

October 31, 2022

Jeannie Woodard
Town of Stratford
234 Shakespeare Drive
Stratford, PE C1B 2V8

Dear Jeannie Woodard:

RE: CBCL Project #222617.02 - Stratford Community Campus: Wetland Delineation Results

1 Introduction

CBCL Limited (CBCL) was engaged by the Town of Stratford (the Town) to conduct a wetland assessment at the site of the planned Stratford Community Campus. The site is located at PID 1137884 between Bunbury Road and Hollis Avenue in Stratford, PE. The subject properties for the purposes of the wetland assessment included PID 1137884, as well as one neighboring property to the east, owned by the Wood Family (PID 190025).

The subject properties and wetlands are along Bouyer Creek, contained within the Fullertons Creek Watershed. The site mainly consists of grass covered fields (agricultural land); however, there is a wooded area, as well as a known Provincially mapped wetland and watercourse, at the southern portion of the site.

The purpose of the wetland assessment is to delineate the known wetland in order to define the necessary construction setbacks. This report is intended to provide a technical summary of the wetland assessment methodology and associated findings.

2 Wetland Assessment Methodology

2.1 Pre-Field Desktop Research

The following data sources were reviewed prior to conducting the fieldwork:

- ▶ PEI wetlands database
- ▶ PEI Forest cover mapping
- ▶ LiDAR (Light Detection and Ranging) digital elevation model and canopy height model
- ▶ Recent aerial imagery (Pictometry)
- ▶ CBCL-generated LiDAR Wet areas mapping (WAM, which depicts predicted depth to water table)
- ▶ CBCL Limited – Geotechnical Investigation Report (July 2022)

2.2 Field Delineation

Ground level wetland determination and delineation was performed, as per the standard protocols outlined by the *US Army Corps of Engineers Wetland Delineation Manual*¹. This procedure focuses on establishing the wetland-upland edge and is based upon the presence of positive indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Being a well understood and broadly applied protocol in the industry, the assessment methodology is not described in detail herein. A synopsis of the process is provided below.

Control Plots: Control plots were established at two locations as depicted in Figure EV02 (Attachment A); one in the wetland, and another in the upland. At each of these locations, vegetation was catalogued at three strata—tree, shrub, and herbaceous layer. All species within these strata were assigned a percent cover value, and their wetland indicator status was recorded per the Nova Scotia *Wetland Indicator Plant List*² which is applicable for use in PEI. Soils samples were extracted to a depth of 50 cm using a soil auger, and all encountered horizons were coloured using a Munsell colour chart, and hand textured. Hydrology indicators were noted within the immediate vicinity of the control plots.

Georeferencing: As the wetland was delineated, handheld GPS waypoints (3 to 5 m accuracy typical) were recorded along the boundary by the delineator. The wetland boundary was not flagged.

Timing of Delineation: The delineation was performed during the growing season (September 7, 2022) by Ian Bryson, who is a senior scientist with CBCL Limited. Conditions at the time of survey were considered to be excessively dry, with several weeks of very little precipitation leading up to the survey (Figure 2.1).

Areas of Assessment: Extent of formal delineation was largely limited to the subject properties owned by the Town, and for the construction facing boundaries only. Limited verification of wetland conditions was conducted on the adjacent properties (with permission by owners) and was used as the basis for wetland boundary interpretation for off-site wetland areas. Two additional Provincially mapped wetland areas at the western and southern extents of the subject properties were not assessed (Figure EV02, Attachment A).

¹ <https://www.lrh.usace.army.mil/Portals/38/docs/USACE%2087%20Wetland%20Delineation%20Manual.pdf>

² <https://novascotia.ca/nse/wetland/indicator.plant.list.asp>

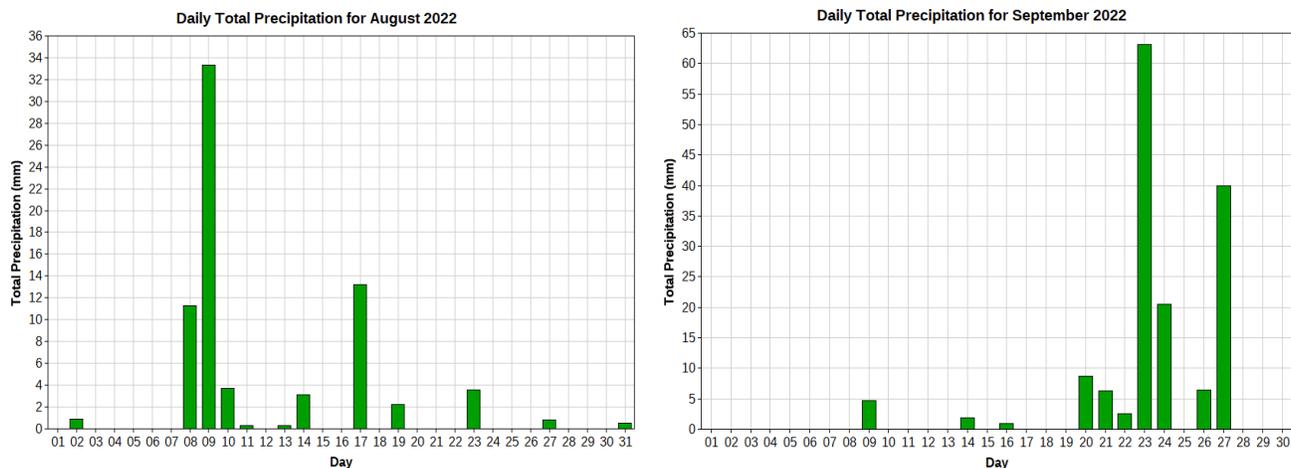


Figure 2.1: Precipitation record for Charlottetown Station A, for August and September 2022. Source: <https://climate.weather.gc.ca/>

2.3 Off-site Wetland Boundary Interpretation

Based on the conditions documented during the field delineation, additional boundary interpretation was conducted for areas not visited. This interpretation was conducted using GIS, with available topographic and imagery data, and depth to water table modelling developed by CBCL.

2.4 Wetland Classification

During field work, relevant characteristics were documented related to the classification of the wetland and its component vegetation communities. These data were used to later conduct a high-level wetland classification of the subject wetlands, based on:

- ▶ Vegetation structure and type
 - Submerged and floating leaved vegetation
 - Herbaceous vegetation
 - Low Shrub (< 2 m height)
 - High Shrub (2 – 7 m height)
 - Forested (> 7 m height)
- ▶ Apparent hydrological regime, based on LiDAR elevation data and aerial imagery:
 - Permanently inundated
 - Seasonally inundated
 - Saturated only

3 Results

A total of four separate wetland areas were documented within or partially within the subject properties, as listed in Table 3.1.

Wetland 1 consists of two portions (mapped as WL-1a, and WL-1b), which are separated by a berm and flow control structure operated by Ducks Unlimited Canada. Despite being separated by this feature, the two portions were historically connected, and are still considered to be hydrologically contiguous—accordingly, WL-1a and WL-1b are still considered to be the same wetland in the functional sense.

Table 3.1 – Summary of Wetlands Encountered

Wetland ID	Wetland Class	Total Area	Area Within Subject Properties
WL-1a	Marsh/Swamp Complex	14.94 ha	1.18 ha
WL-1b	Marsh/Swamp Complex	12.65 ha	N/A
WL-2	Marsh/Swamp Complex	0.35 ha	0.35 ha
WL-3	Marsh/Swamp Complex	0.73 ha	0.73 ha
WL-4	Marsh	0.08 ha	0.08 ha

Mapping of the subject wetland boundaries and wetland type is included in Figure EV02 (Attachment A).

3.1 Wetland Control Plot Observations

A general description of findings at the wetland plot is provided below. The wetland data sheet is provided in Attachment B. Photos are provided in Attachment C.

Vegetation: At the wetland delineation control plot shown on Figure EV02 (Attachment A), the tree layer consisted of tamarack (*Larix laricina*), yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*), white spruce (*Picea glauca*), and paper birch (*Betula papyrifera*). The shrub layer was dominated by speckled alder (*Alnus incana*) with lesser amounts of winterberry (*Ilex verticillata*). The ground vegetation layer was dominated by sensitive fern (*Onoclea sensibilis*; FAC), with lesser amounts of fowl manna grass (*Glyceria striata*), three-seeded sedge (*Carex trisperma*), cinnamon fern (*Osmundastrum cinnamomea*), and creeping buttercup (*Ranunculus repens*); trace amounts of other herbaceous species were also present as indicated in Attachment B.

Soils: Soils at the wetland plot consisted of 10 cm of highly decomposed organics, underlain by 16 cm of silt (7.5 YR 3/1; very dark grey); and a further 24 cm of silty loam (7.5 YR 5/2; brown) with 10% redox concentrations (7.5YR 4/6; strong brown). Refusal was not encountered, and

the soil pit was ended at 50 cm depth from surface. The hydric soil indicator encountered at this location is considered to be a 'Depleted Matrix'.

Hydrology: Primary wetland hydrology indicators observed include the presence of saturation (US Corps of Engineers Indicator A3) (at surface) and a hydrogen sulfide odour (Indicator C1). Secondary indicators include the presence of dry season water table (Indicator C2), geomorphic position (Indicator D2), and microtopographic relief (Indicator D4).

3.2 Upland Plot Observations

A general description of findings at the upland plot is provided below. The upland data sheet is provided in Attachment B. Photos are provided in Attachment C.

Vegetation: At the upland assessment plot shown on Figure EV02 (Attachment A), the tree layer was dominated by tamarack, red maple, and black spruce (*Picea mariana*). The shrub layer was relatively sparse and was dominated by sheep laurel (*Kalmia angustifolia*). The ground vegetation layer was also quite sparse, consisting of cinnamon fern (FAC), bunchberry (*Cornus canadensis*), and *Sphagnum* moss.

Soils: No indicators of wetland soils were noted at the upland assessment point. The soil sample consisted of 5 cm of organics (humus layer), overlaying a 5 cm thick of eluviated sandy loam (7.5 YR 6/3; light brown), and 15 cm of silty loam (7.5 YR 4/4). Refusal was encountered at 25 cm from the soils surface.

Hydrology: No indicators of wetland hydrology were noted at the upland assessment point.

3.3 Wetland Class and Sub-Class Descriptions

The majority of the wetlands encountered within the areas assessed consist of several different wetland classes and sub-classes; namely marsh (submergent marsh, emergent marsh, meadow marsh), and swamp (forested swamp, shrub swamp). All subclasses are present on the subject properties, with the exception of submergent marshes. Each of the classes is described below. Photos of typical wetland class/sub-class conditions are provided in Attachment C.

- ▶ **Submergent Marsh:** These marshes are located at the lowest landscape positions, and evidently contain water year-round. Water depths were unable to be measured while on site, but are sufficiently deep to preclude the growth of emergent vegetation. In these marshes, vegetation may include a combination of floating-leaved vegetation, and submerged vegetation. Typical floating-leaved vegetation may include American white water-lily (*Nymphaea odorata*) yellow water-lilies (*Nuphar* spp.), and duckweeds (*Lemna* spp.). Typical submerged vegetation may include various species of pondweed (*Potamogeton* spp.), and bladderworts (*Utricularia* spp.).

- ▶ **Emergent Marsh:** This wetland type typically occurs in the lowest elevation portions of the site and are found fringing the open water of submergent marshes. Some portions may contain water year-round, from which rooted vegetation emerges. Water level fluctuations are typical through the season in response to seasonal wet/dry cycles, and in some locations there may be no surface water present during the driest period of the year. Vegetation in these marsh areas is typically dominated by cattails (*Typha latifolia* and *T. angustifolia*) and various graminoids (grasses and grass-like species), predominantly manna grasses (*Glyceria* spp.), sedges (*Carex* spp.), bluejoint (*Calamagrostis canadensis*), and bur-reeds (*Sparganium* spp.).
- ▶ **Meadow Marsh:** Found on the gently sloped mid- to lower-slope positions of the site, these wetlands evidently do not typically contain surface water for most of the year, though may be saturated year-round due to groundwater seepage. Within the subject wetlands, these wet meadows are frequently found on gently sloping sites, many of which may have been former farmland that have since been abandoned (presumably due to poor drainage potential). These wetland communities are frequently dominated by the invasive reed canary-grass (*Phalaris arundinacea*) and, in some locations, sensitive fern. These meadows may be interspersed with various shrubs, including speckled alder, pussy willow (*Salix discolor*), Bebb's willow (*Salix bebbiana*), and Virginia rose (*Rosa virginiana*). Other more occasional herbaceous species include various species of goldenrods (*Solidago* spp.), jewelweeds (both the native *Impatiens capensis* and the exotic *I. parviflora*).
- ▶ **Shrub Swamp:** Characteristic shrub swamp vegetation is defined by dense thickets of speckled alder with lesser amounts of pussy willow, Bebb's willow, and winterberry, as well as younger growth (< 7 m tall) of tree species such as red maple, black spruce, and tamarack. Vegetation beneath these thickets is not particularly varied and includes bluejoint and sensitive fern as dominants.
- ▶ **Forested Swamp:** Typical forested swamp conditions are dominated by black spruce (*Picea mariana*), white spruce, tamarack, and red maple. The overstorey is very open in some areas, and in these areas a dense growth of shrubs (primarily speckled alder) capitalizes on the high sunlight availability, excluding most other species. Ground vegetation throughout the forested swamp component is dominated by *Sphagnum* and haircap moss (*Polytrichum commune*), with additional herbs such cinnamon fern, sensitive fern, fowl manna grass, bunchberry, and three-seeded sedge.

4 Closure

This report has been prepared for the sole benefit of the Client. All information, documentation or other material contained in, attached to, or forming part of this report reflects CBCL's opinion and best judgment based on the information available to us at the time of preparation. Any use or reliance on this report by the Client in circumstances where there has been a change in site conditions or for any purpose not expressly intended by or

Jeannie Woodard
October 31, 2022

delineated in this report shall be the sole responsibility of the Client and CBCL accepts no liability for such use or reliance. Any use or reliance on this report by any third party, without CBCL's prior express written consent, shall be the sole responsibility of that third party. CBCL accepts no liability whatsoever for such use or reliance.

The information and conclusions contained in this report are generally consistent with professional standards for engineering and scientific professionals providing similar services at the same time, in similar locations and under similar circumstances.

We trust this is the information you require at this time. We are available to discuss the contents of this report at your convenience.

Yours very truly,

CBCL Limited



Prepared by:
Ian Bryson, M.Sc., EP
Senior Scientist, Ecology & Wetlands



Reviewed by:
Loretta Hardwick, M.Sc., B.Sc., Bio.H
Senior Environmental Scientist

Attachments:

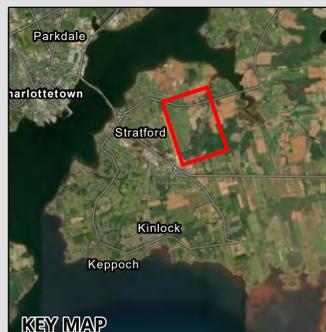
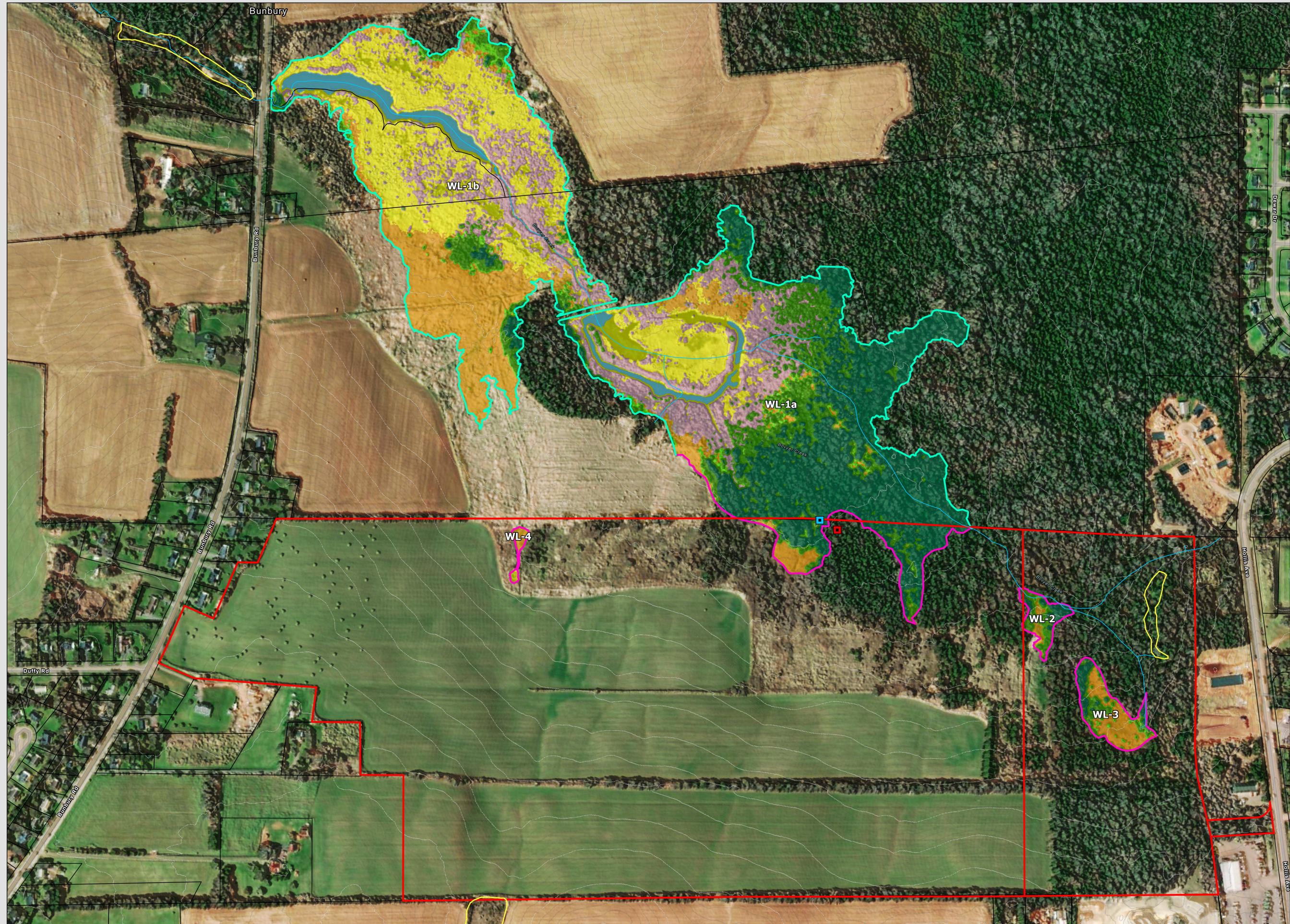
- A – Figure EV02 – Wetland Delineation
- B – Wetland Delineation Forms
- C – Photo Log

Report No: 222617.02

This document was prepared for the party indicated herein. The material and information in the document reflects CBCL Limited's opinion and best judgment based on the information available at the time of preparation. Any use of this document or reliance on its content by third parties is the responsibility of the third party. CBCL Limited accepts no responsibility for any damages suffered as a result of third party use of this document.

ATTACHMENT A

Wetland Delineation Figure



- KEY MAP**
- Subject Properties
 - PEI Hydro Network
 - Property Boundary
 - Upland Control Plot
 - Wetland Control Plot
 - Interpreted Wetland Boundary
 - Field Delineated Wetland Boundary
 - Provincially Mapped Wetland (Not Assessed)
- Wetland Type**
- Emergent Marsh - Graminoid/Cattails
 - Emergent Marsh - Low Shrub/Graminoid/Cattails
 - Forested Swamp
 - Low Shrub Swamp
 - Meadow Marsh
 - Submergent Marsh
 - Tall Shrub Swamp



**TOWN of STRATFORD
Community Campus
Site Servicing**

Wetland Delineation

DATE: 2022-11-01	PROJ N°: 222617.02	FIGURE: EV02 REV01
DRAWN: IB	CHECKED:	APPROVED:

REV No.	Description	Date	By
REV01	Legal Survey Added	10/31/2022	IB
REV00	Issued for Information	08/14/2022	IB

REVISION OR ISSUE

Coordinates System:
GCS: GCS North American 1983 CSRS
Datum: North American 1983 CSRS
Projection: Transverse Mercator
Map Units: Meter
Contour Interval: 0.5 m

SCALE: 1:2,500

Document Path: \\C:\Users\jstewart\OneDrive\Documents\2022\222617.02\STRATFORD - COMMUNITY CAMPUS SITE SERVING - Wetland Delineation - 01 Nov 2022

ATTACHMENT B

Wetland Delineation Field Datasheets

- B1. Wetland Datasheet
- B2. Upland Datasheet

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Starfford Community Campus Municipality/County: Stratford, PEI Sampling Date: Sept 7, 2022
 Applicant/Owner: Town of Stratford Sampling Point: WL-1
 Investigator(s): Ian Bryson Affiliation: CBCL Limited
 Landform (hillslope, terrace, etc.): Basin Local relief (concave, convex, none): Flat
 Slope (%): 0 Lat: 5,119,203 N Long: 494,495 E Datum: UTM NAD83 Z20
 Soil Map Unit Name/Type: _____ Wetland Type: Forested Swamp

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil X, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes <u>X</u> No _____ Wetland Hydrology Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____ If yes, optional Wetland Site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.) Extremely dry conditions at time of survey. Problematic soils, red parent material	

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status		
Tree Stratum (Plot size: _____)					
1. <u>Larix laricina</u>	<u>10%</u>	<u>DOM</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)	
2. <u>Picea glauca</u>	<u>5%</u>				
3. <u>Betula alleghaniensis</u>	<u>5%</u>				
4. <u>Acer rubrum</u>	<u>5%</u>				
5. <u>Betula papyrifera</u>	<u>2%</u>				
	<u>27%</u>	= Total Cover		Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____	
Sapling/Shrub Stratum (Plot size: _____)					
1. <u>Alnus incana</u>	<u>50%</u>	<u>DOM</u>	<u>FACW</u>		
2. <u>Ilex verticillata</u>	<u>5%</u>				
3. <u>Abies balsamea</u>	<u>2%</u>				
4. <u>Rubus pubescens</u>	<u>2%</u>				
5. <u>Taxus canadensis</u>	<u>1%</u>				
	<u>60%</u>	= Total Cover			
Herb Stratum (Plot size: _____)					
1. <u>Onoclea sensibilis</u>	<u>40%</u>	<u>DOM</u>	<u>FACW</u>	Hydrophytic Vegetation Indicators: ___ Rapid Test for Hydrophytic Vegetation <u>X</u> Dominance Test is >50% ___ Prevalence Index is ≤3.0 ¹ ___ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
2. <u>Glyceria striata</u>	<u>10%</u>				
3. <u>Carex trisperma</u>	<u>5%</u>				
4. <u>Osmundastrum cinnamomea</u>	<u>5%</u>				
5. <u>Ranunculus repens</u>	<u>2%</u>				
6. <u>Equisetum arvense</u>	<u>Trace</u>				
7. <u>Scutellaria lateriflora</u>	<u>Trace</u>				
8. <u>Cornus canadensis</u>	<u>Trace</u>				
9. _____					
10. _____					
	<u>62%</u>	= Total Cover			
Woody Vine Stratum (Plot size: _____)					
1. _____				Hydrophytic Vegetation Present? Yes <u>X</u> No _____	
2. _____					
	_____	= Total Cover			
Remarks: (Include photo numbers here or on a separate sheet.)					

Adapted from U.S. Army Corps of Engineers form for Northeast-North Central Supplement for use in Nova Scotia (2011)

SOIL

Sampling Point: WL-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth(cm) (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10							ORGANIC	
10-26	7.5 YR 3/1	100%					Silt	
26-50	7.5 YR 3/2	90%	7.5 YR 4/6	10%	C	M	Silt Loam	

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

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Coast Prairie Redox (A16)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Polyvalue Below Surface (S8)	
<input type="checkbox"/> Thin Dark Surface (S9)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): 0" (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Starftford Community Campus Municipality/County: Stratford, PEI Sampling Date: Sept 7, 2022
 Applicant/Owner: Town of Stratford Sampling Point: UL-1
 Investigator(s): Ian Bryson Affiliation: CBCL Limited
 Landform (hillslope, terrace, etc.): Lower Slope Local relief (concave, convex, none): None
 Slope (%): 2 Lat: 5,119,175 N Long: 494,490 E Datum: UTM NAD83 Z20
 Soil Map Unit Name/Type: _____ Wetland Type: Forested Swamp

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil X, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____ Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> If yes, optional Wetland Site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.) Extremely dry conditions at time of survey. Problematic soils, red parent material	

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status		
Tree Stratum (Plot size: _____)					
1. <u>Larix laricina</u>	20%	DOM	FAC	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>7</u> (A) Total Number of Dominant Species Across All Strata: <u>7</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)	
2. <u>Picea mariana</u>	20%	DOM	FACW		
3. <u>Acer rubrum</u>	15%	DOM	FAC		
4. _____					
5. _____					
55% = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____	
Sapling/Shrub Stratum (Plot size: _____)					
1. <u>Kalmia angustifolia</u>	10%	DOM	FAC		
2. <u>Ilex verticillata</u>	5%	DOM	FACW		
3. <u>Sorbus americana</u>	2%				
4. <u>Acer rubrum</u>	2%				
5. <u>Viburnum cassinoides</u>	1%				
20% = Total Cover				Hydrophytic Vegetation Indicators: ___ Rapid Test for Hydrophytic Vegetation <u>X</u> Dominance Test is >50% ___ Prevalence Index is ≤3.0 ¹ ___ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Herb Stratum (Plot size: _____)					
1. <u>Cornus canadensis</u>	20%	DOM	FAC		
2. <u>Osmundastrum cinnamomea</u>	10%	DOM	FAC		
3. _____					
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
30% = Total Cover				Hydrophytic Vegetation Present? Yes <u>X</u> No _____	
Woody Vine Stratum (Plot size: _____)					
1. _____					
2. _____					
_____ = Total Cover					
Remarks: (Include photo numbers here or on a separate sheet.) Sphagnum moss 40%					

Adapted from U.S. Army Corps of Engineers form for Northeast-North Central Supplement for use in Nova Scotia (2011)

SOIL

Sampling Point: WL-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (cm) (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5							ORGANIC	
5-10	7.5 YR 6/3	100%					Loam	
10-25	7.5 YR 4/4	100%					Silt Loam	
25 +							Refusal	

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

Hydric Soil Indicators: <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Polyvalue Below Surface (S8) <input type="checkbox"/> Thin Dark Surface (S9) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8)	Indicators for Problematic Hydric Soils³: <input type="checkbox"/> Coast Prairie Redox (A16) <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) <input type="checkbox"/> Iron-Manganese Masses (F12) <input type="checkbox"/> Piedmont Floodplain Soils (F19) <input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Other (Explain in Remarks)
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³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes _____ No <u>X</u>
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Remarks:

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): <u>0"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <u>X</u>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

ATTACHMENT C

Photo Log



Photo #1: Wetland control plot within WL-1 – Typical conditions.



Photo #2: Wetland control plot within WL-1 – Typical conditions.



Photo #3: Wetland control plot within WL-1 – Typical ground vegetation conditions.



Photo #4: Upland control plot – Typical conditions.



Photo #5: Evidence of seasonal flooding and saturation typical within WL-1 and WL-2, dry and cracked at time of assessment.



Photo #6: Typical conditions of Bouyer Creek, where it enters WL-2



Photo #7: Wet meadow typical conditions in WL-3, dominated by sensitive fern.



Photo #8: Typical conditions at WL-1b, looking west from Wood’s property. Reed canary grass demarcates the approximate edge of wet meadow at this location.

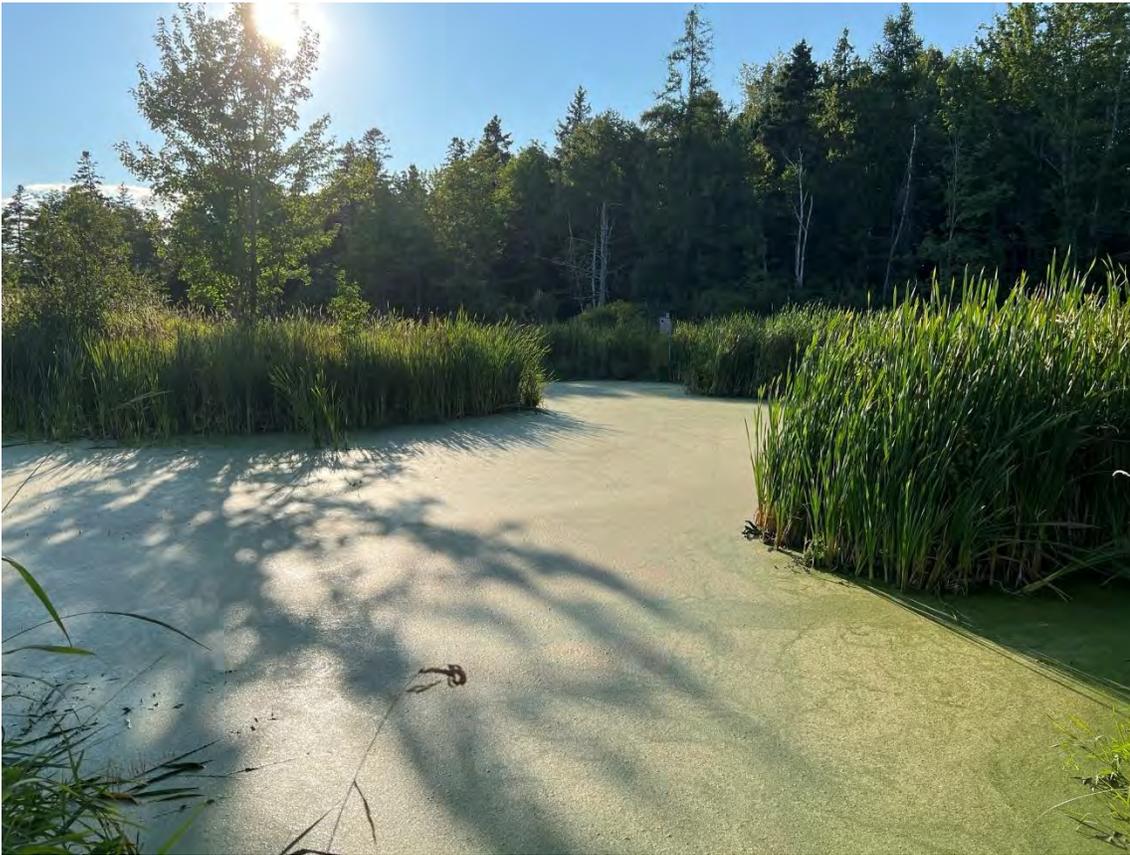


Photo #9: Typical conditions within Ducks Unlimited managed portion of WL-1a, with submergent marsh (foreground) dominated by duckweed, and emergent marsh (midground) dominated by cattails.



Photo #10: Typical emergent marsh conditions within WL-4, dominated by cattails.