox"/> | 3. Seasonally flooded <input checked="" type="checkbox"/> |
| 2. Saturated <input type="checkbox"/>           |   |

## Water Depth:

- |   |                                       |
|---|---------------------------------------|
| 1. 0-5 cm <input checked="" type="checkbox"/> | 4. 50-100 cm <input type="checkbox"/> |
| 2. 5-20 cm <input type="checkbox"/>           | 5. >100 cm <input type="checkbox"/>   |
| 3. 20-50 cm <input type="checkbox"/>          |                                       |



Impoundment Type

- 1. Beaver Pond
- 2. Man-made Impoundment
- 3. Ducks Unlimited Impoundment
- 4. None of the above

Percent Vegetation Cover:

- 1. >95%
- 2. 76-95% in peripheral band
- 3. 76-96% in patches
- 4. 26-75% in peripheral band
- 5. 26-75% in patches
- 6. 5-25% in peripheral band
- 7. 5-25% in patches
- 8. < 5%

Wetland Site:

- 1. Lacustrine
- 2. Riverine
- 3. Palustrine
- 4. Isolated
- 5. Deltaic

Vegetation Types (%):

- 1. Deciduous trees
- 2. Coniferous trees
- 3. Dead trees
- 4. Tall shrubs 5% Speckled Alder
- 5. Low shrubs
- 6. Dead shrubs
- 7. Herbs
- 8. Mosses
- 9. Narrow-leaved emergents 95% Cattails (mainly), water horsetail (E. fluviatile), marsh willow-herb, boneset
- 10. Broad-leaved emergents
- 11. Robust emergents
- 12. Free-floating plants
- 13. Floating plants (rooted)
- 14. Submerged plants
- 15. Other

Interspersion: 1. Minimal  2. Low  3. Medium  4. High

Water Quality

Conductivity: N/A pH: N/A  
 Alkalinity: N/A

Hydrological Classification:

- 1. Surface water depression
- 2. Ground water depression
- 3. Surface water slope
- 4. Ground water slope

Inlets/Outlets/water bodies:

One inlet (drainage ditch) and outlet (culvert) associated with the TransCanada Highway (Route 1) and existing quarry access road. No channel in wetland (i.e., diffuse throughflow). Ditch drainage appears seasonal but *may* intercept groundwater table all year round (very low flow).

Wildlife: (Observation/Signs/Reports)

None observed. No tracks/trails or other sign of wildlife present.

Adjacent Wildlife habitat (%):

- |                                   |              |
|-----------------------------------|--------------|
| 1.Salt marsh ___                  | 5.Beach ___  |
| 2.Forest <u>50</u> (mixed forest) | 6.River ___  |
| 3.Dykelands ___                   | 7. Other ___ |
| 4.Mudflats ___                    |              |

Description: Immature to mature mixed forest including white birch, gray birch, red maple, trembling aspen, red spruce, eastern cedar and balsam fir (patchy regeneration following periodic past disturbances related to road and quarry developments).

Surrounding Land Use %:

- |                            |                           |
|----------------------------|---------------------------|
| 1 Agriculture ___          | 7.Residential ___         |
| 2.Forestry ___             | 8.Waste Disposal ___      |
| 3 Recreation ___           | 9.Scientific Research ___ |
| 4.Industrial ___           | 10.Trapping ___           |
| 5.Urban development ___    | 11.Education ___          |
| 6.Transportation <u>50</u> | 12.Seasonal resident ___  |

Description: The wetland is sandwiched between (and impounded by) road embankments associated with Route 1 and the existing quarry access road. Land use is severely limited by restrictions related to Route 1 RoW management and poor access (steep rocky slopes).

Disturbance: 1.Low \_\_\_ 2.Moderate X 3.High \_\_\_

Description: The wetland continues to receive sediment laden runoff and perhaps salt or petroleum contaminated water from adjacent roadways. Minor water & windborne trash collects in the wetland basin. Also, the wetland is constantly exposed to loud noise from the adjacent roadways.

Roads and/or tracks:

- |                                  |                       |
|----------------------------------|-----------------------|
| 1.Private road adjacent <u>X</u> | 4.DOT road within ___ |
| 2.DOT road adjacent <u>X</u>     | 5.Vehicle tracks ___  |
| 3.Private road within ___        | 6.Other ___           |

Description: Route 1 and private quarry access road confine wetland between them.

Existing Uses of Wetlands:

- |                                   |                                    |
|-----------------------------------|------------------------------------|
| 1.Economic use (e.g. farming) ___ | 4.Education & public awareness ___ |
| 2.Recreational activities ___     | 5. None evident <u>X</u>           |
| 3.Aesthetics ___                  |                                    |

Potential Threats:

Special Features:

- |                                    |   |
|------------------------------------|---|
| 1.Rare wetland type ___            | 4.Nesting site for colonial water birds ___ |
| 2.Rare animal or plant species ___ | 5.Migration stop-over site ___              |
| 3.Habitat of rare species ___      | 6. None evident <u>X</u>                    |

Description:

Notes:

1



2



3



4



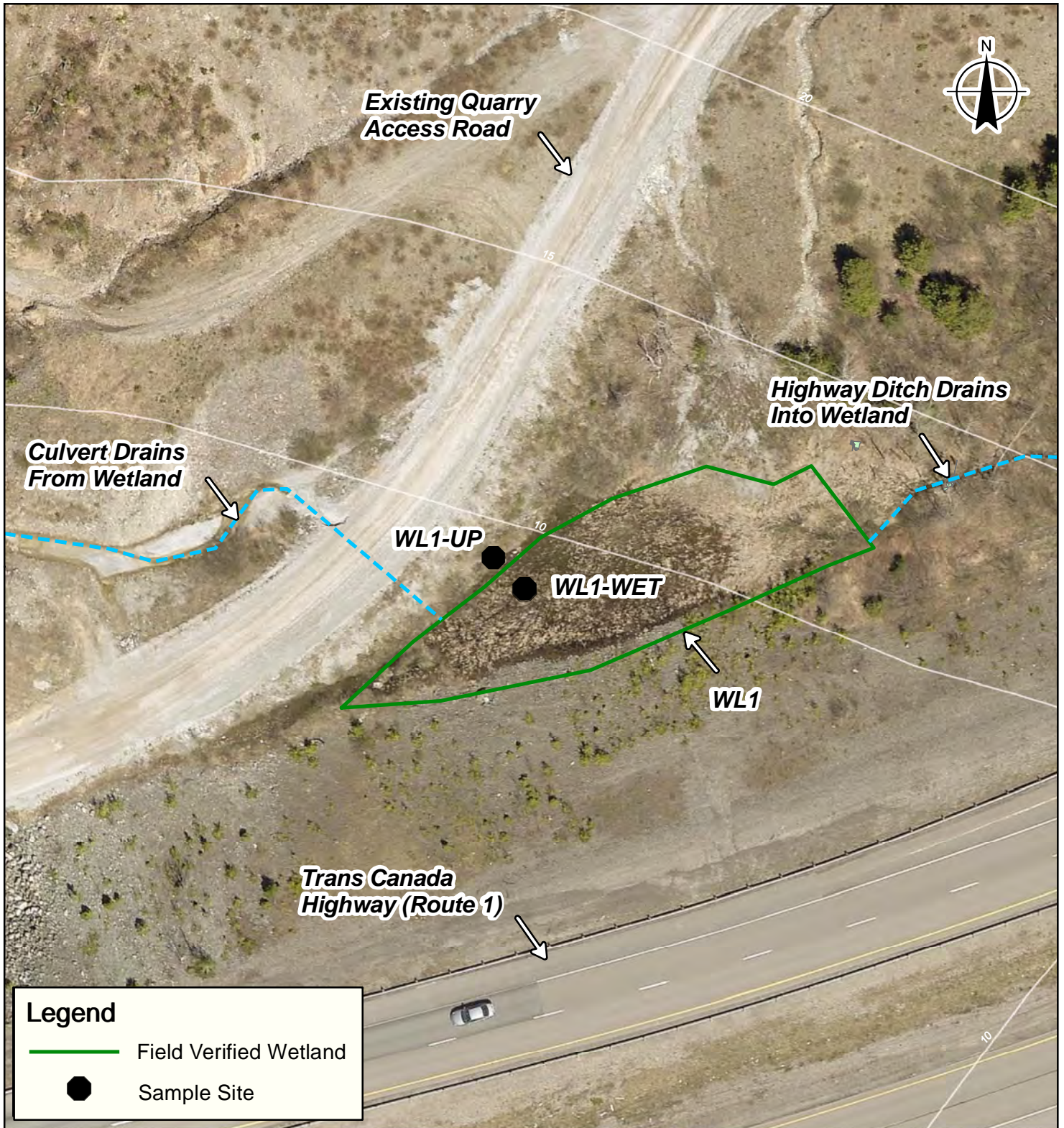
5



6



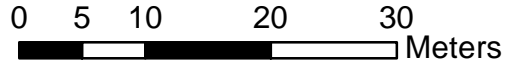
Photos 1,2 - Looking north in Cattail Marsh (Route 1 beyond. Photo 3 - Scrub-covered road banks are steep with loose rock. Photo 4 - Rock lined ditch at inlet with no flow. Photo 5 - Outlet at culvert in quarry road. Photo 6 - Discharge from culvert has stained the gravel in the ditch.



**Legend**

- Field Verified Wetland
- Sample Site

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



<b>TITLE:</b> Wetland Field Survey Delineation Sagewill Limestone Quarry French Village New Brunswick	<b>DATE:</b> APRIL 2019	<b>PROJECT NO.:</b> TE181001	
	<b>DWN BY:</b> NA	<b>DATUM:</b> NAD83 CSRS	
	<b>CHK'D BY:</b> GB	<b>PROJECTION:</b> UTM ZONE 20N	
<b>CLIENT:</b> Sagewill Enterprises Ltd.	<b>REV.NO</b> A	<b>SCALE</b> 1:600	<b>FIGURE NO.:</b> WL-1

Project Site Sagewill Limestone Quarry Date 30 Oct 2018 Sample Point WLI-Wet  
 Applicant/Owner Sagewill Enterprises Ltd Field Investigator(s) Garrett Bell / Mike Lewey  
 County Kings Coordinates 45° 25.56 / 65° 53.12  
 PID 30272652 Do normal environmental conditions exist on-site? Yes  No   
 if no explain: \_\_\_\_\_  
 Atypical Situation? Yes  No  Explain \_\_\_\_\_  
 Is this a potential Problem Area? Yes  No  Explain \_\_\_\_\_

**Wetland Determination**  
 (Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes  No   
 Wetland Hydrology Yes  No   
 Hydric Soils Yes  No   
 Wetland Type: Linked Basin Marsh  
 Rational for Determination: All 3 conditions met

**Wetland Determination**

YES  NO

**Vegetation**

Tree Stratum: (Plot size: _____)	%Cover	Dominant Species	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
= Total Cover			

Shrub Stratum: (Plot size: _____)	%Cover	Dominant Species	Indicator Status
1. <u>Alnus incana</u>	<u>5</u>	<u>✓</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>5</u> = Total Cover			

Herb Stratum: (Plot size: _____)	%Cover	Dominant Species	Indicator Status
1. <u>Typha latifolia</u>	<u>90</u>	<u>✓</u>	<u>OBL</u>
2. <u>Equisetum fluviatile</u>	<u>60</u>	<u>✓</u>	<u>OBL</u>
3. <u>Eutobium palustre</u>	<u>5</u>		<u>OBL</u>
4. <u>Eupatorium perforatum</u>	<u>5</u>		<u>FACW</u>
5. _____	_____	_____	_____
<u>160</u> = Total Cover			

**Dominance Test Worksheet:**

Total # of Dominant Species that are OBL,FACW,FAC: 3 (A)

Total # of Dominant Species across all strata: 3 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

**Prevalence Index Worksheet:**

Total % Cover of: \_\_\_\_\_ Multiply by: \_\_\_\_\_

OBL Species 155 x1 = 155

FACW Species 10 x2 = 20

FAC Species \_\_\_\_\_ x3 = \_\_\_\_\_

FACU Species \_\_\_\_\_ x4 = \_\_\_\_\_

UPL Species \_\_\_\_\_ x5 = \_\_\_\_\_

Column Totals: 165 x1 = 175

Prevalence Index = B/A = 1.06

**Hydrophytic Vegetation Indicators:**

Rapid Test for Hydrophytic Vegetation

Dominance Test is >50%

Prevalence Index is ≤3.0'

\_\_\_\_ Morphological Adaptations<sup>1</sup> (explain)

\_\_\_\_ Problematic Hydrophytic Vegetation (explain)

\_\_\_\_ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments \_\_\_\_\_

Hydrophytic Vegetation Present? Yes  No \_\_\_\_\_

Hydrology

Primary Hydrological Indicators: (minimum of one is required, check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron reduction in filled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators: (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes  No  Depth 5cm

Water Table Present? Yes  No  Depth

Wetland Hydrology Present? Yes  No

Saturation Present? Yes  No  Depth

Comments: Signs of seasonal flooding and variable water depth. Discharge from culvert + down gradient shows ~~iron~~ staining. dark

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features				Remarks	
	Color(moist)	%	Color(moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		Texture

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 5cm Mucky Peat or Peal (S3)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surfaces (S7)
- Polyvalue Below Surface (S8)
- Thin Dark Surface (S9)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Restrictive Layer (if observed): Type \_\_\_\_\_ Depth: \_\_\_\_\_ Hydric Soil Present? Yes  No

Comments: Pit not done. Standing water and rotten-egg smell

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site Sagewill Limestone Quarry Date 30 Oct 2018 Sample Point W1- up  
 Applicant/Owner Sagewill Enterprises Ltd. Field Investigator(s) Garrett Bell / Mike Lervey  
 County Kings Coordinates 45°25.56' / 65°53.12'  
 PID 30272652 Do normal environmental conditions exist on-site? Yes  No   
 if no explain: \_\_\_\_\_  
 Atypical Situation? Yes  No  Explain \_\_\_\_\_  
 Is this a potential Problem Area? Yes  No  Explain \_\_\_\_\_

**Wetland Determination**  
 (Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes  No   
 Wetland Hydrology Yes  No   
 Hydric Soils Yes  No   
 Wetland Type: \_\_\_\_\_  
 Rational for Determination: \_\_\_\_\_

**Wetland Determination**

YES  NO

**Vegetation**

Tree Stratum: (Plot size: _____)	%Cover	Dominant Species	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
= Total Cover			

Shrub Stratum: (Plot size: <u>10m</u> )	%Cover	Dominant Species	Indicator Status
1. <u>Betula papyrifera</u>	<u>5</u>	_____	<u>FACU</u>
2. <u>Alnus incana</u>	<u>25</u>	<input checked="" type="checkbox"/>	<u>FACW</u>
3. <u>Salix babingtonii</u>	<u>5</u>	_____	<u>FACW</u>
4. <u>Populus balsamifera</u>	<u>5</u>	_____	<u>FACW</u>
5. <u>Spiraea alba</u>	<u>2</u>	_____	<u>FACW</u>
<u>42</u> = Total Cover			

Herb Stratum: (Plot size: <u>5m</u> )	%Cover	Dominant Species	Indicator Status
1. <u>Solidago canadensis</u>	<u>15</u>	<input checked="" type="checkbox"/>	<u>FACU</u>
2. <u>Eupatorium sp.</u>	<u>10</u>	_____	<u>FACW</u>
3. <u>Thysanotus sp.</u>	<u>25</u>	<input checked="" type="checkbox"/>	<u>FACU</u>
4. <u>Aster sp.</u>	<u>10</u>	_____	<u>FAC</u>
5. _____	_____	_____	_____
<u>60</u> = Total Cover			

Comments steep slope - loose rock fall

**Dominance Test Worksheet:**

Total # of Dominant Species that are OBL,FACW,FAC: 1 (A)  
 Total # of Dominant Species across all strata: 3 (B)  
 % of Dominant Species that are OBL,FACW,FAC: 33 (A/B)

**Prevalence Index Worksheet:**

Total % Cover of: \_\_\_\_\_ Multiply by: \_\_\_\_\_

OBL Species	_____	x1 =	_____
FACW Species	<u>42</u>	x2 =	<u>84</u>
FAC Species	<u>10</u>	x3 =	<u>30</u>
FACU Species	<u>45</u>	x4 =	<u>180</u>
UPL Species	_____	x5 =	_____
Column Totals:	<u>97</u>	x1 =	<u>294</u>

Prevalence Index = B/A = 3.03

**Hydrophytic Vegetation Indicators:**

- Rapid Test for Hydrophytic Vegetation
- Dominance Test is >50%
- Prevalence Index is >3.0
- Morphological Adaptations<sup>1</sup> (explain)
- Problematic Hydrophytic Vegetation<sup>1</sup> (explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes \_\_\_\_\_ No

Hydrology

Primary Hydrological Indicators: (minimum of one is required, check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron reduction in filled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators: (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes \_\_\_ No  Depth \_\_\_

Water Table Present? Yes \_\_\_ No  Depth \_\_\_

Saturation Present? Yes \_\_\_ No  Depth \_\_\_

Wetland Hydrology Present? Yes \_\_\_ No

Comments: \_\_\_\_\_

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features				Texture	Remarks
	Color(moist)	%	Color(moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 5cm Mucky Peat or Peat (S3)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surfaces (S7)
- Polyvalue Below Surface (S8)
- Thin Dark Surface (S9)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Restrictive Layer (if observed): Type \_\_\_\_\_ Depth: \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_ No

Comments: Pit not done - man-made fill embankment



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Sagewill Limestone Quarry
Investigator Name:	Garrett Bell
Date of Field Assessment:	30/10/2018
Nearest Town:	Quispamsis
Latitude (decimal degrees):	45.2590
Longitude (decimal degrees):	65.5320
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.24
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100%
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes
How many wetlands have you assessed previously using WESP-AC? (approx.)	2
Comments about the site or this WESP-AC assessment (attach extra page if desired):	None

## Assessment Area (AA) Results:

Wetland ID: WL-1

Date: October 30, 2018

Observer: Garrett Bell

Latitude & Longitude (decimal degrees): 45.259, 65.532

*Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.*

*New Brunswick Reference Scores*

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)	New Brunswick Reference Scores											
							Min	Max	Range	F_JenksLo	F_JenksHigh	Min	Max	Range	B_JenksLo	B_JenksHigh		
Water Storage & Delay (WS)	1.50	Lower	2.50	Lower	2.89	2.56	1.73	9.42	7.68	2.48	5.12	0.08	10.00	9.92	2.58	5.67		
Stream Flow Support (SFS)	3.70	Moderate	1.29	Lower	1.97	0.75	0.00	5.33	5.33	2.92	6.56	0.00	5.83	5.83	2.08	6.16		
Water Cooling (WC)	1.67	Lower	1.33	Lower	1.11	0.80	0.00	6.67	6.67	1.80	5.30	0.00	6.02	6.02	1.45	4.79		
Sediment Retention & Stabilisation (SR)	0.00	Lower	2.88	Lower	2.11	1.75	3.16	10.00	6.84	1.76	5.26	0.00	6.07	6.07	3.75	7.95		
Phosphorus Retention (PR)	1.05	Lower	2.70	Moderate	3.64	2.78	2.90	10.00	7.10	2.66	4.17	0.33	9.38	9.04	1.71	4.55		
Nitrate Removal & Retention (NR)	0.74	Lower	6.25	Moderate	4.29	6.67	3.83	10.00	6.17	2.27	4.36	1.11	10.00	8.89	2.50	7.19		
Carbon Sequestration (CS)	0.00	Lower			3.52		4.56	8.88	4.31	3.13	5.70							
Organic Nutrient Export (OE)	2.63	Lower			3.73		2.33	7.64	5.30	3.12	5.26							
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00	0.00	6.13	6.13	1.80	6.71	0.00	7.39	7.39	0.00	4.44		
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00	0.00	5.95	5.95	1.40	6.29	0.00	7.09	7.09	0.00	4.48		
Aquatic Invertebrate Habitat (INV)	0.00	Lower	1.74	Moderate	3.75	2.18	3.87	7.39	3.52	2.58	5.58	1.24	6.64	5.39	0.85	5.74		
Amphibian & Turtle Habitat (AM)	4.38	Moderate	2.46	Moderate	5.62	3.58	3.30	8.58	5.28	3.30	6.25	2.09	8.16	6.06	2.27	6.30		
Waterbird Feeding Habitat (WBF)	3.20	Moderate	6.67	Moderate	2.54	6.67	0.00	7.96	7.96	0.00	6.84	0.00	10.00	10.00	0.83	6.67		
Waterbird Nesting Habitat (WBN)	3.98	Moderate	6.67	Moderate	3.40	6.67	0.00	8.54	8.54	1.95	5.42	0.00	10.00	10.00	0.00	6.67		
Songbird, Raptor, & Mammal Habitat (SBM)	1.85	Lower	6.67	Moderate	1.53	6.67	0.00	8.29	8.29	2.50	7.24	0.00	10.00	10.00	3.33	6.67		
Pollinator Habitat (POL)	6.46	Moderate	6.67	Moderate	5.20	6.67	0.00	8.05	8.05	0.00	7.81	0.00	10.00	10.00	0.00	6.67		
Native Plant Habitat (PH)	2.73	Lower	5.15	Moderate	4.19	4.47	3.08	7.12	4.03	3.96	5.98	0.00	8.68	8.68	0.00	6.33		
Public Use & Recognition (PU)			0.89	Lower		0.97						0.33	7.44	7.11	2.40	5.51		
Wetland Sensitivity (Sens)			1.87	Lower		2.76						2.20	5.20	2.99	2.88	5.30		
Wetland Ecological Condition (EC)			3.25	Moderate		6.11						4.24	10.00	5.76	3.25	6.39		
Wetland Stressors (STR) (higher score means more stress)			6.36	Higher		4.60						2.26	5.93	3.67	2.15	4.97		
<b>Summary Ratings for Grouped Functions:</b>																		
HYDROLOGIC Group (WS)	1.50	Lower	2.50	Lower	2.89	2.56									2.48	5.12	2.58	5.67
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	0.75	Lower	5.10	Moderate	3.84	5.20									3.07	5.39	4.15	7.64
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	2.85	Lower	1.60	Moderate	3.20	1.71									3.82	6.04	1.34	4.99
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	3.35	Moderate	4.91	Moderate	3.96	5.02									2.41	6.22	3.15	6.29
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	5.07	Moderate	6.41	Higher	4.42	6.30									4.68	7.60	0.00	5.33
WETLAND CONDITION (EC)			3.25	Moderate		6.11											3.25	6.39
WETLAND RISK (average of Sensitivity & Stressors)			4.11	Moderate		3.68											2.71	4.33

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.