APPENDIX A

CERTIFICATE OF INCORPORATION AND REGISTRY OF JOINT STOCKS CORPORATE PROFILE

PROVINCE OF NOVA SCOTIA

CERTIFICATE OF INCORPORATION

Companies Act
Chapter 42, R.S.N.S. 1967

M.S.D. ENTERPRISES LIMITED — Name of Company

1818288 — Number

I hereby certify that the above-mentioned Company was this date incorporated under the Companies Act and that the company is limited.

Registrar of Joint Stock Companies

OCTOBER 29, 1987 — Date of Incorporation

596B

PROVINCE OF NOVA SCOTIA

CERTIFICATE OF REGISTRATION

Corporations Registration Act
Chapter 59, R.S.N.S. 1967

M.S.D. ENTERPRISES LIMITED — Name of Corporation

1818288 — Number

I hereby certify that the above-mentioned Corporation is registered under the provisions of Part Two of the Corporations Registration Act.

Registrar of Joint Stock Companies

October 29, 1987 — Date of Registration

1997A

NOVA SCOTIA
Service Nova Scotia and Municipal Relations
Registry of Joint Stock Companies

Print Close Window

PROFILE - M.S.D. ENTERPRISES LIMITED - as of 2007-03-08 10p.m.

Company/Society Name:	M.S.D. ENTERPRISES LIMITED
Registry ID:	1818288
Type:	N.S. Limited Company
Nature Of Business:	
Status:	Active
Jurisdiction:	Nova Scotia
Registered Office:	17 ESTATES DRIVE LOWER SACKVILLE NS B4C 3Z2
Mailing Address:	17 ESTATES DRIVE LOWER SACKVILLE NS B4C 3Z2

PEOPLE

Name	Position	Civic Address	Mailing Address
DAVID BANCROFT	Recognized Agent	17 ESTATES DRIVE LOWER SACKVILLE NS B4C 3Z2	17 ESTATES DRIVE LOWER SACKVILLE NS B4C 3Z2
DAVID BANCROFT	Director	17 ESTATES DRIVE LOWER SACKVILLE NS B4V 3Z2	
DAVID BANCROFT	PRESIDENT/SECRETARY	17 ESTATES DRIVE LOWER SACKVILLE NS B4V 3Z2	
HEDLEY BLUNDON	Director	18 METCALFES LANE CONCEPTION BAY SOUTH NL	

		A1W 5P6	
HEDLEY BLUNDON	VICE-PRESIDENT	18 METCALFES LANE CONCEPTION BAY SOUTH NL A1W 5P6	
EDWARD MURPHY	Director	5 LAMBERT PLACE ST. JOHN`S NL A1A 3X4	
EDWARD MURPHY	TREASURER	5 LAMBERT PLACE ST. JOHN`S NL A1A 3X4	

ACTIVITIES

Activity	Date
Registered	1987-10-29
Incorporated	1987-10-29
Change of Directors	1987-11-27
Registered Office Change	1987-11-27
Special Resolution	1988-07-19
Agent Filed	1991-10-15
Annual Report Filed	1995-10-04
Annual Renewal	1996-10-18
Annual Statement Filed	1996-10-18
Change of Directors	1997-10-20
Appoint an Agent	1997-10-20
Annual Statement Filed	1997-10-28
Annual Renewal	1997-10-28
Annual Renewal	1998-09-16
Annual Statement Filed	1998-09-16
Annual Renewal	1999-09-16

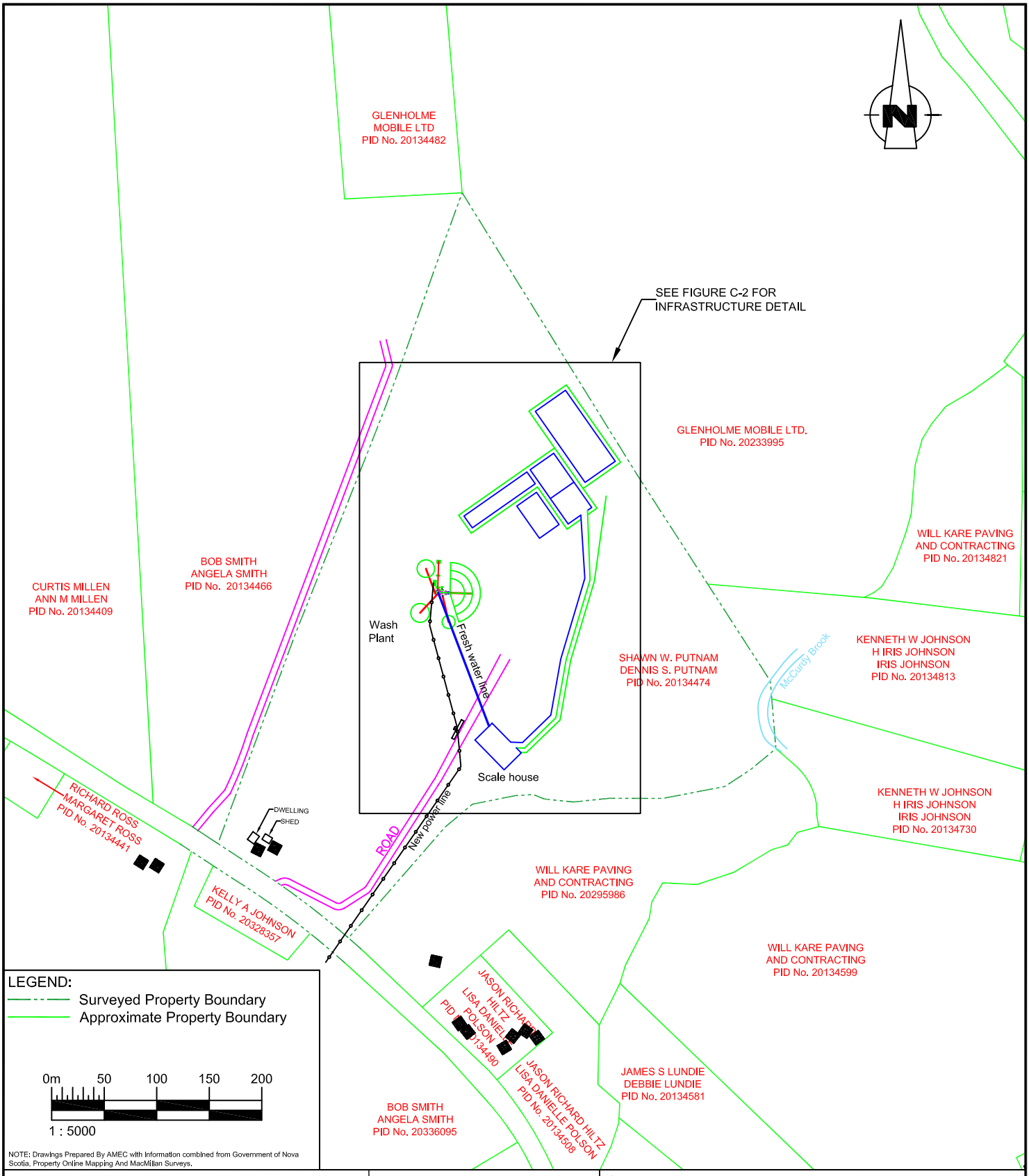
Annual Statement Filed	1999-09-16
Annual Renewal	2000-10-16
Annual Statement Filed	2001-01-30
Appoint an Agent	2001-02-13
Address Change	2001-02-13
Annual Renewal	2001-10-16
Annual Statement Filed	2001-10-16
Annual Renewal	2002-09-12
Annual Renewal	2003-10-30
Annual Statement Filed	2003-10-30
Annual Renewal	2004-10-29
Annual Statement Filed	2004-10-29
Change of Directors	2005-08-10
Annual Renewal	2005-11-30
Annual Statement Filed	2005-12-15
Filed Document	2006-01-18
Appoint an Agent	2006-01-25
Address Change	2006-01-25
Change of Directors	2006-01-25
Special Resolution	2006-01-27
Annual Renewal	2006-10-13
Annual Statement Filed	2006-10-13

RELATED REGISTRATIONS

This Company ...
Registered GLENHOLME READY MIX & CONTRACTING

APPENDIX B

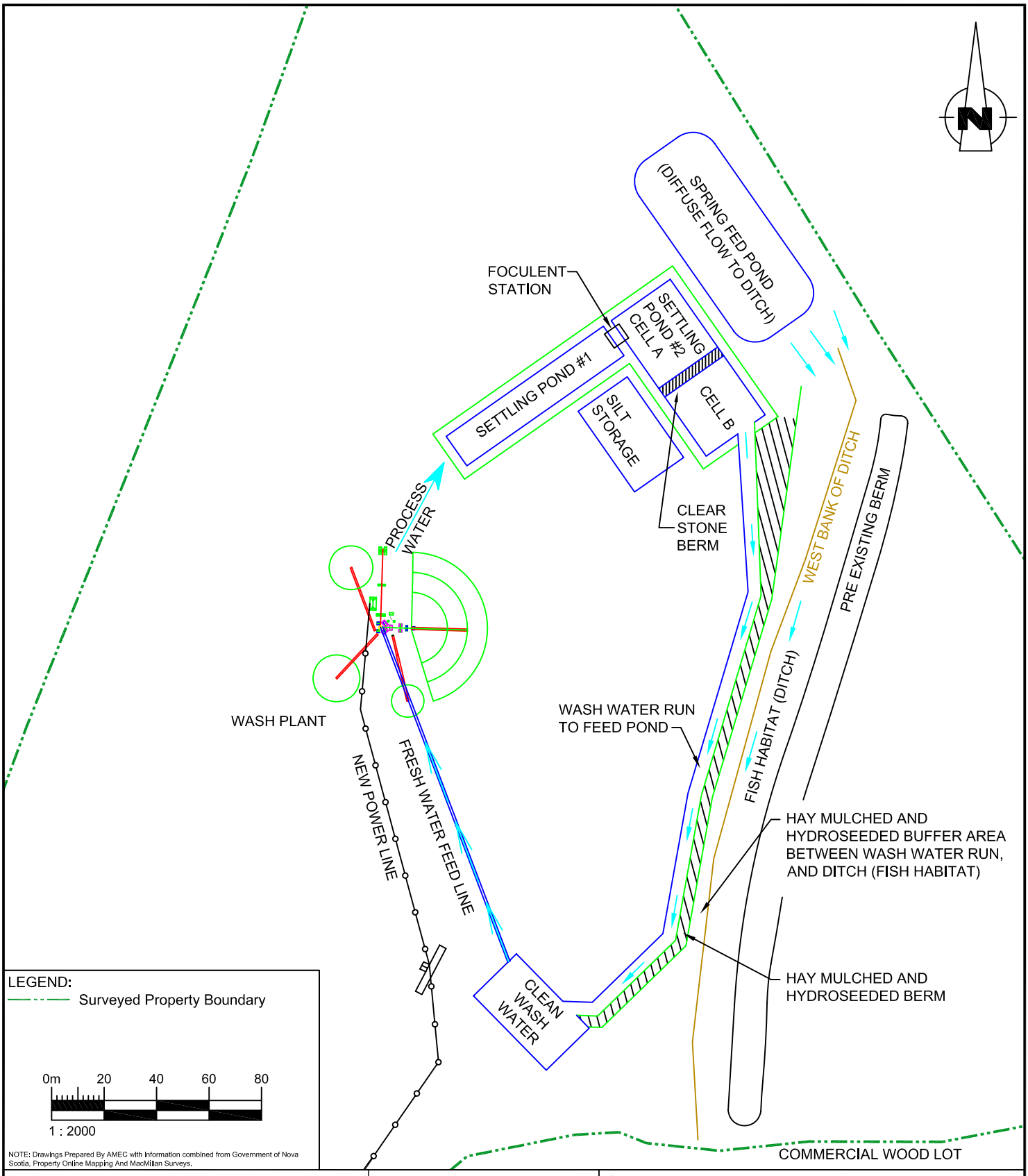
SURVEY AND PLANS SHOWING PIDs
FOR NORTH AND SOUTH PROPERITES



AMEC Earth & Environmental
32 Troop Avenue, Unit 301, Dartmouth, NS, B3B 1Z1
Tel. 902-468-2848 Fax 902-468-1314

CLIENT
M.S.D. ENTERPRISES LTD.

PROJECT: GLENHOLME GRAVEL PIT EXPANSION DEVELOPMENT	DWN BY: EM	DATUM: NAD83	DATE: June 2007
TITLE: NORTH PROPERTY SURVEY PLAN	CHK'D BY: JM	REV. NO.: 0	PROJECT NO: TV61049
	PROJECTION: UTM Zone 20	SCALE: 1:5,000	FIGURE No. FIGURE B-1



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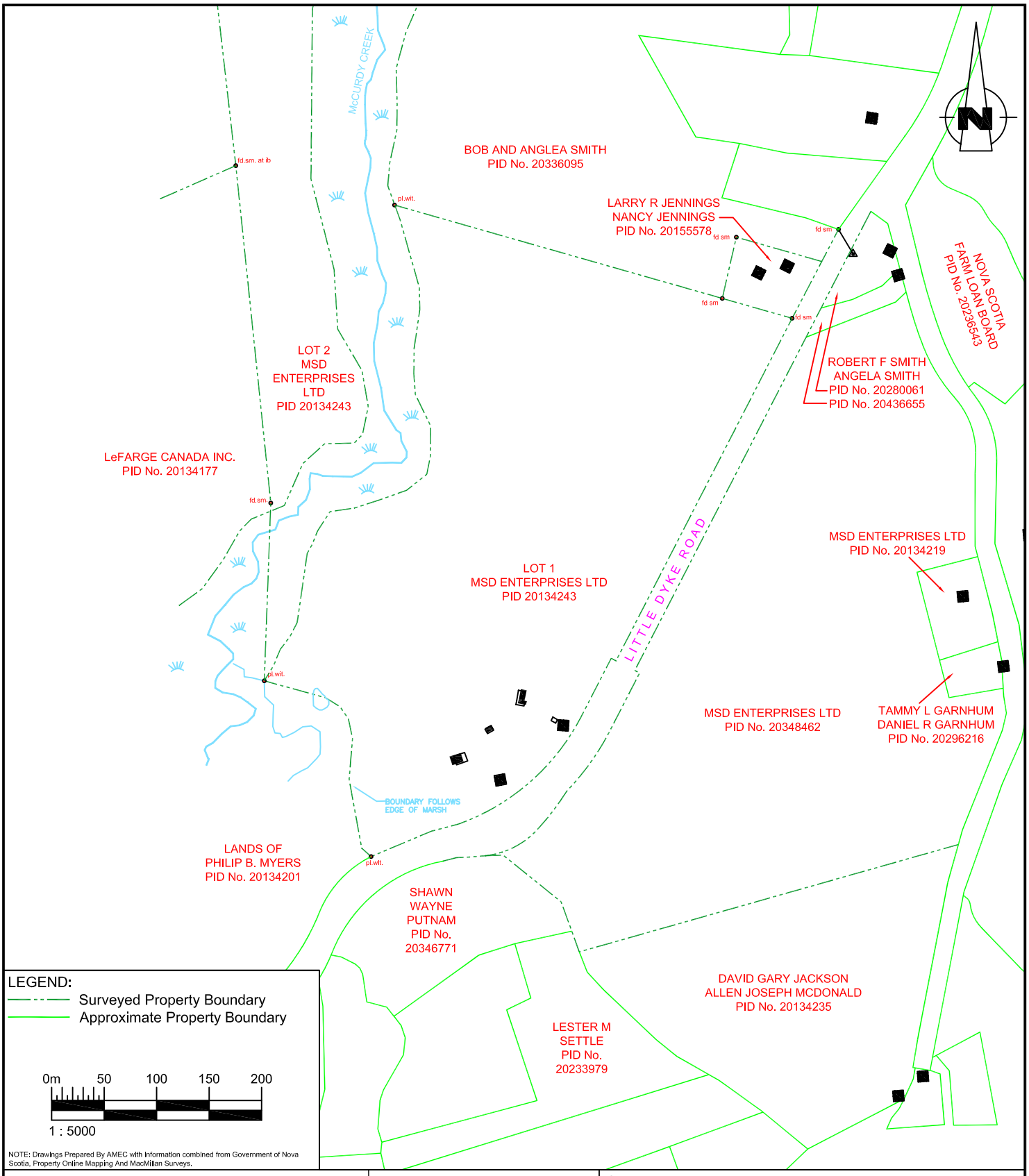
Tel. 902-468-2848 Fax 902-468-1314

CLIENT
M.S.D. ENTERPRISES LTD.

PROJECT: GLENHOLME GRAVEL PIT EXPANSION DEVELOPMENT	DWN BY: EM	DATUM: NAD83	DATE: June 2007
TITLE: NORTH PROPERTY INFRASTRUCTURE SURVEY	CHK'D BY: JM	REV. NO.: 0	PROJECT NO: TV61049
	PROJECTION: UTM Zone 20	SCALE: 1:5,000	FIGURE No. FIGURE B-2



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Tel. 902-468-2848 Fax 902-468-1314

CLIENT
M.S.D. ENTERPRISES LTD.

PROJECT: GLENHOLME GRAVEL PIT EXPANSION DEVELOPMENT	DWN BY: EM	DATUM: NAD83	DATE: June 2007
TITLE: SOUTH PROPERTY SURVEY PLAN	CHK'D BY: JM	REV. NO.: 0	PROJECT NO: TV61049
	PROJECTION: UTM Zone 20	SCALE: 1:5,000	FIGURE No. FIGURE B-3

APPENDIX C

PUBLIC INVOLVEMENT

M.S.D. Enterprises Ltd.
Gravel Pit Expansion Development
Project Information Sheet

Project Overview

M.S.D. Enterprises Ltd. (MSD) is undertaking an environmental assessment of two existing gravel pit operations and expansion developments located on two separate properties (North and South Property) near the community of Glenholme, Colchester County, NS (see Figure 1 on reverse). The proposed developments would supply aggregates, concrete, and manufactured soil to various local markets including residential and commercial construction, municipal infrastructure projects *(i.e*., water and sewer) and road building. The scope of the future activities is similar to current and past activities and will encompass pit extraction, crushing, washing, stockpiling, and dry batch concrete production. All new activities will be undertaken in accordance with the Nova Scotia *Pit and Quarry Guidelines* (NSEL 1999).

North and South Properties

The North Property is located north of Highway No. 2, and northwest of the community of Glenholme. The area of development for the North Property will total approximately 10.2 ha with a gravel pit development of approximately 4.6 ha, and associated process operations within a footprint of 5.6 ha more or less.

The South Property is located south of the community of Glenholme adjacent to Little Dyke Road. The area of development for the South Property will total approximately 19.6 ha, with existing gravel pit operations extending over an area of approximately 10.8 ha. and expanded area of approximately 8.8 ha.

Products, Processes, Transportation

The products generated include sand, stone, dry batch concrete, and manufactured soil. Portable crushing equipment will be brought to the site to process the extracted gravel. Gravel is washed by means of constructed on-site wash facilities. Various products *(i.e.,* various aggregate sizes) will be stockpiled at the site until they are trucked to local markets in Nova Scotia, typically within 125 km of Glenholme. The average number of trucks hauling aggregates from the pits will be 20 to 50 per day, depending on market demand. This could increase to as much as 100 to 165 per day, at peak production for short periods during the construction season, if a large aggregate supply contract were awarded. The anticipated average production rate is approximately 155,000 tonnes per year. The operating schedule will be based typically on 12-hrs/day, 5-days/week, year-round, with the potential for short term expansion of operations to 7-days per week, 24-hours per day for short periods during the construction season.

Environmental Assessment and Approvals

M.S.D. Enterprises Ltd. (MSD) is required to register this project as a Class I Undertaking pursuant to the Nova Scotia *Environment Act* and *Environmental Assessment Regulation*s. This legislation requires the proponent to undertake an environmental assessment (EA) of the proposed works and activities.. The EA is currently being prepared by environmental consultants AMEC Earth and Environmental, a division of AMEC Americas Limited. AMEC conducts the EA on behalf of MSD. Other relevant provincial regulations include the *Activities Designation Regulation*s, which requires an Industrial Approval from the Nova Scotia Department of Environment and Labour for the pit operation. Provincial guidelines to be adhered to include the Nova Scotia *Pit and Quarry Guidelines* (NSEL 1999). MSD will submit an application for the Industrial Approval upon completion of the EA.

The EA will evaluate potential environmental effects of the project and identify mitigation and monitoring measures to minimize adverse effects. The EA focuses on those aspects of the environment that are of most concern such as: rare and sensitive flora; wildlife; wetlands; groundwater resources; surface water resources; freshwater fish and fish habitat; archaeological and heritage resources; air quality; and socio-economic environment. The results of the assessment and all recommendations will be documented in an environmental registration document which will be available for public review and comment once it is filed with the NSEL.

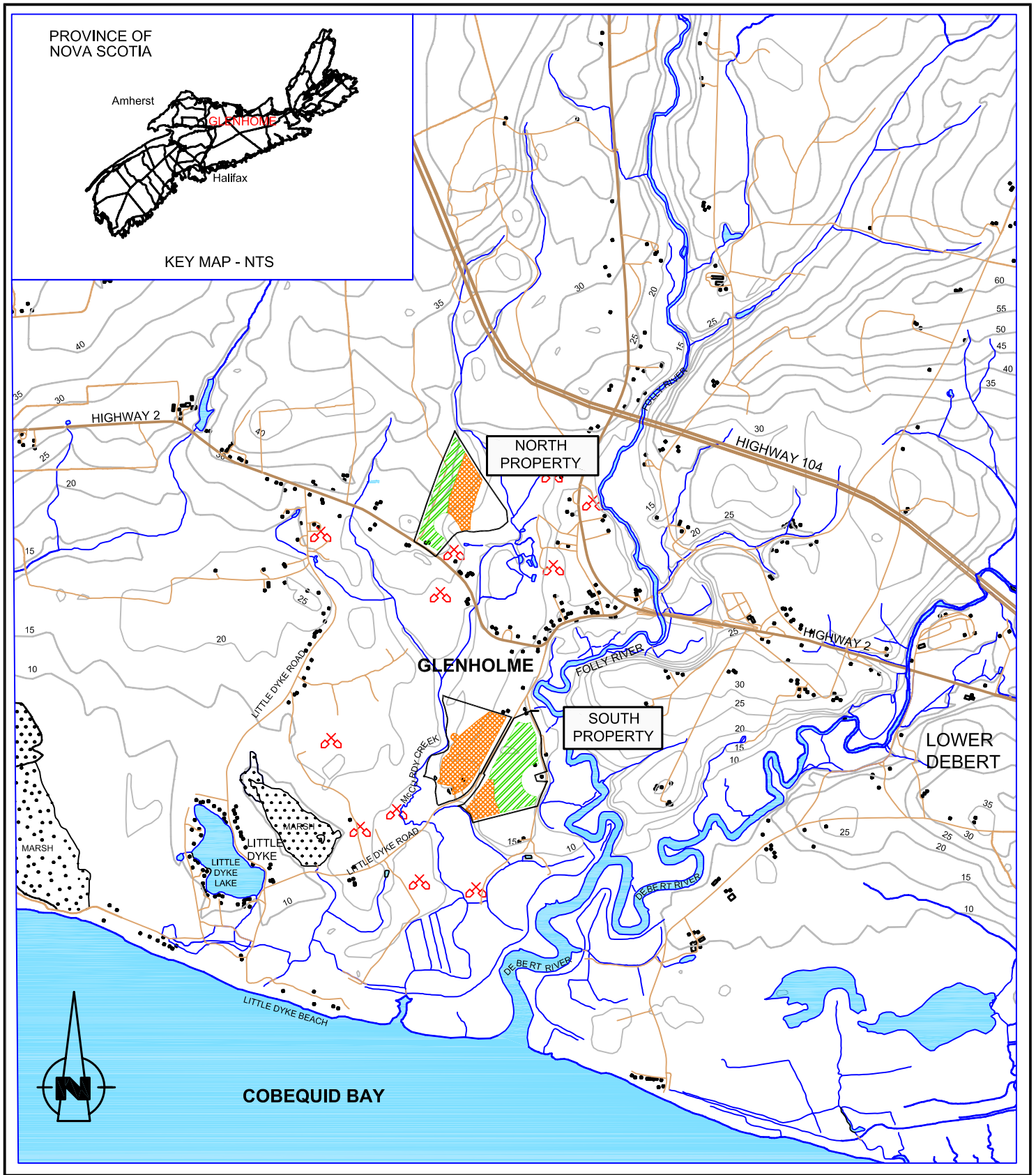
Contacts

If you have any questions or concerns about this project please contact:

Shawn Putnam, General Manager
M.S.D. Enterprises Ltd.
(902) 662.3722 tel
(902) 662.2825 fax

or

James Millard, Senior Environmental Scientist
AMEC Earth and Environmental
32 Troop Avenue, Unit 301
Dartmouth, NS B3B 1Z1
(902) 468-2848 tel
(902) 468-1213 fax



M.S.D. ENTERPRISES LTD GRAVEL PIT EXPANSION DEVELOPMENT

0m 300 600 900 1200

1 : 30,000

- ROADWAYS
- CONTOUR (5m INTERVALS)
- WATERCOURSE
- BUILDING/ STRUCTURE
- GRAVEL PIT
- PROPERTY BOUNDARY
- EXISTING AREA OF PROJECT DEVELOPMENT
- PROPOSED / EXPANDED AREA OF PROJECT DEVELOPMENT

SOURCE: DEPARTMENT OF HOUSING AND MUNICIPAL AFFAIRS, NOVA SCOTIA GEOMATICS CENTER, 1991.

amec

February 9, 2006

Michael Cox, Department of Lands, Environment, and Natural Resources.
The Confederacy of Mainland Mi'kmaq
PO Box 1590 (57 Martin Crescent)
Truro, NS B2N 5V3

Dear Mr.Cox:

Re: Glenholme Gravel Pit Expansion Development
Glenholme, Nova Scotia

M.S.D. Enterprises Ltd. (MSD) is undertaking an environmental assessment (EA) of two existing gravel pit operations and expansion developments located on two separate properties near the community of Glenholme, Colchester County, NS. The proponent (MSD) plans to develop the two properties which have previously been used for agricultural commercial crops (south property) and blueberry fields (north property).

The environmental assessment (EA) is currently being prepared by environmental consultants AMEC Earth and Environmental, a division of AMEC Americas Limited (AMEC). AMEC conducts the EA on behalf of MSD. The attached information circular provides information on the location and scope of the project in advance of submission of the EA registration document. The EA report will be submitted to government within the next month.

Davis Archaeological Consultants Limited (Davis) conducted an archaeological resource impact assessment of the proposed development properties in June and July 2006. The results of the archaeological surveys showed both properties to be of low archaeological potential and no archaeological resources were encountered within the development areas.

Please do not hesitate to contact the undersigned by telephone at 902-468-2848 or by fax at 902-468-1314 should you wish to receive a copy of the Davis report or if you have any comments regarding the proposed expansion development.

Respectfully submitted,

AMEC Earth & Environmental
A Division of AMEC Americas Limited

James Millard, M.Sc., P.Geo.
Senior Environmental Scientist

Atttach: Project Information Sheets (two pages)

AMEC Earth & Environmental,
A division of AMEC Americas Limited
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Dartmouth, Nova Scotia
Canada B3B 1Z1
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APPENDIX D

FISH AND FISH HABITAT

D-1. PROJECT LOCATION AND SETTING

The pit development and operations (the Project) are located on two properties, separated by a distance of approximately 1.5 km. The South Property is located south of Glenholme along Little Dyke Road and the North Property is located immediately northwest of Glenholme, north of Highway No. 2 (Glooscap Trail). The locations of the two properties are shown in Figure 2-1, 2-2, and 2-3 of the main report. M.S.D. Enterprises Limited (MSD) currently conducts gravel pit extraction and associated operations on these properties, and will be extending/expanding gravel pit extraction and related operations at both properties. Associated operations include gravel extraction, classification, washing, and concrete production.

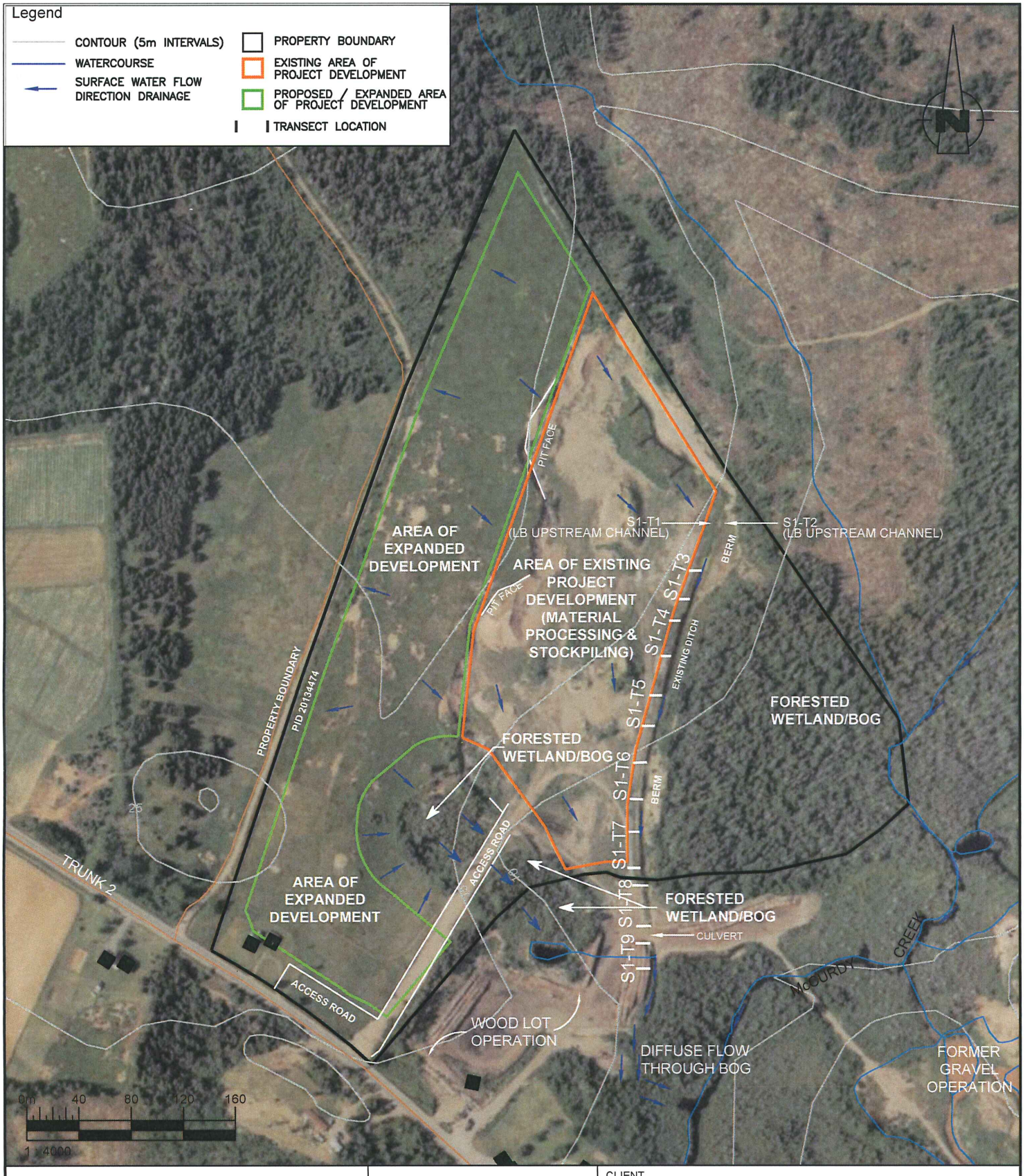
D-2. SURVEY METHODS

Qualitative fish habitat surveys were conducted on May 8 and 9, 2006, by a qualified fish biologist employed by AMEC using a standard approach developed through past discussions with Nova Scotia Department of Natural Resources (DNR), DFO published literature, and DFO specialists from the Habitat Management Division. The surveys involved the selection of transects along the watercourse and included a range of physical characteristics (i.e. channel morphology, substrate, riparian and in-stream vegetation), and pH[1] measurements. Photographs were also taken and are presented in Section D-6. Transect lengths were based on average transect widths to obtain a total transect area of approximately $100m^2$. Transect widths and depths were approximated or, if crossing the channel was possible, measured at three locations and averaged. Qualitative estimations were expressed as percentages. Estimation of substrate composition was done using the classification guide as presented in Table D.1. Transect locations for the North and South Properties are provided in Figures D-1 and D-2.

Cover was estimated using five different types grouped into two categories: instream and riparian (Scruton et al.1992, cited by Sooley et al. 1998). Descriptions are provided in Table D.2.

Stream banks were assessed according to stability. *Stable* banks were considered to be areas of well-vegetated ground with adequate root system and without visible signs of soil erosion; *eroding* banks were considered to be areas of slumping that displayed loss of bank material. Finally, habitat types and classifications were determined according to the description in Table D.3 (Gibson et al. 1987, Scruton and Gibson 1995, Scruton et al. 1992 and McCain et al. 1990, as cited by Sooley et al. 1998).

[1] Field water quality field measurements (dissolved oxygen, conductivity, and temperature) were aborted part way through the program due to meter malfunction.



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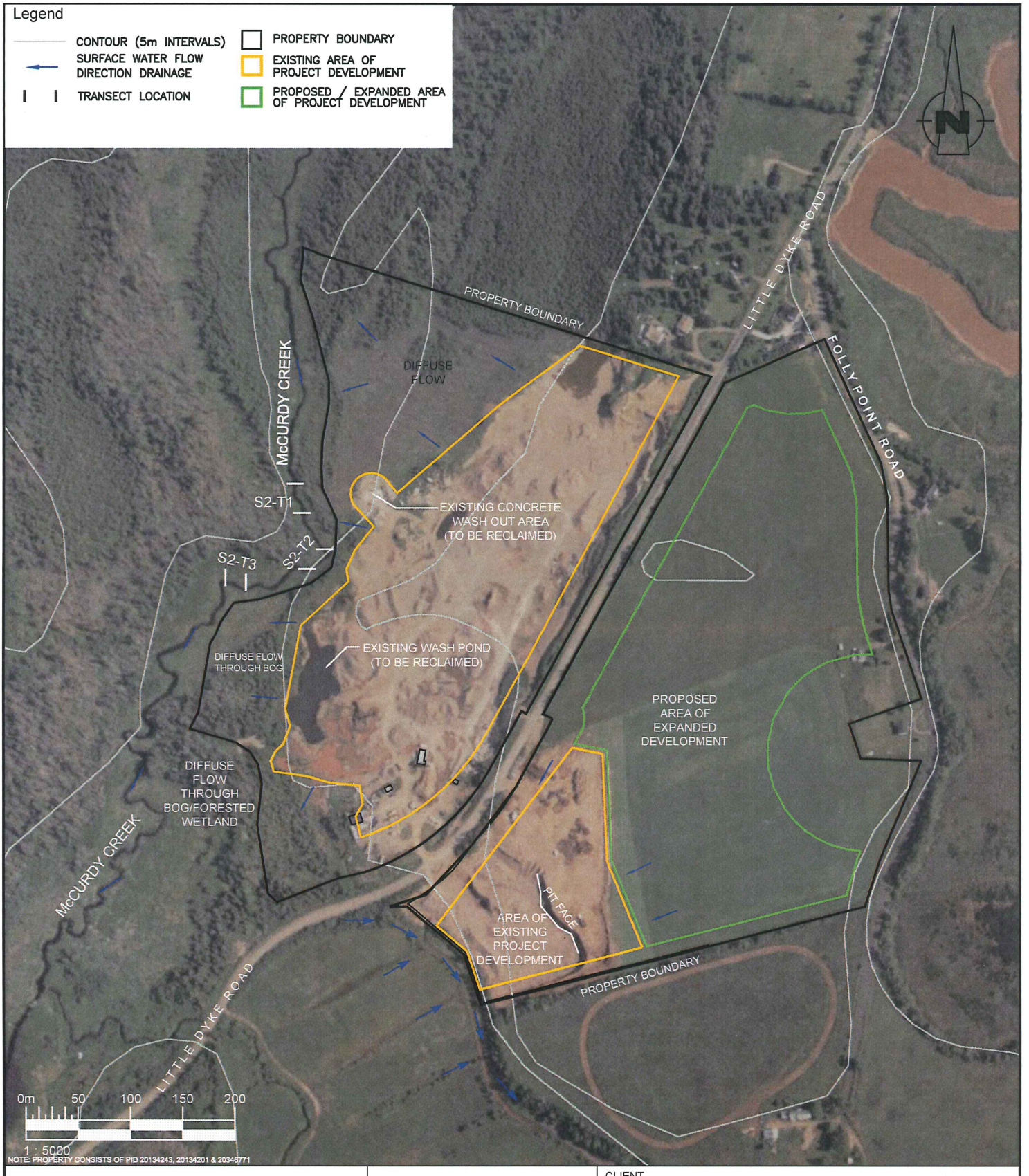
CLIENT

M.S.D. ENTERPRISES LTD.

PROJECT: GLENHOLME GRAVEL PIT EXPANSION DEVELOPMENT	DWN BY: YC/EM	DATUM: NAD83	DATE: June 2007
TITLE: TRANSECT LOCATIONS-NORTH PROPERTY FISH HABITAT ASSESSMENT	CHK'D BY: JM	REV. NO.: 0	PROJECT NO: TV61049
	PROJECTION: UTM Zone 20	SCALE: 1:4,000	FIGURE No. FIGURE D-1



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CLIENT
M.S.D. ENTERPRISES LTD.

PROJECT: GLENHOLME GRAVEL PIT EXPANSION DEVELOPMENT	DWN BY: EM	DATUM: NAD83	DATE: June 2007
TITLE: TRANSECT LOCATIONS-SOUTH PROPERTY FISH HABITAT ASSESSMENT	CHK'D BY: JM	REV. NO.: 0	PROJECT NO: TV61049
	PROJECTION: UTM Zone 20	SCALE: 1:5,000	FIGURE No. FIGURE D-2

TABLE D.1: Classification of Substrate Types

Substrate Type	Description
Siltation	The relative degree of siltation in a section includes a determination of the amount of silt deposited on top of, and between, other substrate materials. This could be descriptive or defined as a percentage of the substrate by silt.
Mud/clay	Very fine deposits from mud to silt on stream margins, between rocks, and on top of other substrates.
Sand	Sand sized deposits frequently found on margins of streams or between rocks and stones, from 0.06 to 2 mm in diameter.
Gravel	Small stones from 2 mm to 3 cm in diameter.
Pebble	Small rocks to stones from 3 – 5 cm in diameter.
Cobble	Moderate to small sized rocks from 6 - 13 cm in diameter.
Rubble	Large rocks from 14 - 25 cm in diameter.
Small Boulder	Boulder sized rocks from 25 cm to 1 m in diameter.
Large Boulder	Large boulder sized rocks greater than 1 m in diameter.
Bedrock	Contiguous parent material exposed by the scouring forces of the river/stream.

TABLE D.2: Classification of Cover Types

Cover Category and Type	Description
Instream	
Inert	Cover present in the stream bed including fallen trees and logs, rocks and boulders and other accumulated debris as well as undercut banks.
Vegetation	Aquatic vegetation growing in the stream bed including grasses, macrophytes, water weeds, mosses, algae and other stream plants.
Pools	Pools with a depth greater or equal to 1 m.
Riparian	
Canopy	Cover provided by mature hardwood and softwood trees growing along the riparian zone (within a 5 m distance of both stream banks). This only includes trees with branches/foliage hanging over the stream.
Overhanging	Cover provided by riparian grasses and shrubs up to 1 m in height. This type of vegetation is found along the stream edge or hangs out over the stream.

TABLE D.3: Classification of Habitat Types

Run	Swiftly flowing water with some surface agitation but no major flow obstructions, coarser substrate (gravel, cobble and boulders).
Riffle	Shallower section with swiftly flowing, turbulent water with some partially exposed substrate (usually cobble or gravel dominated).
Pocket water	Turbulence increased greatly by numerous emergent boulders that create, eddies or scour holes (pockets) behind the obstruction.
Flat (or steady)	Water surface is smooth and substrate is generally flat bottomed and made up of organic matter, such as sand, mud, and fine gravel. This habitat differs from a pool due to the length, associated with low gradient.
Pool	Deeper area comprising the full or partial width of the stream and exhibiting a reduced flow due to greater depths and/or or widths. Pools have rounded surfaces on the bottom.
Cascade (rapids)	Areas of steeper gradient with irregular and rapid flows and often with turbulent white water. Rapids are primarily associated with larger stream sections and rivers. In large rivers it is recommended that the survey crew not attempt to conduct cross sections in these areas.
Glide	Wide, shallow pool flowing smoothly and gently, with low to moderate velocities and little or no surface turbulence. Substrate usually consists of cobble, gravel and sand.

D-3. RESULTS – NORTH PROPERTY

A total of seven (7) surveys were completed for the drainage ditch on the North Property over a length of approximately 330 m. An additional two (2) surveys were completed at the upper end of the ditch to account for two small channels (refer to Figure D-1) and a walk off-property at the downstream end of the ditch through the bog to McCurdy Creek was also completed. Photos are provided in Section D-6 (Photos 1 to 16, incl.)

North Property - General Description

Overall the ditch was fairly uniform and straight with a largely silty bottom, low flow and an average width of about 5.0 m (refer to Table D.4 and Photos D.1 to D.9). The upstream end of the ditch system begins as two small converging channels that, in the past, likely drained a wet area that is now occupied by a sedimentation pond. The source of water in the ditch is believed to be primarily seepage and local run-off. The ditch is a flanked on the east bank by a berm, which separates most of the lower end of the ditch channel from a bog. Several run-in channels originating from the bog pass through breaks in the berm. The west bank of the ditch flanks the eastern extent of historical pit operations. Ditch depths were varied with most of the watercourse averaging 1.0 m in the main channel reach areas, and approximately 0.20 m in the upstream (transects T1 and T2) and downstream reaches (transects T8 and T9) (refer to Figure D-1 and Table D.5). Upstream areas appeared to have experienced regular seasonal flooding (Photo C.10) however, the streambanks overall were mostly stable with around 20% undercut banks and shallow inclines. As the ditch continues downstream, the channel cuts closer to the berm, thereby leading to progressively steeper banks supported by various canopy species.

Ditch widths varied from about 1.0 m to 8.0 m (Table D.4). Upstream areas were wider for the most part leading to a constriction downstream resulting in decreased silt deposition and increased flow. Most of the cover is provided by instream and overhanging riparian vegetation while a small percentage is supplied through inert and canopy cover (Figure D.3). The majority of the ditch can be described as a flat with some run and riffle habitat (Figure D.4) and there are no pools. A log in transect T9 had created a small still area in this section (Photo C.11). The lower end of the watercourse enters a large bog area and becomes quite bifurcated before entering McCurdy Creek (Figure D.1 and Photos D.12 and D.13). At least one beaver dam has been constructed downstream from this location (Photo D.14).

Woody debris from a logging pile had entered the watercourse downstream of transect T9 creating a small still area and, in times of low flow, likely creates a barrier at this location (Photo D.15). Furthermore, woody debris continually dumped at this section has resulted in unstable banks (Photo D.16). It should be noted however, that this portion of the watercourse is on the adjacent property to the east (wood lot operation).

North Property - Vegetation

Vegetation along the watercourse was of low to moderate diversity and included instream, riparian and, in some locations, canopy specimens (Table D.4). Table D.5 provides a list of species, however it should be noted that identification was limited due to the time of year. There was a high density of algal growth and floating brown algal blooms in the water of most of the upstream areas where cover and flow are generally decreased in comparison to downstream areas.

North Property - Fish

There were no rare or endangered species noted, however this area is within the range of the Inner Bay of Fundy salmon (*Salmo salar*). This species has been designated as "*Endangered*" by COSEWIC and spawns in those rivers of Nova Scotia and New Brunswick that drain into the Minas Basin and Chignecto Bay (SAR website, 2006). Other anadromous species such as Atlantic sturgeon (*Acipenser oxyrhynchus*), American shad (*Alosa sapidissima*), striped bass (*Morone saxatilis*) and rainbow smelt (*Osmerus mordax*) are also common to the region but would not be likely to access the watercourse from McCurdy Creek, even during flood events, due to the bog barrier. Freshwater fishes common to the region include creek chub (*Semotilus atromaculatus*) and brook trout (*Salvelinus fontinalis*) as well as stickleback (*Gasterosteidae sp.*), killifish (*Fundulus sp.*), common shiner (*Notropis cornutus*), golden shiner (*Notemigonus crysoleucas*), white sucker (*Catastomus commersoni*) and pearl dace (*Margariscus margarita*) (Davis and Browne 1996). Minnows were observed in all transects except T6 and T7 (Figure D.1), and there were two observations of what was likely a salmonid species, most likely trout. Since an electro-fishing survey was not completed, the positive verification of fish species observed in the ditch and pond cannot be confirmed.

North Property – Summary

Overall the habitats observed on the ditch of the North Property have a sluggish flow with mainly flats and runs, variable depths not exceeding 1m, soft sediment with occasional large and small boulders, and aquatic macrophytes in many locations. Although there are sections with moderately stable and undercut banks, and areas with good cover, the North Property ditch is considered a Classification IV under the habitat classifications for salmonid macro-habitat (Beak 1980 as cited by Sooley et al. 1998). This type of habitat is defined as poor juvenile salmonid rearing habitat with no spawning capability, although there are areas that could (and possibly do) provide shelter and feeding habitat for larger, older and juvenile salmonids such as brook trout. Ideal salmonid spawning habitat is typically characterized by well oxygenated water with riffle sections, deeper pools, and substrate large enough for sufficient water flow with little silt build-up.

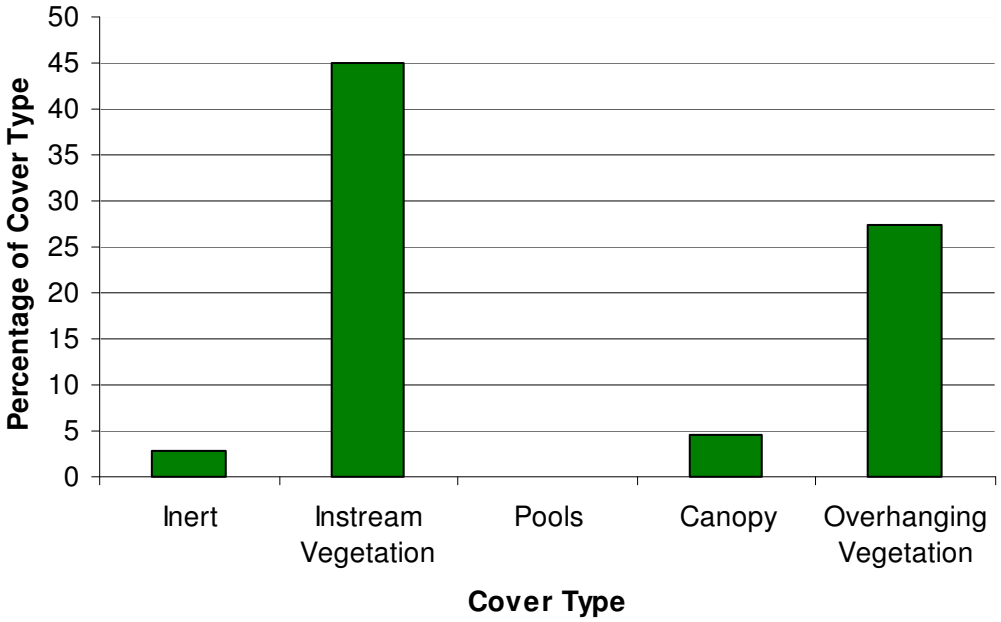

Figure D-3: Percent Cover for North Property-Existing Ditch System

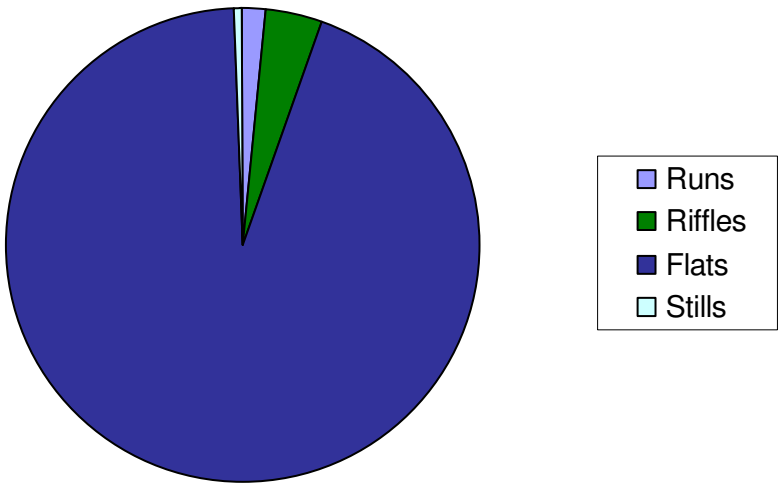

Figure D-4: Percent Habitat Types for North Property-Existing Ditch System

TABLE D.4: Qualitative Data for North Property Surveys

Site #	Site Length (m)	Site Width (m)	Average Depth (m)	Siltation	Substrate (%)		Habitat Types (%)		Cover (%)			pH	Habitat Classification[2]
S1-T1	17.9	1.09	0.11	Heavy	Silt	76	Riffle	11	Instream	Inert	3	6.5	Type 4
					Sand	5	Flat	89		Vegetation	80		
					Gravel	5	Run	0		Pools	0		
					Pebble	10	Glide	0	Riparian	Canopy	0		
					Rubble	4	Pool	0		Overhanging	1		
S1-T2	31.7	6.74	.25	Heavy	Silt	98	Riffle	0	Instream	Inert	0	6.7	Type 4
					Sand	.5	Flat	80		Vegetation	98		
					Gravel	.5	Run	20		Pools	0		
					Pebble	0	Glide	0	Riparian	Canopy	0		
					Rubble	1	Pool	0		Overhanging	90		
S1-T3	14.0	Approx. 7.0	>1.0	Heavy	Silt	85	Riffle	0	Instream	Inert	10	7.2	Type 4
					SB	5	Flat	100		Vegetation	5		
					LB	3	Run	0		Pools	0		
					Pebble	2	Glide	0	Riparian	Canopy	0		
					Rubble	5	Pool	0		Overhanging	15		
S1-T4	20.0	Approx. 5.0	>1.0	Heavy	Silt	94	Riffle	0	Instream	Inert	7	7.0	Type 4
					SB	2	Flat	100		Vegetation	1		
					LB	0	Run	0		Pools	0		
					Pebble	2	Glide	0	Riparian	Canopy	2		
					Rubble	2	Pool	0		Overhanging	25		
S1-T5	11.0	8.0	>1.0	Heavy	Silt	70	Riffle	0	Instream	Inert	0	6.9	Type 4
					SB	0	Flat	100		Vegetation	30		
					LB	0	Run	0		Pools	0		
					Pebble	10	Glide	0	Riparian	Canopy	20		
					Rubble	20	Pool	0		Overhanging	15		
S1-T6	20.0	Approx. 5.0	>1.0	Heavy, with high concentration of TDS	Silt	Unk[1]	Riffle	0	Instream	Inert	0	6.8	Type 4
					SB		Flat	100		Vegetation	91		
					LB		Run	0		Pools	0		
					Pebble		Glide	0	Riparian	Canopy	3		
					Rubble		Pool	0		Overhanging	35		
S1-T7	20.0	Approx. 5.0	>1.0	Heavy	Silt	92	Riffle	0	Instream	Inert	3	6.9	Type 4
					SB	0	Flat	100		Vegetation	20		
					LB	0	Run	0		Pools	0		
					Pebble	3	Glide	0	Riparian	Canopy	10		
					Rubble	5	Pool	0		Overhanging	55		
S1-T8	30.6	1.4	.26	Moderate - Low	Silt	50	Riffle	9	Instream	Inert	1	7.1	Type 4
					Sand	15	Flat	51		Vegetation	70		

TABLE D.4: Qualitative Data for North Property Surveys (Cont...)

Site #	Site Length (m)	Site Width (m)	Average Depth (m)	Siltation	Substrate (%)		Habitat Types (%)		Cover (%)			pH	Habitat Classification[2]
					Gravel	10	Run	40		Pools	0		
					Pebble	15	Glide	0	Riparian	Canopy	7		
					Rubble	10	Pool	0		Overhanging	8		
S1-T9	13.6	.81	.10	Heavy - Low	Silt	43	Riffle	12	Instream	Inert	1	7.0	Type 4
					Sand/Gravel	20	Flat	20		Vegetation	8		
					SB	2	Run	63		Pools	0		
					Pebble	15	Still	5	Riparian	Canopy	0		
					Rubble	20	Pool	0		Overhanging	5		

Notes:
[1] Unknown: Substrate difficult to see due to turbidity
[2] Type 4 Habitat defined as poor juvenile salmonid rearing habitat with no spawning capability, although there are areas that could (and possibly do) provide shelter and feeding habitat for larger, older and juvenile salmonids such as brook trout.
Transects are listed from upstream (T1) to downstream (T9).
Where noted, site widths and depths are approximations because silt conditions made it difficult to accurately measure these parameters.

Table D.5. Vegetative Species Observed in Site 1 Survey

Scientific Name	Common Name
Flora	
Euthamia sp.	Goldenrod
Typha sp.	Bullrush
Iris versicolor	Blue flag
Chamaedaphne calyculata	Leatherleaf*
Ledum groenlandicum	Labrador tea*
Daucus carota L.	Queen Anne's lace (Wild carrot)
Unknown species	Ferns, grasses, algae and aquatic macrophytes
Tree/Shrub	
Pinus strobus	White pine
Picea sp.	Spruce
Betula papyrifera	White birch
Larix laricina	Tamarack (Larch)
Acer rubrum	Red maple (saplings)
Rubus allegheniensis	Blackberry
Salix discolor	Pussy willow
Alnus rugosa	Speckled alder

* Noted in the bog area.

D-4. RESULTS – SOUTH PROPERTY

A total of three surveys were completed on a section of McCurdy Creek that lies west of the South Property west boundary over a reach length of approximately 330 m (refer to Figure D-2).

South Property - General Description

McCurdy Creek meanders through this area with a relatively uniform width, mucky bottom, and very low flow (Table D.6). The banks of the creek in this section are low and stable, with few undercut areas overall (< 5%) Refer to Photos D.17 to D.20, Section D-6.

There is a low variety of instream and overhanging vegetation, mostly alders, grasses and sedges, but very little canopy cover (within 5 m of streambank) (Table D.6). As in the North Property, the majority of cover is provided by instream and overhanging riparian vegetation (Figure D-5). A small percentage of inert cover is available and pools create an additional 11% overall cover for the transects surveyed. There are signs of regular flooding especially in T3 where the left bank extends as a broad, flat, grass and sedge area that likely becomes wetland in flooding events (Photo D.20). Depths could not be measured but, in general were about .5-1 m.

The majority of the watercourse can be described as a run with some pool and flat habitat (Figure D-6).

South Property - Vegetation

There were no rare or endangered species noted. Vegetation along the watercourse was of low diversity consisting mainly of speckled alder (Alnus rugosa), leatherleaf (Chamaedaphne calyculata) and wild perennials (mainly golden rod) that provided good riparian (overhanging) cover. Instream cover was provided by woody debris and extensive grasses. There was a high density of algal growth and floating brown algal blooms in the water in the two upstream locations where flow was decreased.

South Property - Fish

There were no rare or endangered fish noted however as mentioned in Section D-3, Inner Bay of Fundy salmon (Salmon salar) are found in this region. It is not known if this species could access McCurdy Creek from Cobequid Bay. Fish were observed feeding in T2 but species type was not known.

TABLE D-6: Qualitative Data for South Property Surveys

Site #	Site Length (m)	Site Width (m)	Average Depth (m)	Siltation	Substrate (%)		Habitat Types (%)		Cover (%)			pH (units)	Habitat Classif-ication
S2-T1	13.0	Approx 7.0	>1.0	Moderate	Silt	100	Riffle	0	Instream	Inert	5		Type 4
					Clay	Minimal	Flat	10		Vegetation	70		
					Gravel	0	Run	59		Pools	15		
					Pebble	0	Glide	0	Riparian	Canopy	0		
					Rubble	0	Pool	31 (2 pools)		Overhanging	40		
S2-T2	20.0	Approx 5.0	>1.0	Moderate - Low	Silt	80	Still	32	Instream	Inert	10		Type 4
					Sand	10	Flat	19.7		Vegetation	45		
					Gravel		Run	48		Pools	5	Meter mal-function	
					Pebble	5	Pool	.1 (1 pool)	Riparian	Canopy	0		
					Clay	Minimal	Marsh	.2		Overhanging	50		
S2-T3	16.0	Approx6.0	1.0-.5	Moderate - Low	Silt	75	Riffle	0	Instream	Inert	1		Type 4
					Sand	15	Flat	10		Vegetation	55		
					Gravel		Run	74		Pools	15		
					Pebble	10	Glide	0	Riparian	Canopy	0		
					Muds	Minimal	Pool	16 (1 pool)		Overhanging	21		

[1] Substrate difficult to see due to high turbidity

Notes:
Site widths and depths are approximations because silt conditions made it difficult to accurately measure these parameters.
All site photos attached in Appendix B.

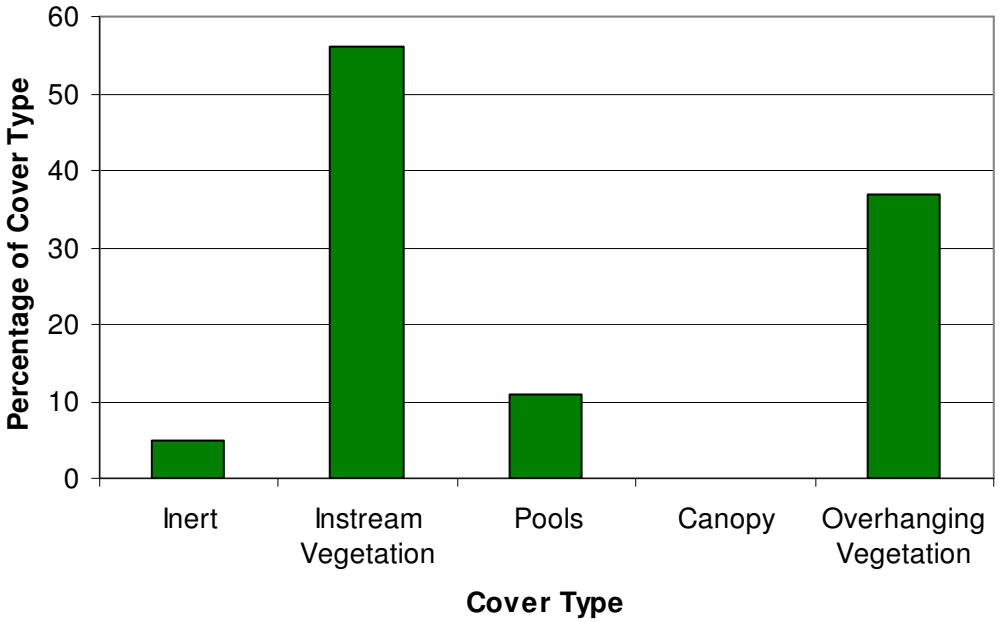

Figure D-5: Percent Cover for South Property

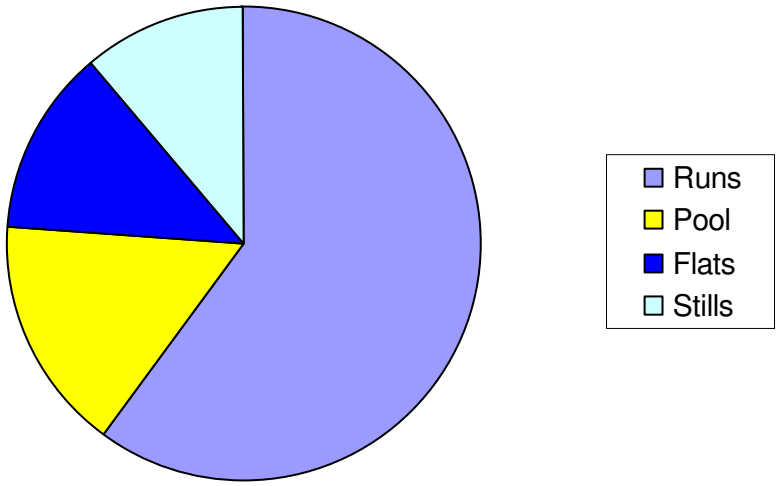

Figure D-6: Percent Habitat Types at South Property

D-5 REFERENCES

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Photo D.1: North Property– T2 ('Right' upstream channel)

Photo D.2: North Property – T1 ('Left' upstream channel)

Photo D.3: North Property - T3

Photo D.4: North Property– T4

Photo D.5: North Property– T5

Photo D.6: North Property – T6

Photo D.7: North Property – T7

Photo D.8: North Property– T8

Photo D.9: North Property T9

Photo D.10: North Property - Flooding conditions downstream from T1 and T2

Photo D.11: North Property - Still area created by log (T9)

Photo D.12: North Property - Downstream view of McCurdy Creek

Photo D.13: North Property - Flooding conditions Downstream from T1 and T2

Photo D.14: Beaver dam on McCurdy Creek downstream from North Property.

Photo D.15: North Property - Wood debris downstream from T9.

Photo D.16: North Property - Wood debris along banks at T9.

Photo D.17: South Property McCurdy Creek – T1.

Photo D.18: South Property - McCurdy Creek – T2.

Photo D.19: South Property - McCurdy Creek – T3.

Photo D.20: South Property - Flooded marsh area at T3.

APPENDIX E

SPECIES- AT –RISK DATABASE REVIEW

E-1 Species of Special Status

Plant and Animal Species of conservation concern in Nova Scotia include:

- Species listed by COSEWIC as endangered, threatened or of special concern;
- Species protected under the Nova Scotia Endangered Species Act
- Wildlife protected under the Nova Scotia Wildlife Act
- Species listed in the Nova Scotia General Status of Wild Species in Nova Scotia as "Red" or "Yellow"
- Species designated as rare by species/resource experts such as the ACCDC (as S1, S2, S3) and the NS Museum.

Species at Risk Database Definitions can be found in Section E-6.

E-2 Species of Special Status Known to Occur in the Vicinity of the Project Area

A survey of species at risk databases available from the Atlantic Canada Conservation Data Centre (ACCDC) and the Nova Scotia Museum identified a small number of known occurrences of species of conservation concern.

In an email dated May 5, 2006, the ACCDC indicated the presence of a relatively small number (quintile 1) of rare taxa records within a 5 km buffer around the Project Area: 13 records of 12 taxa from 5 sources, for a data density of 0.15 records/km^2.

E-3 Flora Species of Special Status known to Occur in the Project Area

ACCDC (2006) indicated records for 4 rare vascular plant species within a 5 km radius around the Project Area, and no records for rare non-vascular plants (Table E-1). These records are based on Zinck and Roland (1998), Blaney (2000) and Benjamin (2002).

The Nova Scotia Museum (2006) has records of 12 rare species of vascular plants within the 10 km grid that contains the Project Area (Table 2). Rare plant species associated with the gypsum area around Maitland, found in an adjacent grid, as well as species associated with estuarine conditions were not included by the NS Museum (2006). Museum staff pointed out that the presence or absence of these plants should be determined during field assessments.

None of the species listed in Tables E-1 and E-2 is listed as "of concern" under COSEWIC or SARA (lists updated March 20 2007) or the Nova Scotia Endangered Species Act (as of March 2007).

Based on habitat requirements and habitats available at the Project Site, the following plants are unlikely to occur at the Project Site: *Equisetum pratense*, *Huperzia selago*, *Asplenium trichomanes- ramosum* and *Dryopteris fragans*. However, *Equisetum pretanse*, as well as *Polygonum scandens* may occur in the wetlands adjacent to the Project Site (streamside fen and wooded floodplain.

TABLE E-1 Plant Species of Special Status Known to Occur Within 5 km of the Proposed Glenholme Pit (ACCDC, 2006)

Common Name	Scientific Name	NSDNR Rank[1]	ACCDC Rank	Phenology**
Meadow Horsetail*	*Equisetum pratense*	Yellow	S2	--
Fir Clubmoss	*Huperzia selago*	Not Assessed	S1/S3	--
Woods-Rush	*Juncus subcaudatus*	Undetermined	S3	July to October
Pale-spiked Lobelia	*Lobelia spicata*	Undermined	S1/S2/SE	--

Notes: 1 – Webpage last updated November 2002
S1- Extremely rare throughout its range in the province, and may be especially vulnerable to extirpation
S2 - Rare throughout its range in the province, and may be vulnerable to extirpation due to rarity or other factors.
S3 - Uncommon throughout its range in the province, or found only in a restricted range, even if abundant in some locations.
S1/S2 - Considered extremely rare or rare throughout its range in Nova Scotia
S3/S4 – May be uncommon or widespread through its range in Nova Scotia, depending on its location.
* Also listed by the NS Museum (Table E-2)
** Flowering times from Zinck and Roland (1998).
-- not applicable

TABLE E-2 Plant Species of Special Status Known to Occur Near the Study Area (NS Museum, 2006)

Common Name	Scientific Name	NSDNR General Status Rank in Nova Scotia [1]	Phenology **
Green Spleenwort	*Asplemium trichomanes-ramosum*	Yellow	--
Purple-Stem Swamp Beggar-Ticks	*Bidens connata*	Yellow	Aug. and Sept
Fragrant Fern	*Dryopteris fragans*	Yellow	Spores: June – Sept.
Meadow Horsetail*	*Equisetum pretense*	Yellow	--
Black Ash	*Fraxinus nigra*	Yellow	May and June
Wood Nettle	*Laportea Canadensis*	Yellow	July - September
Yellow Canada Lily	*Lilium canadense*	Yellow	July
Beck's Water Marigold	*Megalodonta (syn. Bidens) beckii*	Yellow	Aug. and Sept.
Halberd- Leaf Tearthumb	*Polygonum arifolium*	Yellow	--
Climbing False-Buckwheat	*Polygonum scandens*	Yellow	Late Aug- Oct.
Long-leaf Stitchwort	*Stellaria longifolia*	Yellow	May- July
Heart-leafed Foam Flower	*Tiarella cordifolia*	Yellow	May 15- June15

Notes: 1 – Webpage last updated November 2002
* Also listed by ACCDC (Table E-1)
** Flowering times according to Zinck and Roland (1998)
-- not applicable

Based on available habitat, the following plants could potentially occur at the Project Site: *Lobelia spicata* may occur in dry fields, such as the blueberry fields/ abandoned blueberry fields; *Juncus subcaudatus*, *Bidens connata, Fraxinus nigra, Laportea canadensis, Lilium canadense*, *Polygonium arifolium* and *Stellaria longifolia* may occur in the wetlands on the Project Site or bordering the Project Site. *Megalodonta beckii,* a submerged aquatic plant, may occur in the ponds and streams on the Project Site or bordering the Project Site. *Tiarella cordifolia* occurs in deciduous forests and intervales and gravelly roadsides. Therefore, it may be found both on and adjacent to the Project Site.

E-4. Fauna Species of Special Status known to Occur in the Project Area

ACCDC indicated 7 records of 6 rare vertebrate species, and two records of two rare invertebrate fauna within a 5-km buffer around the Study Area (ACCDC, 2006) (Table E-3). These records are based on Erskine (1992) and Brunelle (2004). ACCDC also notes that Wood Turtles (COSEWIC: Special Concern) are potentially present in the Study Area (i.e. present in adjacent watersheds), and that they utilize both the upper and lower elevations (ACCDC, 2006).

In addition, the NS Museum, Heritage Division, assembled a list of 12 species of birds of concern, which were found nesting in the area, as well as four fish species and one shellfish species (Table 4). While these species have not been found on the specific Project Sites, they have however been found in the immediate area around the Project Site. The fish species have been found in waters that would or could receive water from the project area, including Debert River, Folly River, and McCurdy Brook, as well as the Mina Basin. The near shore (hard-bottom) habitats in the Minas Basin are the home to a significant disjunct population of Anglewing Clams (Table E-4). Museum Staff also points out that the nature of the wetlands in immediately adjacent areas is such, that there is a high probability for seasonal use of such habitats by a large number of other bird species, particularly during the migration period (NS Museum, 2006). Migratory bird species, which include most of the song birds present in Nova Scotia, are protected under the Migratory Birds Convention Act (MBCA). The protection extends to include nests and young of these species. Raptors such as Northern Goshawk are protected under the Nova Scotia Wildlife Act, as are fish-eating birds.

TABLE E-3 Animal Species of Special Status Known to Occur Within 5 km of the Glenholme Pit (ACCDC, 2006)

Common Name	Scientific Name	NSDNR Rank[1]	ACCDC Rank	COSEWIC/ SARA Ranking**
Birds				
Northern Pintail*	*Anas acuta*	Green	S2B	-
Black-billed Cuckoo	*Coccyzus erythrophthalmus*	Green	S3B	-
Indigo Bunting*	*Passerina cyanea*	Accidental	S2S3B	-
Nelson's Sharp-tailed Sparrow	*Ammodramus nelsoni*	-	S2S3B	NAR
Bobolink*	Dolichonyx oryzivorus	Yellow	S3B	-
Baltimore Oriole (Northern O. – NSDNR)	*Icterus galbula*	Green	S3B	-
Odonata				
Common Whitetail (syn. White Tailed Skimmer)	*Plathemis (syn. Libellula) lydia*	Green	S3	-
Emerald Spreadwing	*Lestes dryas*	Green	S3	-

Notes: S1- Extremely rare throughout its range in the province, and may be especially vulnerable to extirpation
S2 - Rare throughout its range in the province, and may be vulnerable to extirpation due to rarity or other factors.
S3 - Uncommon throughout its range in the province, or found only in a restricted range, even if abundant in some locations.
B= Breeding population; NAR= Not at Risk
1 – Webpage last updated November 2002
* Also listed by NS Museum (Table E-4)
** Listing as of March 20, 2007.

TABLE E-4 Animal Species of Special Status Known to Occur in the Area of the Proposed Glenholme Pit (NS Museum, 2006)

Common Name	Scientific Name	NSDNR Rank[1]	ACCDC Rank	COSEWIC/ SARA Ranking**	Probability of Nesting (NS Museum)
Birds					
Northern Goshawk	*Accipiter gentilis*	Yellow		NAR	Possible
Sharp-tailed Sparrow	*Ammodramus caudacutus*	Yellow		-	Possible
Northern Pintail*	*Anas acuta*	Green	S2B	-	Probable
American Widgeon	*Anas Americana*	Green		-	n.a.
Black-billed Cuckoo*	*Coccyzus erythrophthalmus*	Green	S3B	-	Probable
Nelson's Sharp-tailed Sparrow*	*Ammodramus nelsoni*	(A. caudacutus: Yellow)	S2S3B	NAR/-	
Bobolink*	Dolichonyx oryzivorus	Yellow	S3B	-	Highly probable
Horned Lark	*Eremophila alpestris*	Green		-	Possible
Common Loon	*Gavia immer*	Yellow		NAR /COSEWIC	Probable
Baltimore Oriole/Northern Oriole? *?	*Icterus galbula*	Green	S3B	-	n.a.
Indigo Bunting*	*Passerina cyanea*	Accidental	S2S3B	-	Possible
Pied-billed Grebe	*Podilymbus podiceps*	Green		-	n.a.
Eastern Kingbird	*Tyrannus tyrannus*	Green		-	n.a.
Fish					
Inner Bay of Fundy Salmon (landlocked and anadromous)	*Salmo salar*	Red		SARA and COSEWIC: endangered (Inner Bay of Fundy Pops)	-
Striped Bass	*Morone saxatilis*	Red		COSEWIC: threatened; SARA: decision pending	-
Atlantic Sturgeon	*Acipenser oxyrhynchus*	Red		-	-
Blacknose Dace	*Rhinichthys atratulus*	Green		-	-
Molluscs					
Anglewing Clam/ Atlantic Mud-piddock	*Barnea truncate*	?		-	-

Notes: S1- Extremely rare throughout its range in the province, and may be especially vulnerable to extirpation
S2 - Rare throughout its range in the province, and may be vulnerable to extirpation due to rarity or other factors.
S3 - Uncommon throughout its range in the province, or found only in a restricted range, even if abundant in some locations.
S1/S2 - Considered extremely rare or rare throughout its range in Nova Scotia
S3/S4 – May be uncommon or widespread through its range in Nova Scotia, depending on its location.
B- Breeding population; NAR= Not at Risk
1 – Webpage last updated November 2002
* Also listed by ACDC (TableE-3)
** ** Listing as of March 20, 2007.

None of the birds, dragon flies and molluscs listed in Tables E-3 and E-4 are listed under COSEWIC/ SARA or the Nova Scotia Endangered Species Act. However, most birds are protected under MBCA, and Northern Goshawk is protected under the NS Wildlife Act. Two of the four fish species are listed under COSEWIC: Striped Bass and Atlantic Salmon. The latter is also protected under the SARA.

E-5 Managed and Special Areas

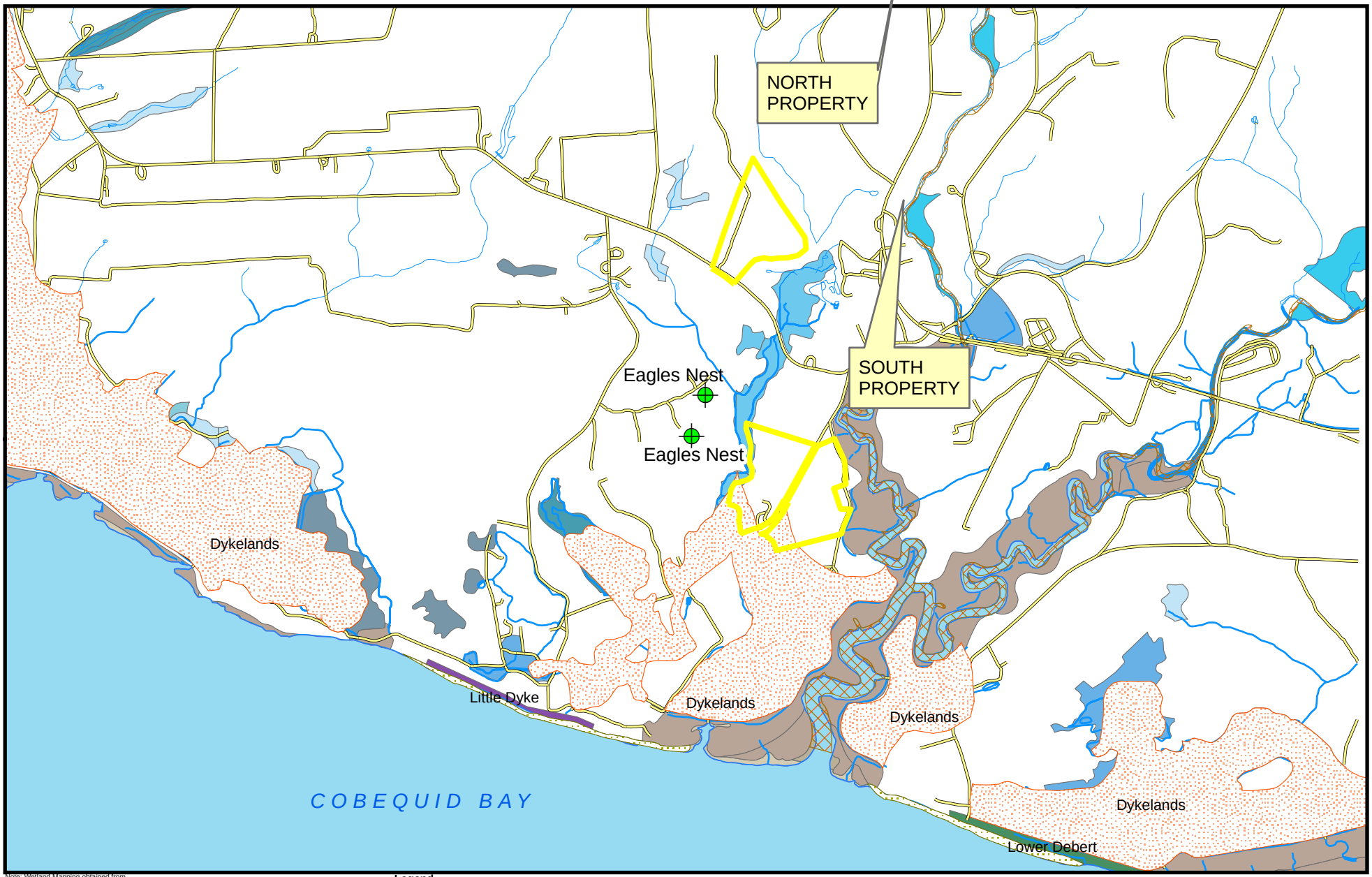
As part of the scoping and assessment process, a GIS scan carried out by ACCDC (2006) identified two areas with some degree of protection within a 5 km radius around the Study Area. The search results indicated the following:

- Lower Debert Beach, protected under the Nova Scotia Beaches Act, is located about 3 – 4 km southeast of the study area at the Bay of Fundy coast.
- Little Dyke, an area owned by Ducks Unlimited, is located about 3- 4 km southwest of the Study Areas at the Bay of Fundy Coast. (Both areas are unlikely to be impacted by the Project developments due to the distance from the Project areas.)

In addition, the Nova Scotia Department of Natural Resources (NSDNR) Significant Species and Habitat database was consulted to determine the presence of high priority areas within the general area of the Project. This database contains information on sites within Nova Scotia that contain species at risk, species of special conservation concern, specialized habitats that could be jeopardized by human activities, sites of high biodiversity, and sites of local natural historic interest. A distance of around 10 km from the Project was used as a search radius. The results from the search are presented in Figure E-1. The search outlined the following habitats and species of interest:

- Fundy Dykelands that are south of the Project area[1]
- Salt marshes that are located east and southeast of the Project area along the Folly River basin. Salt marshes were not associated with McCurdy Creek.
- Sand bars, beaches and shorebirds associated with coastal areas south of the Project area.
- Three bald Eagle nests located in forested areas. Two of the nests were located 280m and 340m northwest of the South Property. A third nest is located 5 km from the properties. Bald eagles are protected under the Nova Scotia Wildlife Act.
- Atlantic Salmon habitat associated with Folly River.

[1] Note that the NSDNR mapping shows "dykeland" habitat overlapping with the project development. In reality the NSDNR mapping is in error based on the topographic considerations (i.e., elevation too high). The actual dykeland boundary is approximately 200 to 500 metres further to the south.



Note: Wetland Mapping obtained from "NSDNR-Renewable Resources Branch-Wildlife Division "Nova Scoita Wetlands and Coastal Habitats Inventory (2000). 1:10,000 Mapping provided by Service Nova Scotia, Municipal Relations Nova Scotia Geomatics Centre. Significant Species and Habitats Database Obtained from NSDNR. UTM NAD83 Zone 20

Legend

Significant Species and Habitats
- ecological site
- migratory bird
- of concern
- other habitat
- species at risk

Protected Beaches - NS DNR
- Little Dyke
- Lower Debert

Freshwater Wetlands
- (BG) Bog
- (DM) Deep Marsh
- (FE) Fen
- (LW) Lakeshore Wetland
- (ME) Meadow
- (SF) Seasonally Flooded Flats
- (SM) Shallow Marsh
- (SS) Shrub Swamp
- (WS) Wooded Swamp

Saltwater Wetlands
- (B) Beach
- (EF) Estuarine Flat
- (MF) Marine Flat
- (S) Salt Marsh

1:30,000

0 487.5 975 1,950 Meters

Figure E-1
Significant Habitats
Glenholme Gravel Pit
Expansion Development
June 2007
TV61049

amec

E-6 SPECIES-AT-RISK DATABASES AND RANKS

E-6.1. COMMITTEE ON THE STATUS OF ENDANGERED SPECIES IN CANADA (COSEWIC)

COSEWIC determines the national status of wild Canadian species, subspecies and separate populations suspected of being at risk. COSEWIC bases its decisions on the best up-to-date scientific information and Aboriginal Traditional Knowledge available. All native mammals, birds, reptiles, amphibians, fish, molluscs, lepidopterans (butterflies and moths), vascular plants, mosses and lichens are included in its current mandate.

COSEWIC categorizes listed species based on a qualitative classification system as follows:

- Extinct – Species that no longer exists.
- Endangered – Species is facing imminent extirpation or extinction.
- Extirpated – Species that no longer exists in the wild in Canada, but occurs elsewhere.
- Threatened – Species is likely to become endangered if limiting factors are not reversed.
- Special concern – Species has characteristics that make it particularly sensitive to human activities or natural events.
- Not at Risk – Species that has been evaluated and found to be not a risk.
- Data Deficient – Species for which there is insufficient information to designate a status.

Although there are 7 categories of classifications, review of the COSEWIC database is limited to those species listed as endangered, extirpated, threatened, and of special concern.

E-6.2. NOVA SCOTIA DEPARTMENT OF NATURAL RESOURCES (NSDNR)

The General Status Ranks of Wild Species in Nova Scotia is compiled by the Nova Scotia Department of Natural Resources. The broad goal is to prevent species from becoming extinct or extirpated as a result of human activities. This commitment will help identify those species most in need of immediate conservation and recovery action. The approach also helps to identify gaps in scientific knowledge and serves as an early warning system that better aligns human priorities for species conservation recognizing the need for a heightened focus on prevention in decision-making.

The General Status Assessment process is a system that provides an overall indication of viability of species in Nova Scotia, highlighting which species populations are secure, which are sensitive and which are at risk.

The General Status Ranks of Wild Species in Nova Scotia categorizes listed species based on a colour designation system as follows:

- Blue – Species are extirpated or extinct.
- Red – Species are at risk or may be at risk of extirpation or extinction.
- Yellow – Species are not believed to be at risk of immediate extirpation or extinction, but may require special attention or protection to prevent them from becoming at risk.

- Green – Species are not believed to be at risk, or sensitive.
- Undetermined – Species for which insufficient data, information, or knowledge is available.
- Not Assessed – Species that are known to be regularly present, but not yet assessed.
- Exotic – Species have migrated beyond natural range, as a result of human activity.
- Accidental – Species occurring infrequently and unpredictably, outside natural range.

Although there are 8 colour ranked categories, review of the General Status of Wildlife in Nova Scotia is limited to those species listed as Red and Yellow.

E-6.3. NOVA SCOTIA MUSEUM OF NATURAL HISTORY

The Nova Scotia Museum of Natural History is an active partner with the provincial government in evaluating, protecting, and aiding in recovery efforts of habitats and species at risk. The Museum relies heavily on the COSEWIC and NSDNR General Status Ranks to identify species at risk but compile records of confirmed sightings or collections of such species.

The Museum has developed a resource book titled *Natural History of Nova Scotia* that is intended to provide a framework in which the significant natural resources of the province of Nova Scotia can be understood, managed and interpreted. The information is useful for parks and natural areas planning, management and interpretation; land use planning for municipalities; development project planning, assessment and evaluation; eco-tourism and recreational planning. Accordingly, the Museum has generated a broad base of knowledge pertaining to Nova Scotia environment, and therefore, is an exceptional source for information related to species at risk and potential for species to be present at the wind farm site.

E-6.4. ATLANTIC CANADA CONSERVATION DATA CENTRE (ACCDC)

Conservation Data Centres (CDCs), as part of The NatureServe (formally The Nature Conservancy) international network, track biodiversity at two levels: species and ecological communities. Species and ecological communities are referred to as elements of biodiversity. Elements are ranked in each jurisdiction (province or state) and at global and national levels in order to help prioritize conservation efforts.

NatureServe and all CDCs (called Heritage Programs in the US) use a standardized element ranking system that has evolved over 30 years with input from hundreds of scientists, managers and conservationists. The ranking system is very elaborate and comprehensive, thus, the following material describes only the provincial-level ranking used in this investigation, as follows:

- S1 – Extremely rare throughout its range in the province, and may be especially vulnerable to extirpation.
- S2 – Rare throughout its range in the province, and may be vulnerable to extirpation due to rarity or other factors.
- S3 – Uncommon throughout its range in the province, or found only in a restricted range, even if abundant in at some locations.

E-7 REFERENCES

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APPENDIX F

HABITAT MAPPING AND RARE AND SENSITIVE FLORA

F-1 HABITAT SURVEY

Methodology

A habitat survey and preliminary plant survey was carried out on April 27, 2006, at the North and South Properties. Both properties were surveyed by walking the perimeters, as well as conducting several random transects across the properties, while ensuring that all habitat types were covered. Habitat maps are provided as Figures E-1 and E-2 for the North and South Properties, respectively.

North Property

At the time of the habitat survey, the North Property consisted mainly of blueberry fields, abandoned blueberry fields, forested wetlands, and a highly disturbed area used for gravel extraction and process/laydown areas. A ditch (man-made stream) runs from north to south in the northeastern part of the property (refer to Figure 2-4 in the main report body and Figure E-1, this appendix). The natural topography of property is moderate, varying from 25 metres above sea level (masl) near the western property boundary to 15 masl along the eastern portion of the development area. The natural drainage of the North Property is to the east towards a pre-existing drainage system that consists of ditches that discharges to forested wetland/bog areas to the east and southeast. The forested wetland/bog areas drain indirectly and diffusely to McCurdy Creek, located further to the east.

The southwestern quarter of the North Property consists of abandoned blueberry fields, characterized by dry soil and a meadow–like appearance strongly dominated by grass, with a few patches of blueberries and a few shrubs which have obviously been cut back before. There also is a small forested wetlands which may have become disconnected from the wetlands further east through the construction of the access road to the existing operation. The northwestern half of the property consists of blueberry fields, characterized by dry soil and over 90 % cover with blueberries, interrupted by bare spots spots devoid of blueberries but often occupied by grasses.

The eastern half of the North Property consists of a highly disturbed area used for sand extraction and storage, and a forested wetland, which occupies the northeastern boundary of the property. McCurdy Creek lies further to the east. There also is a smaller forested wetland in the southeastern quadrant, which is separated from the larger wetland by an existing access road to the lumberyard on the adjoining property. This small wetland flows onto the lumberyard property to a small man-made settling pond with discharge to a ditching system that flows diffusely toward McCurdy Creek.

A water filled ditch with pools and shallow areas, which is between 1 and 2 m wide, runs along the eastern boundary of the Project development area at the foot of a manmade berm structure, which separates the disturbed area from the forested wetland. This berm is obviously a number of years old, as several tree species as well as many other plants grow on it. The trees are an estimated 5- 10 years old or older. Small fish were observed in the ditch.

The northern edge of the North Property, which is the highest elevation on property, borders on a dry woodland. Only a small strip of woodland remains, as areas further north were clear-cut. The western boundary follows a dirt road, with remnant blueberry fields and coniferous forest dominated by spruce further to the west. The eastern boundary of the Project development

borders on a forested wetland and woodlot operation. The southern boundary of the property borders on Highway No. 2.

Potential for rare plant species:
The blueberry fields and abandoned blueberry fields, as well as the highly disturbed area are of low potential for the occurrences of rare plant species. The forested wetlands have a medium to high potential for the presence of rare plant species.

Habitat Survey - South Property

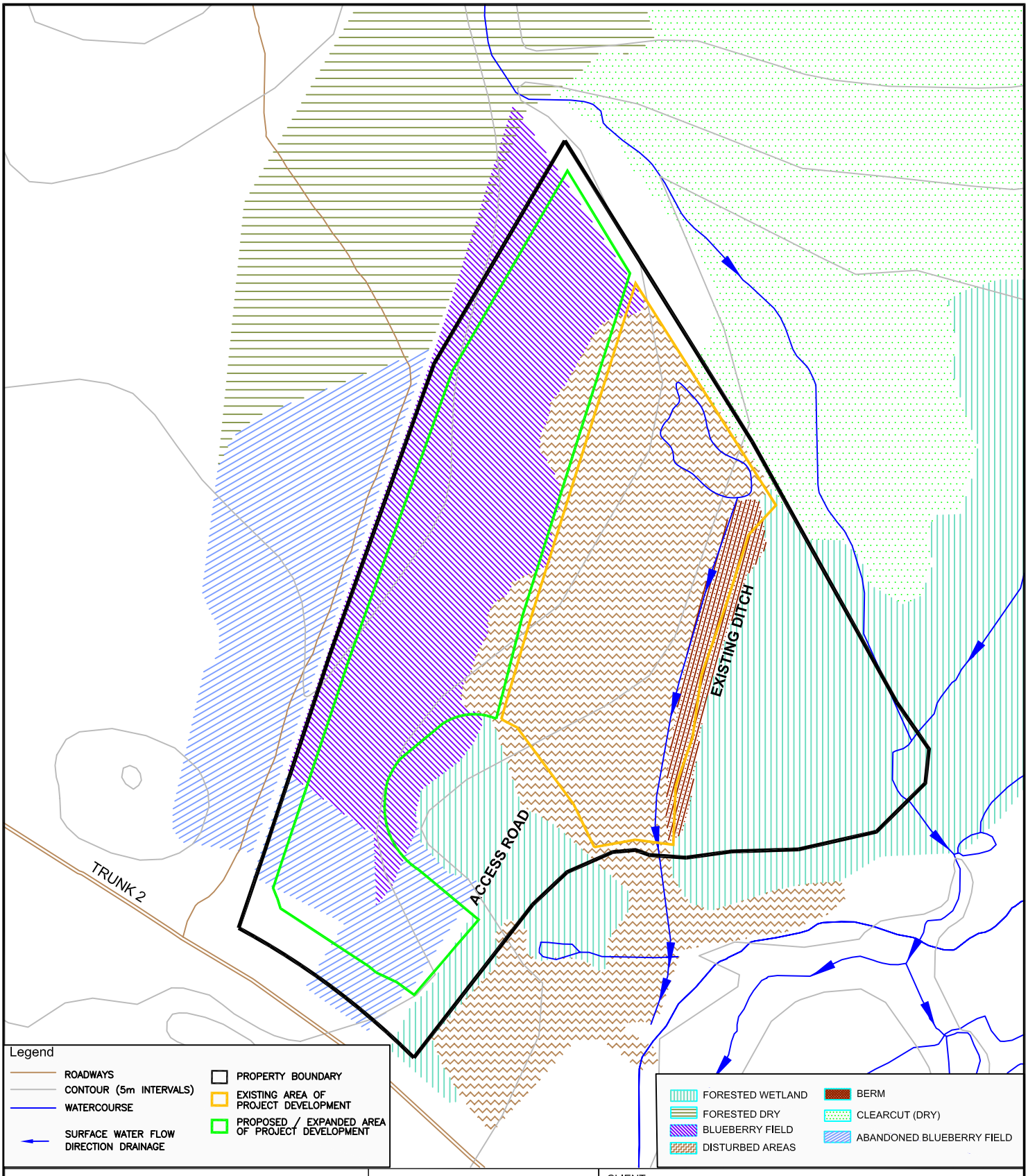
This South Property consists of two parts, which are separated by Little Dyke Road (Figure E-2). The property on the eastern side of the road formerly consisted of abandoned agricultural fields. The property is surrounded by agricultural fields, which are covered with either grass (north) or grain seedlings (east).

The South Property west of the road contains a variety of habitats. Most of the property is highly disturbed due to the current use of the area as a sand storage and concrete manufacturing facility. However, there is a small bog embedded in a shrub wetland and forested wetland, which stretches along the southern boundary of the property. Water levels are close to the surface, and the surface of the wetland is covered with Sphagnum moss. The forested wetland borders on a dry forest south of the property where the land rises. This is followed by more stream- related marshy wetland or fen further southwest. The dry forest and adjacent fen are outside of the property line.

The western part of the South Property near the property boundary is occupied by a shrub-wetland and marshy wetland or fen dominated by monocotyledonous plants, which contains a stream. The northeastern quadrant is occupied by a clear-cut, which was formerly a damp woodland. The property boundary runs along the stream. A small woodland between the marshy wetland and the settling ponds, which is visible on aerial photos, is now cut and grubbed.

There are two settling ponds on the South Property. The northern pond does not contain visible plant life, while the large, southern pond sports a few cattails at the northern end. Runoff from settling ponds drains diffusely toward the wetland at the southern part of the property. There are, however, no observable direct drainage pathways. The settling ponds are no longer used as part of the operation and are scheduled to be decommissioned.

Potential for rare plant species
The agricultural fields as well as the highly disturbed area are of low potential for the occurrences of rare plant species. The forested and shrub wetlands have a medium to high potential for the presence of rare plant species.

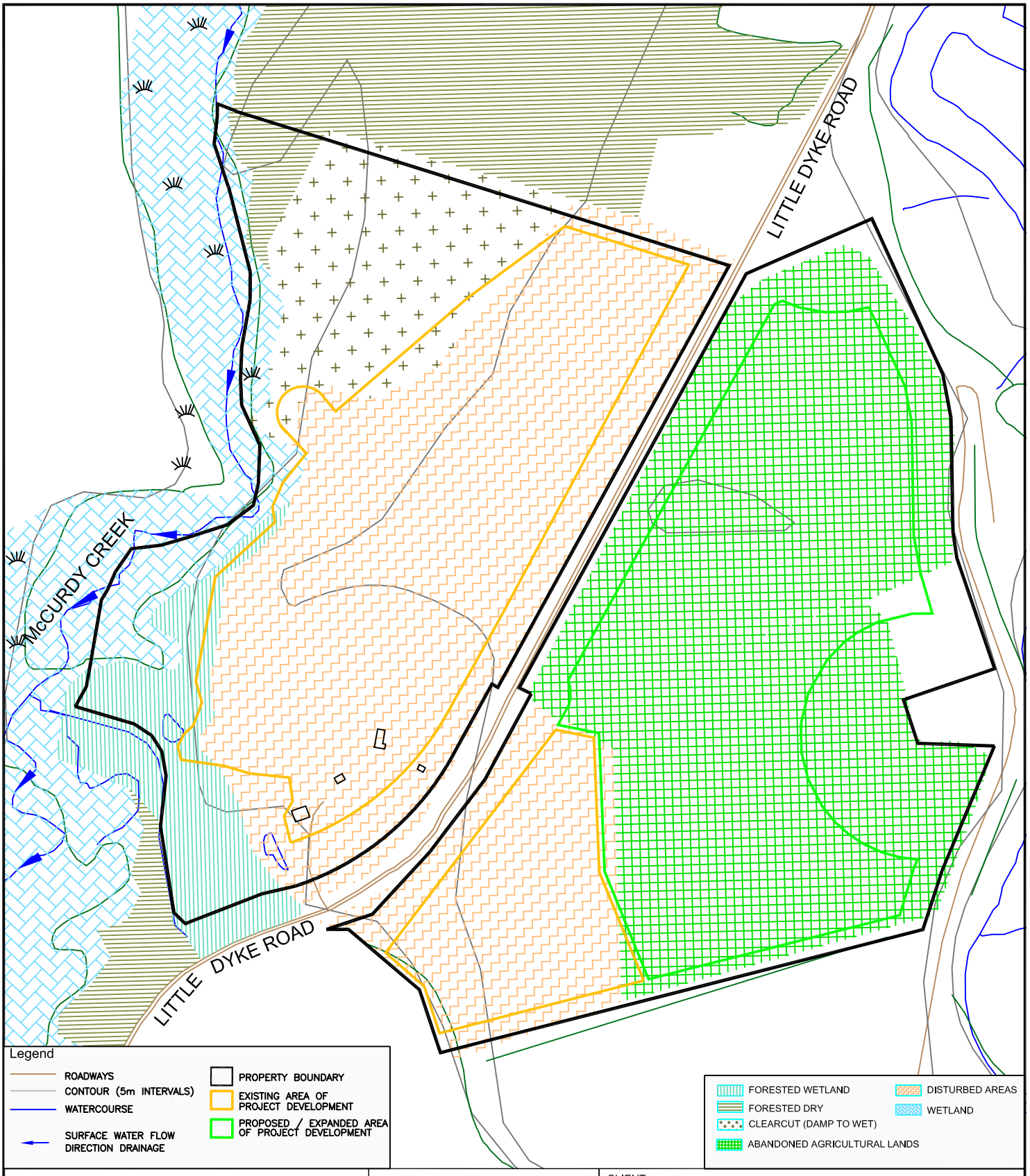


AMEC Earth & Environmental
32 Troop Avenue, Unit 301, Dartmouth, NS, B3B 1Z1
Tel. 902-468-2848 Fax 902-468-1314

CLIENT

M.S.D. ENTERPRISES LTD.

PROJECT: GLENHOLME GRAVEL PIT EXPANSION DEVELOPMENT	DWN BY: YC/EM	DATUM: NAD83	DATE: June 2007
TITLE: NORTH PROPERTY - HABITAT MAP	CHK'D BY: JM	REV. NO.: 0	PROJECT NO: TV61049
	PROJECTION: UTM Zone 20	SCALE: 1:4,000	FIGURE No. FIGURE F-1



AMEC Earth & Environmental
32 Troop Avenue, Unit 301, Dartmouth, NS, B3B 1Z1
Tel. 902-468-2848 Fax 902-468-1314

CLIENT

M.S.D. ENTERPRISES LTD.

PROJECT: GLENHOLME GRAVEL PIT EXPANSION DEVELOPMENT	DWN BY: YC/EM	DATUM: NAD83	DATE: June 2007
TITLE: SOUTH PROPERTY - HABITAT MAP	CHK'D BY: JM	REV. NO.: 0	PROJECT NO: TV61049
	PROJECTION: UTM Zone 20	SCALE: 1:4,000	FIGURE No. FIGURE F-2

F-2 RARE PLANT INVENTORY

The specific scope of work for the rare plant assessment involved the following activities for the North and South Properties:

- Identify and map general habitat types;
- Survey the study area for rare plant species;
- Assemble vascular plant inventory; and
- Record GPS coordinates of all significant species found within the property, if warranted.

Habitat types were identified during a preliminary field visit on April 27, 2006. Subsequent rare plant surveys were conducted on July 17 and September 28, 2006, at the North and South Properties. The survey dates were chosen to cover early and late flowering times. The study area was surveyed for plant species listed as "endangered", "threatened" or "vulnerable/special concern" under SARA, COSEWIC or NSESA, as well as plants listed as "Red" or "Yellow" in the NSDNR General Status Ranks of Wild Species in Nova Scotia (NSDNR 2001), and not restricted to the species listed by ACCDC or NS Museum as known to occur within five kilometres.

Both properties were surveyed by walking the perimeters, as well as several meanders across the properties, while ensuring that all habitat types were covered.

There were several distinct habitats identified on the North and South Properties. Habitat maps and descriptions are provided in Appendix F (Section F-1).

Four species of orchids were found, none of them rare. No rare vascular plants or rare lichens were found during the field surveys.

The vegetation on both properties indicates a long history of human use of the area, as there are many introduced plants. These plants were introduced to Canada from Eurasia through early settlers, some for cultivation, others inadvertently. Among the introduced plants found in the study area are Black Medic (*Medicago lupulina*), Cow Vetch (*Vicia cracca*), Purple Loosestrife (*Lythrum salicaria*), Yellow Devil *(Hieracium X floribundum*), Yellow King- Devil (*H. cespitosum*), White Bedstraw (Galium mollugo), Sticky Groundsel (*Senecio viscosum*) and sweet clovers (*Melilotus officinalis*), as well as grasses such as Timothy Grass (*Phleum pratense*) and Fine Bent Grass (*Agrostis capillaris*). *Lythrum salicaria* is invasive and the plants should be removed from the wetlands in order to protect the wetlands, particularly since the number of Purple Loosestrife plants is still very small.

The South Property consists largely of disturbed area surrounded by various wetlands and a clearcut. The disturbed areas include three small settling ponds, which are now starting to re-vegetate. Plants found in the settling ponds include Water Horsetail (*Equisetum fluviatile*), Cattail (*Typha latifolia*), Pondweed (*Potamogeton* sp.) and Greater Water Starwort (*Callitriche heterophylla*). Land vegetation in the disturbed areas is very sparse, and includes many introduced species (see above) as well as several native species, such as Field Horsetail (*Equisetum arvense*). None is rare.

Plant inventory
North Property

Location 1.1: Abandoned blueberry field overgrown with grass
Location 1.2: Forested wetlands (treed bogs); the wetland east of the access road is somewhat drier in parts.
Location 1.3: Blueberry field- slope
Location 1.4: Blueberry field, walked from south to north, including rim (R)
Location 1.5: Dry, coniferous woods and rim of clearcut
Location 1.6: Dry area (D) in gravel pit, wetland at settling pond and ditch-like stream
Location 1.7: Perimeter berm
Location 1.8: Forested wetland at eastern property boundary

Plant inventory
South Property
Location 2.1: Abandoned agricultural field and hayfield
Location 2.2: Shrub wetland, forested wetland, bog at southwest corner of property
Location 2.3: Marshland/ fen along the stream
Location 2.4: Clear-cut area which formerly was a damp woodland

Scientific Name	Common Name	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4
Abies balsamea	Balsam Fir		X			X	X	X	X		X	X	
Achillea millefolium	Yarrow	X								X			
Acer rubrum	Red Maple		X						X			X	X
Agrostis capillaris	Fine Bent Grass	X											
Alnus incana	Speckled Alder				R		X,D		X		X	X	
Amelanchier sp.	Shadbush	X	X,R	X	R	X							X
Anaphalis margaritacea	Pearly Everlasting		R			X		X					
Apocynum androsaemifolium	Spreading Dogbane					R	D						
Aralia nudicaulis	Wild Sarsaparilla					X		X	X		X		X
Aronia sp. (sterile, sapling)	Chokeberry				X						X		
Aster acuminatus	Whorled Wood Aster		X			X							
Aster novi-belgii	New York Aster	X					X				X		
Aster lateriforus	Calico Aster	X					X				X		
Aster umbellatus	Tall White Aster						X						X
Betula populifolia	Grey Birch/ Wire Birch	X	X		R,X	X		X			X		X
Betula cordifolia (sapling)	Heart-leaf Birch		R		X	X							X
Bidens cernua	Nodding Beggar-Ticks										X		
Bidens frondosa	Devil's Beggar-Ticks						X						
Calamagrostis canadensis	Blue-Joint Reedgrass								X		X	X	
Callitriche heterophylla	Greater Water- Starwort						X						
Carex vesicaria	Lesser Bladder Sedge						X		X			X	
Carex aquatilis	Leafy Tussock Sedge						X				X	X	
Carex c.f. echinata (fruit dispersed)	Star Sedge										X		
Carex paupercula (C. magellanica)	Boreal Bog Sedge		X								X		
Carex trisperma	Three-seeded Sedge		X								X		
Chamaedaphne calyculata	Leatherleaf		X								X	X	X
Chrysanthemum leucanthemum	Ox-eye Daisy	X		X									
Cicuta cf. bulbifera (seedling)	Water Hemlock						X						
Circaea alpina	Dwarf Enchanter's Nightshade								X				
Comptonia peregrina	Sweetfern				X	R	D, X						X
Coptis trifolia	Goldthread				X								X
Cornus canadensis	Bunchberry		X	X	X	X	X		X		X		X
Drosera rotundifolia	Roundleaf Sundew						X						
Dryopteris carthusiana	Spinulose Wood Fern										X		
Epilobium angustifolium	Fireweed						X						X
Epilobium ciliatum	Glandular Willow-Herb						X				X		
Epilobium leptophyllum	Narrow-leafed Willow-Herb										X		
Epilobium palustre	Swamp Willow Herb						X						
Equisetum arvense	Field Horsetail						X	X					
Equisetum X mackaii (no spores)							X						
Equisetum fluviatile	Water Horsetail						X					X	
Equisetum variegatum	Variegated Scouring Rush						X						
Erigeron strigosus	Daisy/ Rough Fleabane	X		X									
Eriophorum virginicum	Tawny Cottongrass		X										X

Scientific Name	Common Name	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4
Eriophorum angustifolium	White Cottongrass												X
Eupatorium perfoliatum	Boneset						X						
Fragaria X ananassa	Strawberry	X					X	X					
Galium sp. (sterile)	A bedstraw						X						
Galium mollugo	White Bedstraw	X											
Galium c.f. tinctorium (sterile)	Small Bedstraw										X		
Galium trifidum ssp. trifidum	Three-petaled Bedstraw							X					
Gaultheria hispidula	Creeping Snowberry		X										X
Gaultheria procumbens	Teaberry		X										X
Gaylussacia baccata	Black Huckleberry		X										
Glyceria grandis	Reed Meadow Grass		X								X		
Hieracium sp. (sterile)	A Hawkweed				X								
Hieracium cespitosum	Yellow King-Devil						D						
Hieracium pilosella	Mouse-ear Hawkweed	X											
Hieracium X floribundum	Yellow-Devil		X			X	D	X					
Hypericum perforatum	St. John's Wort	X		X	X								
Ilex verticillata	Winterberry		X								X		
Impatiens capensis	Spotted Jewelweed						X						
Iris versicolor	Blue Flag Iris										X		
Juncus effusus	Soft Rush, Taper Rush		X				X,D				X		
Kalmia angustifolia	Sheep-Laurel		X		X	X	X				X		X
Kalmia polifolia	Pale Laurel												X
Larix laricina	American Larch, Tamarack		X			X	X	X	X		X		X
Ledum groenlandicum	Labrador Tea		X						X		X		X
Lemna minor	(smaller) Duckweed						X						
Linnaea borealis	Twinflower		X			X			X		X		
Lobelia inflate	Indian-Tobacco	X			X								
Lycopus americanum	Cut-leafed Water-horehound		X				X				X		
Luzula sp. (sterile)	A Woodrush				X			X					
Lysimachia terrestris	Swamp Candles						X				X	X	
Lythrum salicaria	Purple Loosestrife		X				X						
Maianthemum canadense	Wild Lily-of-The-Valley					X					X		
Maianthemum trifolium	Three-leafed False Salomon's Seal		X								X		X
Medicago lupulina	Black Medic						X						
Medicago sativa	Alfalfa									X			
Melampyrum lineare	Cow Wheat				X								
Melilotus officinalis	White + Yellow Sweet Clover									X			
Mitchella repens	Partridge Berry					X			X				
Malus pumila	Apple			X									
Myosotis laxa	Small Forget-me-not						X						
Myrica gale	Sweet Gale		X								X	X	
Nemopanthus mucronatus	False Holly	X	X						X		X		
Oenothera biennis	Evening Primrose	X		X	X		D						
Onoclea sensibilis	Sensitive Fern						X		X				
Osmunda cinnamomea	Cinnamon Fern		X						X		X		
Oxalis montana	Common Wood-Sorrel								X				
Picea mariana	Black Spruce		X						X		X	R	X
Picea rubens	Red Spruce		X		C			X					
Picea glauca	White Spruce		X		R	X							X

Scientific Name	Common Name	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4
Pinus resinosa	Red Pine		X										
Pinus strobus	White Pine (sapling/seedling)		R				X						
Phleum pratense	Common Timothy	X		X				X		X			
Plantago major	Common Plantain	X											
Plathanthera lacera	Ragged-fringed Orchid	X		X									
Populus grandidentata	Large-tooth Aspen		R					X			R		
Populus tremuloides	Trembling Aspen		X			X	D, X						
Potamogeton sp.	A Pondweed						X					X	
Persicaria persicaria (P. maculosa)	Lady's thumb						X						
Persicaria sagittata	Arrowleafed Tearthumb						X						
Pogonia ophioglossoides	Rose Pogonia										X		
Prunus pennsylvanica	Pin Cherry		R	X	R	X	D	X				R	
Pteridium aquilinum	Bracken Fern		X			X		X					X
Quercus rubra (seedlings)	Northern Red Oak		X								X		
Ranunculus repens	Creeping Buttercup						X						
Rhododendron canadense	Rhodora		X								X		X
Rhynchospora alba	White Beak-rush										X		
Ribes glandulosum	Skunk Currant								X				
Ribes lacustre	Swamp (Bristly) Currant								X				
Rosa sp.	A Rose	X	R	R,C							X	X	
Rosa nitida	Swamp Rose		X									X	
Rubus idaeus	Red Raspberry		R	X	R	X	D	X			X		X
Rubus sp. (sterile)	A Bramble		X,R		R	R							
Rumex acetosella	Sheep Sorrel			X	X						X		
Rumex crispus	Curled Dock						X						
Sambucus racemosa	Red Berried Elder		X			X		X					
Salix bebbiana	Long-beaked Willow						X	X			X		
Salix eriocephala	Red-tipped Willow						X,D				X		
Salix lucida	Shining Willow						X						
Sarracenia purpurea	Pitcher plant										X		
Scipus cyperinus	Common Wool grass		X				X				X	X	X
Sedum telephium	Live- Forever			X									
Senecio viscosus	Sticky or Stinking Groundsel						D						
Sisyrinchum montanum	Strict blue-eyed grass												X
Solidago canadense	Canada Goldenrod	X			X	X	X,D			X			
Solidago bicolor	Silverrod				R,X								
Solidago puberula	Downy Goldenrod	X			R,X	D	X						
Solidago rugosa	Rough-stemmed Goldenrod	X			R,X	X					X		
Euthamia graminifolia	Grass-leafed Goldenrod	X			X		D	X					
Sparganium sp., sterile	A Burreed						X						
Spiraea alba	Narrow-Leaved Meadow-Sweet	X	X		R,X	X	X	X			X	X	
Spirea tomentosa	Steeple Bush						X					X?	
Spiranthes cernua	Nodding Ladies'- Tresses	X					X						
Spiranthes lacera	Northern Slender Ladies'-Tresses	X											
Taraxacum officinale	Dandelion			X				X		X			
Thelypteris palustris	Marsh Fern										X		
Triadenum fraseri	Marsh St. John's Wort		X						X		X		
Trientalis borealis	Northern Starflower								X		X		

Scientific Name	Common Name	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4
Trifolium arvense	Rabbit-foot clover						X						
Trifolium hybridum	Alsike Clover	X								X			
Trifolium repens	White Clover									X			
Tussilago farfara	Coltsfoot						D						X
Typha latifolia	Common Cattail						X				X	X	
Vaccinium angustifolium	Lowbush Blueberry	X	X	X	X,R	X		X			X		X
Vaccinium myrtilloides	Velvet- leaf Blueberry		X		X								X
Vaccinium macrocarpon	Large Cranberry										X		
Vaccinium oxycoccus	Small Cranberry		X								X		X
Verbascum thapsus	Common Mullein			X	X								
Viburnum nudum	Wild Raisin/ Witherod		C		R,X	X	X				X		X
Vicia cracca	Cow Vetch	X		X	R,X			X		X			
Viola sp.	A Violet	X		X	X								
Grasses (sterile)		X	X	X	X					X	X		X

Notes: C= cut down saplings; R= rim; D = dry area

APPENDIX G

ARCHAEOLOGICAL AND HERITAGE RESOURCES

NOVA SCOTIA
Tourism, Culture and Heritage
Heritage Division

1747 Summer Street
Halifax, Nova Scotia
Canada B3H 3A6

902 424-7344 T
902 424-0560 F
www.gov.ns.ca

December 19, 2006

Ms. April MacIntyre
Davis Archaeological Consultants
6519 Oak Street
Halifax, NS B3L 1H6

Dear Ms. MacIntyre:

RE: Heritage Research Permit Report
A2006NS49 – Glenholme Quarry Expansion

We have received and reviewed your report on work conducted under the terms of Heritage Research Permit (A2006NS49) for an Archaeological Resource Impact Assessment for the Glenholme Quarry Expansion.

The report concludes that no archaeological resources where found within the proposed development zones at Folly Village and Little Dyke, and recommends that development proceed as planned on both properties and no further archaeological assessment is recommended. We concur with your assessment.

Staff concur with your assessment that the development area contains no significant cultural resources and your recommendation that the development be allowed to proceed. I will notify Jim Millard, AMEC, by copy of this letter.

If you have any questions, please let me know.

Sincerely,

Robert Ogilvie
Manager, Special Places

c. Jim Millard, AMEC Earth & Environmental
Stephen Powell, NS Museum

MSD ENTERPRISES GRAVEL PIT EXPANSION DEVELOPMENT:

ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT

Heritage Research Permit A2006NS49

August 2006

Submitted by:
Davis Archaeological Consultants Limited
6519 Oak Street
Halifax, Nova Scotia
B3L 1H6

Submitted to:
AMEC Earth & Environmental
301-32 Troop Avenue
Dartmouth, Nova Scotia
B3B 1Z1

MSD ENTERPRISES GRAVEL PIT EXPANSION DEVELOPMENT:

ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT

Heritage Research Permit A2006NS49
Category C

Davis Archaeological Consultants Limited

Principal Investigator: April D. MacIntyre
Report Compiled by: April D. MacIntyre & Stephen A. Davis

Cover: South property, looking west.

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EXECUTIVE SUMMARY

Davis Archaeological Consultants Limited conducted an archaeological resource impact assessment of the proposed MSD Enterprises Gravel Pit Expansion Development in Colchester County in June and July 2006. The proponent plans to development two properties in Glenholme which have previously been used for agricultural commercial crops (south property) and blueberry fields (north property). Historical background research shows that this area was settled by Europeans as early as the first quarter of the eighteenth century and may have been used by First Nations peoples prior to that. However, archaeological survey showed both properties to be of low archaeological potential and no archaeological resources were encountered within the development areas.

1.0 INTRODUCTION

Davis Archaeological Consultants Limited conducted an archaeological resource impact assessment of the proposed MSD Enterprises Gravel Pit Expansion Development in June and July 2006. The assessment was conducted by two qualified archaeologists and included a historical background study, predictive modeling, and field survey. The historical research was conducted on 08 and 09 June 2006 at Nova Scotia Archives and Records Management, Halifax by DAC's vice-president, April MacIntyre. The purpose of this assessment was to assess the level of archaeological potential within the development area, to determine past land use, and to relate any archaeological resources encountered to their historic/pre-contact context. An archaeological predictive model was developed by DAC's president, Stephen Davis, in order to determine First Nations potential within the development zone. This was based on climate, terrain, proximity to available food resources and transportation routes, previous disturbance, and so on.

A field survey was conducted by two archaeologists (Stephen Davis and April MacIntyre) and a student assistant (Devin Fraser) on 16 June 2006. Two properties were investigated for heritage resources. The archaeological assessment was conducted under Category C Heritage Research Permit A2006NS49. On 26 July 2006, a survey of an expansion of the south property was conducted by Stephen Davis and April MacIntyre under extension of the current Heritage Research Permit.

2.0 DEVELOPMENT AREA

The impact areas are restricted to two small properties in Colchester County. The first, or north property, is located on route 2 in Glenholme and encompasses an area approximately 500 m (north-south) by 175 m (east-west). The second, or south property, is located on the east side of Little Dyke Road and initially encompassed an area approximately 250 m by 250 m (Figure 2.0-1). This property was later expanded northward to include an additional 150 m by 150 m parcel of land.

The development zone is located within the tidal bay region of Nova Scotia and is underlain by Triassic red sandstone beneath glacial outwash deposits. The eroded sandstones resulting from sea level rise can be seen in the Avon and Shubenacadie river estuaries. The coastal portion of the development zone (just south of the south property) is characterized by wide salt marshes. The Folly and Debert Rivers flow southward from the Cobequids. The north shore of Cobequid Bay is home to several species of shorebirds in August and September and waterfowl in spring and fall. The waters within the tidal bay zone are also home to several anadromous species of fish.[1]

[1] Davis and Browne, 1996:164-166.

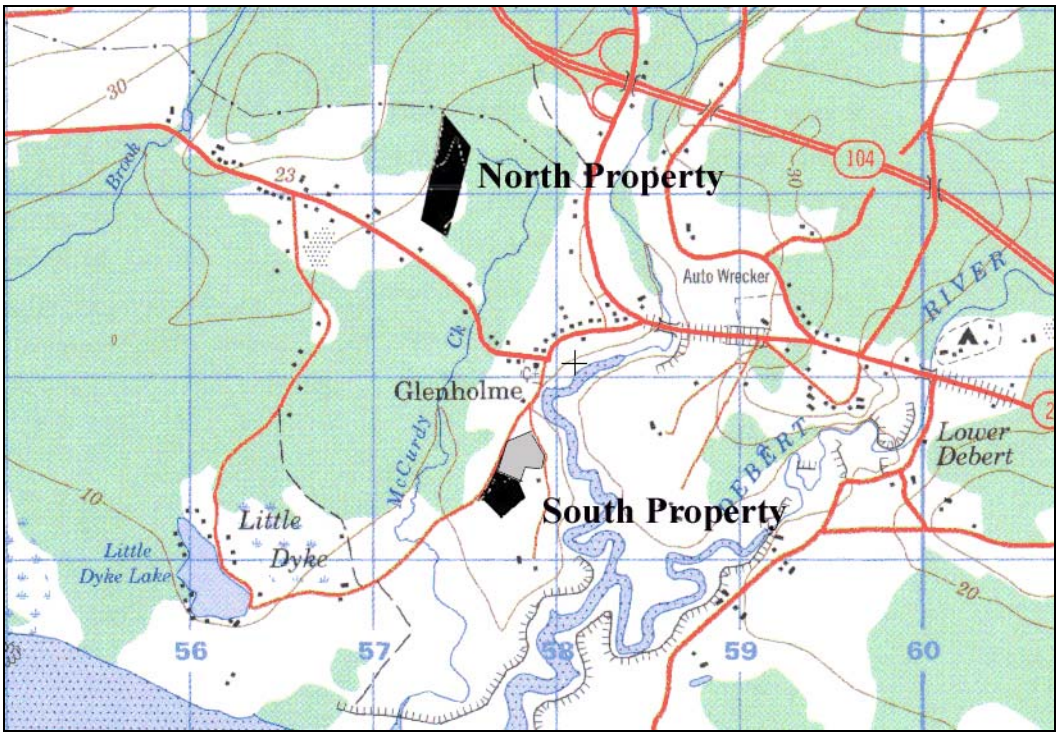

Figure 2.0-1: Approximate boundaries of the proposed disturbance areas. The area of later expansion on the south property is shaded in grey.

3.0 STUDY AREA

The study area includes the community of Glenholme, although the focus is primarily on those disturbance zones indicated above (section 2.0).

3.1 Historical Background

The first known habitation in Colchester County dates back at least as early as 11,000 years ago when the areas around Debert and Belmont were occupied by bands of hunter-gatherers known to us today as Palaeo-Indians. In 1948 E. S. Eaton, a blueberry harvester, first discovered stone tools on the surface of the air base which has occupied the Debert site since World War II. The site was investigated by archaeologists from the Peabody Museum and the National Museum of Canada from 1962 to 1964 and was shown to contain intact Palaeo-Indian occupations. In 1989, two additional Palaeo-Indian sites were discovered at nearby Belmont. In total, at least 22 acres of land between Debert and Belmont are known to have been occupied by the early hunter-gatherers and the resources likely stretch beyond that. These occupations mark the earliest known human habitation in the northeast, owing to their great importance and their designation as a Special Place. Occupation in Debert occurred during the Younger-Dryas event, an episode in the glacial history of the Maritime Provinces which succeeded a brief period of warming, and was marked by an abrupt cooling episode and glacial readvancement in

northern Nova Scotia. An ice sheet sat just north of the Debert area and dammed up much of the inner Minas Basin. Palaeo-Indian occupation in Debert was short-lived. The Younger Dryas event drove the inhabitants out of the Debert area and their destination after this is not known.[2]

The present-day community of Glenholme is located in the territory known by the Mi'kmaq as *Cobequid* meaning "end of flowing water". First Nations encampments are known to have existed at Bible Hill on the present site of the NS Agricultural College and along the Salmon River and Tatamagouche Bay and in the middle of the town of Truro. In 1976, in the Truro location, at least ten fire pits "complete with cooking utensils" dating back to the sixteenth century were discovered.

By the 1880s, the land at Salmon River was turned over to the School of Agriculture and the Mi'kmaq were removed to Christmas Crossing in Truro, where St. Mary's School is located (King Street near the railroad crossing) and eventually they became centered at Millbrook.[3]

In 1689, Louis XIV of France granted lands in the Cobequid district to Mathieu Martin. The grant contained 12 miles (approximately 19 kms) of land stretching around the head of the Bay of Fundy from the mouth of Shubenacadie River on the south side to Truro and then along the north side of the Bay to Spencer's Point. The land extended back about 6 miles (9 ½ kms) from the shore. In the 18th century, the French settlements expanded northward as far as Tatamagouche and as far south as Stewiacke, taking in approximately 140 families. Acadians dyked the marshes in order to control flood waters along the coast and produce fertile farmland. In 1748, on the eve of Acadian expulsion, there were French families at Economy, Debert, Masstown, Fort Belcher, North River, Salmon River, Bible Hill, Lower Truro, and Clifton. The Acadians cut a road through the woods leading from the Chiganois River to Tatamagouche roughly running along the Chiganois River. The Acadians in Cobequid supplied Fort Louisburg via shipping lanes from Tatamagouche to the Strait of Canso, which the English were sure had to be stopped in order for them to gain the advantage in the English-French war over Acadia that was raging throughout the 18th century. They burned the Acadian village at Tatamagouche first, and dispersed the settlers.[4]

Despite the Maritime-wide expulsion (1750-1755), tax returns for 1754 indicated the 16 families remained in the district of Cobequid. On July 28, 1755 the order was given to 100 British soldiers to have all remaining Acadians removed from Acadia. On August 16, the troops burned 14 buildings along with the chapel in the Acadian village and sent the men to Fort Beausejour, leaving the women and children behind to survive as best they could. Several days later, the soldiers continued through the rest of Cobequid taking the district deputies prisoners. They left villages in tact, not wanting to warn the Acadians at Grand Pré that expulsion was next for them. Families were expelled from that village on September 6 and shortly afterward, the villages in Cobequid were to be

[2] Nova Scotia Museum website.
[3] Creighton, 1979:11-14.
[4] Ibid:15-18; The University Women's Club of Truro, 1975:7.

destroyed. But the inhabitants there had been forewarned by the raids on Grand Pré and they fled before the British soldiers arrived. The remnants of their villages were burned, leaving behind only 2 or 3 old barns. It is from this episode that the community of Old Barns west of Lower Truro gets its name.[5]

In 1758 and again in 1759, the Nova Scotia government issued a proclamation in the Boston Gazette to attract British subjects to the province. In May of 1759, twenty men from New England sailed to Cobequid Bay to assess the land and shortly after, waves of immigrants began to arrive.[6] In 1762, over 150 Irish immigrants took up land in the Londonderry Township which included Masstown, Glenholme, Great Village, and Portapique. The grant included 53,000 acres divided into 69 shares. A share included marsh land, house lot, farm land, and wood lot which were drawn for by lottery in order to ensure that each settler had land of equal value. The Township also included a lot for a school and church.[7] The grant was not made official until 1775. Included on the grantees' list for Londonderry Township were 67 grantees.[8] The government made arrangements for the repair of Acadian dykes which had lain for nearly a decade in a state of abandon and disrepair. Several families of Acadians had remained in the colony in hiding or returned after the strife of the mid 18th century and were hired to repair these dykes where necessary, given their superior knowledge of their construction and engineering.[9]

A 1756 map of Nova Scotia shows a village in the general area of Glenholme known as *Vil Petit Louis Longue Epée* meaning "village of Little Louis of the long spear" (Figure 3.1-1). Longue Epée is listed in the 1714 Acadie census but no location for his settlement is given.[10]

[5] The University Women's Club of Truro, op. cit.:9-11.
[6] Creighton, op. cit.:20-21.
[7] The University Women's Club of Truro, op. cit.:15.
[8] Ibid:102
[9] Creighton, op. cit.:22.
[10] Public Archives of Nova Scotia, 1967:242.

Figure 3.1-1: *A map of the Surveyed Parts of Nova Scotia, 1756* showing the location of the Vil Petit Louis Longue Epée at Glenholme.[11]

Some time prior to 1770, James Fleming, a native of Londonderry, Ireland, donated a portion of his land in Glenholme for the construction of a log church. The land was located at the junction of the road to Little Dyke Village. Fleming's house and the church were still shown on a 1834 map of the area. Tradition states that Fleming discovered shortly after obtaining the land that the soil was heavy clay and not suitable for farming so he donated it for the meeting house. A small community grew up around the meeting house and was originally known as Fleming's Folly and later became known as Folly Village. In 1909, by act of Provincial Legislature, the name was changed to Glenholme.[12]

Very little historical documentation of the Glenholme area exists into the nineteenth century but by the turn of the twentieth century, villages had grown up in both areas and each settlement had a church and schoolhouse. Ambrose F. Church's map of Colchester County (1874) shows several buildings in Folly (Fawleigh) Village including the

[11] Anonymous, 1756.
[12] Ibid:242; *Great Map of Nova Scotia*; Campbell, 1995:54.

residences of J. Cummings, S. Davidson, and H. Marsh in the study area (Figure 3.1-2). The standing house and barn at the southwest corner of the north property is likely the original Davidson homestead. The current occupant of the property indicated that the house was "well over 100 years old." A postal way office was opened at Folly River in 1874 and can be seen on the Geological Survey of Canada Map for 1905 (Figure 3.1-3).[13]

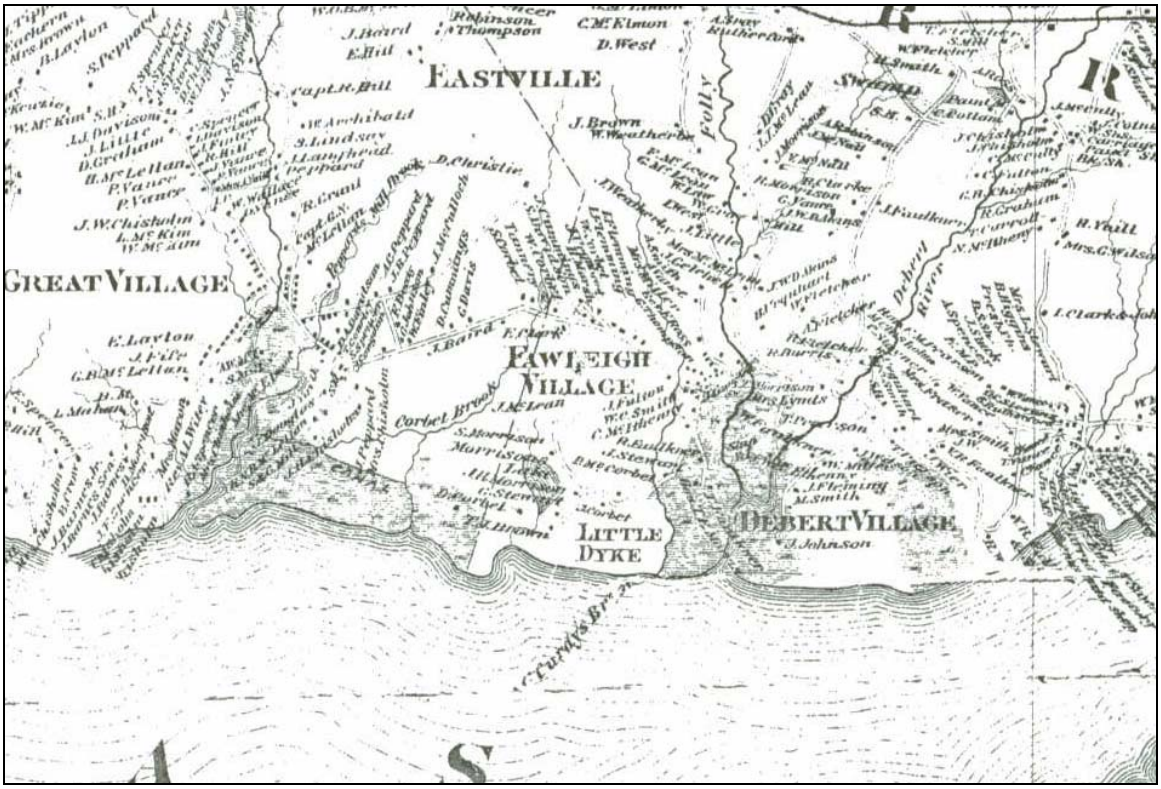

Figure 3.1-2: Ambrose F. Church's map of Colchester County in 1874.[14]

[13] Public Archives of Nova Scotia, 1967:242.
[14] Church, 1874.

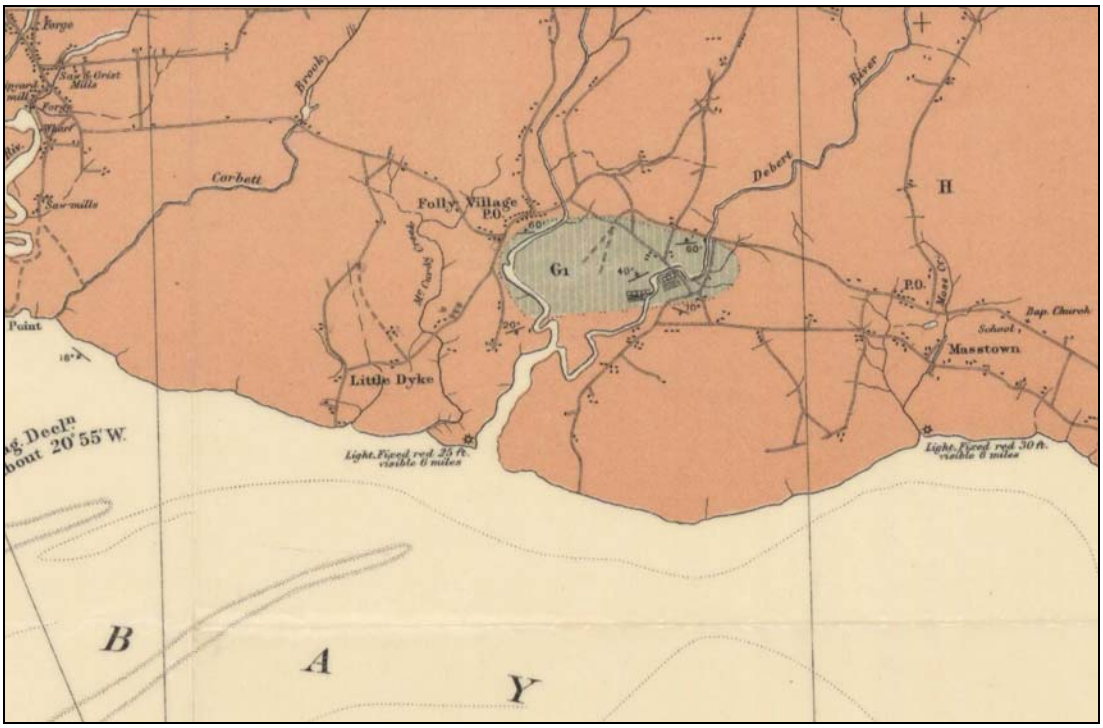

Figure 3.1-3: Geological Survey of Canada Map of 1905, showing the community of Glenholme.[15]

4.0 METHODOLOGY

The historical background study has shown that the study area was inhabited by Acadian settlers in the eighteenth century and by New England settlers throughout the nineteenth century. However, due to a significant amount of disturbance in the development zones owing to agricultural activity in the twentieth century, both properties are believed to be of low potential for historic resources. A field reconnaissance was conducted by two qualified archaeologists, paying particular attention to any potential surface features and to the erosional surface of the impact zones.

In addition to conducting a historical background study for the development area, predictive modeling was used to determine the level of archaeological potential for First Nations resources within the study area. As has already been demonstrated, the area around Debert and Belmont was settled as early as 11,000 years ago by small bands of aboriginal hunter-gatherers and additional settlements throughout the Cobequid district and the whole of Nova Scotia may as yet be undiscovered. In creating a predictive model for First Nations presence in the Maritimes, proximity to water is most often the most heavily weighted value for determining potential, led by available food resources (both aquatic and terrestrial), slope of terrain, and drainage. Aerial photographs and 1:10,000 topographical maps were consulted for the predictive modeling exercise. Given the

[15] Fletcher, 1905.

relative distance of both disturbance zones from water (approximately 450 m in the case of both properties), the level of potential for First Nations occupations in these areas is believed to be low. This prediction was tested by reconnaissance and subsurface investigation in the field. A reconnaissance was conducted on the south property in which three archaeologists surveyed the surface of the site on foot, walking parallel lines at 5 m intervals (Plate 1). The field was recently used as agricultural land which was ploughed extensively and alternated between corn and hay production. The top soil was relatively thin (less than 20 cm in most areas) and comprised of medium brown silty loam and gravel. Rhyolite, a suitable lithic source for flint-knapping, was abundant throughout this area. Glacially-deposited till (orange-brown silty loam and gravel) was exposed at the surface in many locations (Plate 2). Consequently, extensive subsurface testing was not necessary. Near the centre of the property, a slight ridge runs from the south end of the property northward and forms a rounded point. The land on both sides (east and west) gently slopes suggesting that the area below may have been a stillwater at one time. A 0.50 m by 0.50 m trowel test pit was excavated at the highest point of this ridge and was negative for cultural resources.[16] Till was reached at a depth of 0.18 m below the surface. At the interface between the A horizon and the till, a small patch (0.10 m diameter) of charcoal was found, likely the result of a forest fire rather than a cultural event, given the absence of any other cultural evidence (Plate 3).

On the southeast corner of the property, the ground is also slightly elevated and looks out over Folly River, at an elevation of approximately 25 m above the river (Plate 4). The descent to the marsh and river below is dramatic and would not have been easily accessible to First Nations or Acadian peoples. If historic or precontact sites exist in the vicinity, they are most likely to the southeast where the river banks are lower and the surrounding land flat.

A field survey by two archaeologists on 26 July 2006 of the northward expansion of the south property showed that this area was not as extensively ploughed as the south portion of the property and, consequently, there was less surface exposure of soils and heavier ground cover. However, the erosional surfaces that were present exhibited the same shallow stratigraphy as that seen to the south. The central portion of this area is low and the high ground above it suggests this may have been a kettle lake. Again, there is no evidence of an easily accessible source of fresh water. This area is believed to be of low archaeological potential for both historic and First Nations resources.

The north property is largely low bush blueberry fields. At the south end of the study area is a poor grade concrete foundation approximately 15 m east of the standing dwelling and shed (Plate 5). This is likely the remnants of the Marsh homestead indicated on Church's map. Fragments of stubby-neck beer bottles and coal are littered around the feature. However, the foundation is located outside the development area and is of low archaeological significance.

[16] The location of the test pit was marked using GPS at <3m accuracy. The coordinates were N45 23.373 W63 32.344 (NAD83 datum, UTM projection).

Several fragments of Rockingham-like earthenware, ironstone ceramics, dark green bottle glass, and white refined earthenware were seen scattered throughout the property, although no other structural remains were seen. Like the south property, the till here was very shallow and the topography and location suggest this area is of low archaeological potential for First Nations resources given the distance from water.

5.0 CONCLUSIONS AND RECOMMENDATIONS

No archaeological resources were encountered within the development zones of either property and both properties are believed to be of low archaeological potential for First Nations or historic Euro-Canadian resources. Therefore, it is recommended that development be permitted to proceed without further mitigation. However, in the unlikely event that any archaeological resources should be encountered during development, it is recommended that all disturbance activity cease and the manager of Special Places, Nova Scotia Museum (Robert Ogilvie, 902-424-6475), be contacted immediately to determine a strategy for mitigation.

6.0 REFERENCES

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PLATES

Plate 1: Archaeological survey at 5 m intervals on the south property.

Plate 2: Exposed till at the surface on the south property.

Plate 3: Charcoal at the interface of the A horizon and glacial till in the test unit (south property).

Plate 4: Folly River from the southeast end of the south property.

Plate 5: Concrete foundation at the southwest corner of the north property.

APPENDIX A:
HERITAGE RESEARCH PERMIT

A2006NS49

NOVA SCOTIA
Tourism and Culture

Nova Scotia Museum
Special Places Protection Act,
R.S.N.S. 1989

Application for
Heritage Research Permit
(Archaeology)

Permit No. . . . . .

(Original becomes Permit when approved by the Executive Director of the Nova Scotia Museum)

The undersigned April MacIntyre

of c/o 6519 Oak Street, Halifax, NS B3L 1H6

representing (institution) Davis Archaeological Consultants Limited

hereby applies for a permit under Section 8 of the Special Places Protection Act to carry out archaeological investigations during the period:

from 15 June 2006 to 31 December 2006

at Glenholme Quarry Expansion

general location Route 2 and Little Dyke Road, Colchester County

specific location(s) (cite Borden numbers and UTM designations where appropriate

and as described separately in accordance with the attached Project Description. Please refer to the appropriate Archaeological Heritage Research Permit Guidelines for the appropriate Project Description format.

I certify that I am familiar with the provisions of the Special Places Protection Act of Nova Scotia, and that I will abide by the terms and conditions listed in the Heritage Research Permit Guidelines for the category (check one).

- ○ Category A - Archaeological Reconnaissance
- ○ Category B - Archaeological Research
- ◉ Category C - Archaeological Resource Impact Assessment

Signature of applicant April MacIntyre **Date** 7 June 2006

Approved:

Executive Director [signature] **Date** June 12/06