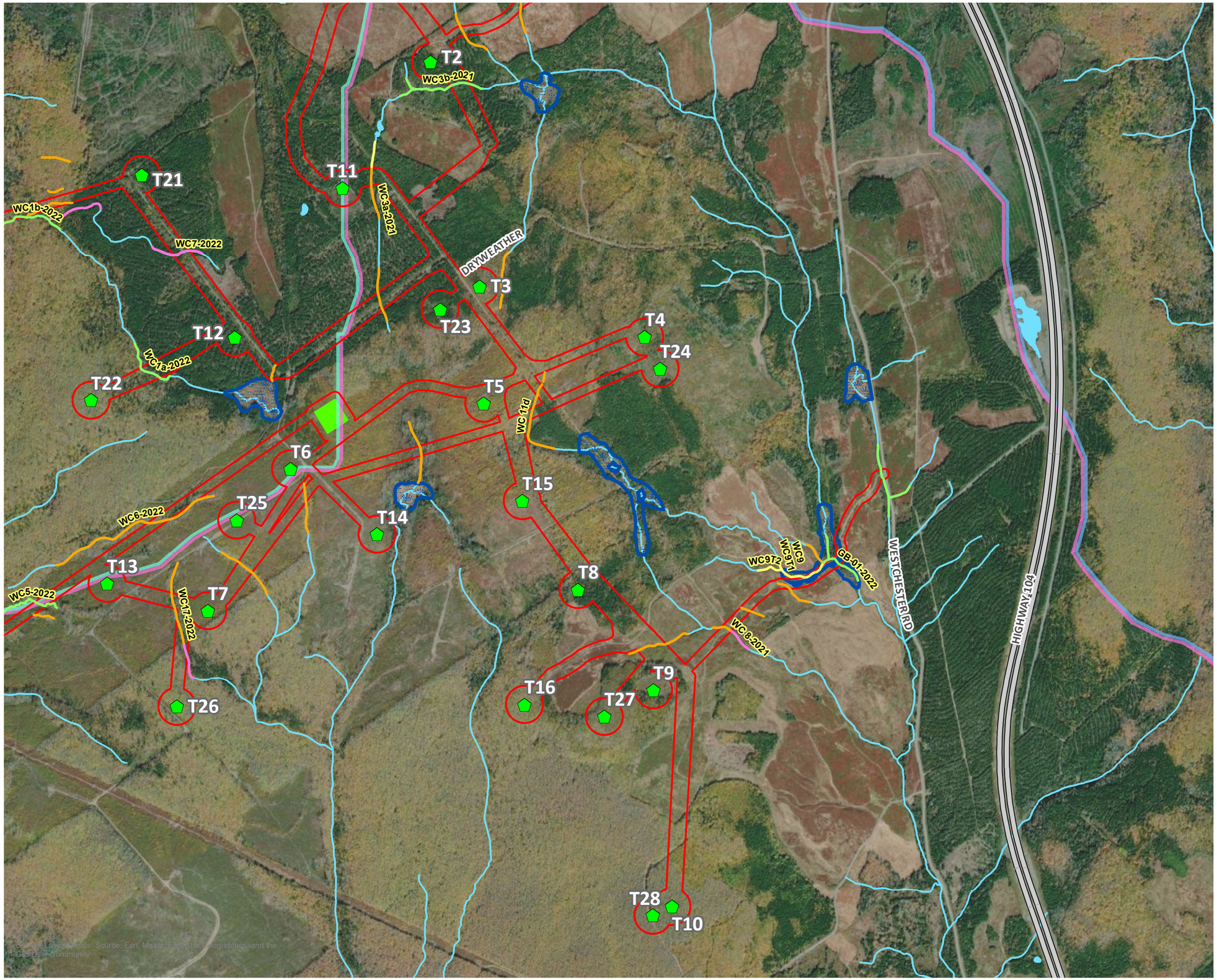


Natural Forces

WESTCHESTER WIND PROJECT

WATERCOURSE AND FISH HABITAT SUITABILITY FOR ASSESSED WATERCOURSES WITHIN THE PORTAPIQUE RIVER SECONDARY WATERSHED
FIGURE 13A

- Proposed Turbine Location
- Proposed Substation Location
- Potential Development Area (PDA)
- Highway
- Watercourse
- Waterbody
- Wetland (Province of Nova Scotia, 2021)

Secondary Watershed (Local Assessment Area)

- Portapique River Secondary Watershed
- River Philip Secondary Watershed
- Wallace River Secondary Watershed

Fish Habitat

- Confirmed Fish Habitat
- Likely Provides Fish Habitat
- May Provide Seasonal Fish Habitat
- Unlikely to Provide Suitable Fish Habitat

0 0.25 0.5 km

N W E S

SCALE 1:15,000

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING, GEONB, NATURAL FORCES

MAP CREATED BY: DU
MAP CHECKED BY: KB
MAP PROJECTION: NAD 1983 UTM ZONE 20N

DILLON CONSULTING

PROJECT: 21-1329
STATUS: DRAFT
DATE: 2022-12-09

FILE LOCATION: K:\2021\211329\Product\Internal\Westchester_Figures_2022\Watercourse Figures 2022\WC_F03to5B_Watercourse_FishHabitatSuitabilityAssessment_2022.mxd

TABLE 14: PDA CROSSINGS OF WATERCOURSES

Watercourse and Crossing ID	Characterization	Potential Alterations	Water Quality	Potential Barriers	Likelihood of Fish Habitat
River Phillip Secondary Watershed (IDN-1)					
MB-01	Mountain Brook: small permanent watercourse.	None – The proposed collector line will span Mountain Brook.	pH: 6.3-6.5 DO: 8.2-9.2 mg/L	Slightly acidic water	Yes. Cobble substrate, neutral to slightly acidic pH and available cover.
WC1a-2022	Small permanent tributary flowing north. Flow into a larger tributary (WC1b-2022) before flow enters Mountain Brook.	A new proposed access road and adjacent collector line to T22.	pH: 7.5-8.4 DO: 8.2-9.2 mg/L	None identified	Yes. 5cm brook trout observed July 27, 2022.Cobble substrate, suitable water quality and available cover.
WC1b-2022	Small permanent tributary flowing east to west and parallel to the PDA. Tributary receives flow from WC-01a-2022 and WC-07-2022 and flows directly into Mountain Brook.	None – This watercourse runs parallel to existing access road to be upgraded.	pH: 6.4-6.7 DO: 7.7-8.6 mg/L	Slightly acidic water	Yes, brook trout observed upstream (WC1a-2022). Cobble substrate, neutral to slightly acidic pH and available cover.
WC7-2022	Ephemeral tributary to Mountain Brook. Watercourse flows through a metal culvert at the PDA crossing. Downstream of the culvert appears to be washed out from previous high flows.	An existing access road with metal culvert may require upgrades.	pH: 6.1 DO: 5.0 mg/L	Insufficient water and soft substrate in some areas. Moderate to low pH and DO observed on July 28, 2022.	Unlikely with potential for tolerant species when water is at a high stage.
WC15-2022	Forked intermittent tributary to Mountain Brook.	Potential within the eastern fork (T2) where an existing access road and culvert may require upgrades.	pH: 6.5-6.7	Slightly acidic and insufficient water in areas. A raised culvert in the east form prevents fish passage upstream of the existing access road.	Potential for some tolerant fish species to be present seasonally. Watercourse is very steep with sections with cobble and gravel substrate. Culvert under an existing access road may block upstream access for fish.
WC16-2022	Small permanent forked tributary	None – The collector line	pH: 7.0	None identified	Yes, small minnows observed

Watercourse and Crossing ID	Characterization	Potential Alterations	Water Quality	Potential Barriers	Likelihood of Fish Habitat
	to Mountain Brook.	proposed will span both forks of this tributary and Mountain Brook.			70-900 m downstream of the PDA July 27, 2022.
Portapique River secondary watershed (IDJ-7)					
GB-01	Gleason Brook: Small permanent watercourse that collects waters from tributaries from the north and west of the proposed crossing. Water flow is south to the Portapique River. A rare lichen was identified 600 m upstream from this crossing in 2021[2].	None – An existing access road and bridge will be upgraded. No instream work will be required within Gleason Brook.	pH: 6.4-6.7 DO: 6.5-7.3 mg/L	None observed	Yes, small Brook trout were observed near T1 and T4 on July 27, 2022.
WC8-2021	Intermittent Tributary to Gleason Brook. Watercourse is deeply incised and overtops existing roadbed The watercourse flows overtop of an existing access road at the PDA crossing location.	Upgrades will be required to the existing access road including the installation of a culvert or bridge.	pH: 7.4 DO: 10 mg/L	Insufficient water in the upstream reaches.	Potential for some tolerant fish species to be present downstream of the PDA crossing location based on suitable pH, DO and substrate conditions.
WC9-2021	Tributary to Gleason Brook that runs parallel to an existing access road. This location collects flows from several south-flowing tributaries (including from WC3) and then flows east into Gleason Brook.	None – This watercourse runs parallel to existing access road to be upgraded.	pH: 7.2 DO: 11.7 mg/L	A raised culvert near the confluence with Gleason Brook is a barrier to fish passage.	Likely/Yes. Cobble substrate and available cover.
WC3-2021 (WC3a and WC3b)	Tributary to Gleason Brook that the PDA crosses in two locations. The watercourse is intermittent to ephemeral at WC-3a and forms a small permanent stream further downstream before WC3b. This watercourse runs through a conifer plantation at WC3b.	Upgrades will be required to the existing access roads and for collector lines at two locations (i.e., WC3a and WC3b).	pH: 5.8-6.9 DO: 6.1-10.5 mg/L	Soft substrate (fines), low to no flow, acidic pH and low DO in the upstream reach (WC3a). A culvert beneath an access road at	Yes, minnows were observed at WC3b (July 29, 2022). At WC3b, gravel substrate with fines, pH is neutral to slightly acidic and watercourse has available cover and suitable DO. Upstream crossing (WC3a) is

Watercourse and Crossing ID	Characterization	Potential Alterations	Water Quality	Potential Barriers	Likelihood of Fish Habitat
				WC3a further restricts fish passage upstream.	unlikely fish habitat due to insufficient flow and poor water quality.
WC17	Ephemeral tributary to Fountain Lake Brook	An access road and two collector lines are proposed to cross this watercourse. The access road is proposed for an area with limited flow and two collector lines are not anticipated to require instream work and can span the crossing locations.	pH: 5.7 DO: 3.4 mg/L	Soft substrate (fines), low to no flow, low pH and DO and insufficient flow.	Unlikely
WC5	Ephemeral tributary to Duck Pond.	Potential for an access road to cross this watercourse to support the interconnection to the transmission line.	pH: 4.7-5.4 DO: 6 mg/L	Low flow, acidic pH and low DO	Yes – minnows observed in small, isolated pools within this watercourse.
WC6	Ephemeral tributary to Duck Pond.	None – This watercourse runs parallel to existing access road to be upgraded.			Unlikely

NOTES:

1. As previously described, the PDA encompasses all of the proposed 28 turbines locations and their associated infrastructure. The Project would consist of up to 12 of those locations and their associated infrastructure. As such, this list encompasses all potential watercourse crossings in this secondary watershed within 30m of the PDA.
2. Eastern waterfan (*Peltigera hydrothyria*) was identified 600m upstream from the proposed GB-01 crossing in 2021. Further details and proposed mitigation measures are found in the Vegetation and Lichen Section (**Section 3.1.1.3**).

3.1.4.2 Turtles and Turtle Habitat

Scope of VECs

The proposed Project is located in an area where turtles and turtle habitat may be present. Turtles and turtle habitat are considered important features and VECs because they are valued in their relationship with other wildlife and wildlife habitat, including other biological and physical components addressed as VECs.

The LAA for turtles and turtle habitat had the same extent as the watercourse and fish habitat LAA, defined as watercourse crossings within 30 m of the PDA and their associated tributaries or distributaries. Watercourse crossings within 30 m of the PDA were surveyed for turtles from 50 m upstream to 100 m downstream from the PDA as part of the study area (**Figure 14**). Additionally, the study area included transect-based survey areas within the LAA targeting representative habitats. A buffer of 30 m was selected to include watercourses that are adjacent to the PDA and could be impacted by Project activities within their riparian zone.

3.1.4.2.1 Desktop Assessment

Approach and Methodologies

Prior to completing the field assessments, Dillon reviewed readily-available information from reputable sources. The information was reviewed to evaluate the potential for turtles and turtle habitat to be found within the LAA for the Project and to assist in scoping the field program. The information was reviewed, along with information on habitats present in the LAA to determine preliminary potential for at-risk turtle species and/or their critical habitat. Dillon completed a review of the following sources and data lists prior to completing field surveys:

- Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSE 2009);
- Fauna Desktop Study by Strum Environmental (Strum 2013);
- Available mapping to develop a list of potential terrestrial habitat types from:
  - NSDNRR forest inventory database;
  - NSDNRR ownership and restricted/limited land-use database;
  - NSDNRR WAM;
  - Publicly available GIS map layers (e.g., ecological land classification, forest and non-forest inventory, wetland inventory, Protected Natural Areas, Wildlife Management Zones);
  - NS Provincial Landscape Viewer; and
  - Google Earth satellite imagery.

Results

Although the Project layout was designed to minimize the disturbance of naturalized areas by prioritizing development in areas with existing anthropogenic disturbance, some areas within the proposed footprint for the Project will extend through less disturbed habitat types, including areas with mature trees, wetlands, and watercourses. Two watercourses, Gleason

Brook and Mountain Brook, were selected as having the potential to support turtles based on their permanency and connection to larger river systems that may provide habitat for important life stages for turtles.

Wood turtles (*Glyptemys insculpta*), Eastern painted turtles (*Chrysemys picta*), and snapping turtles (*Chelydra serpentine*) have been historically identified within 15 km of the PDA based on the 2021 and 2022 ACCDC reports. The three-turtle species are all considered to be SAR based on their conservation status and the definition of SAR for the purposes of this Addendum. Further details on SAR turtles are discussed in **Section 3.2.5.2**.

3.1.4.2.2 Field Assessments

Approach and Methodologies

Incidental reporting

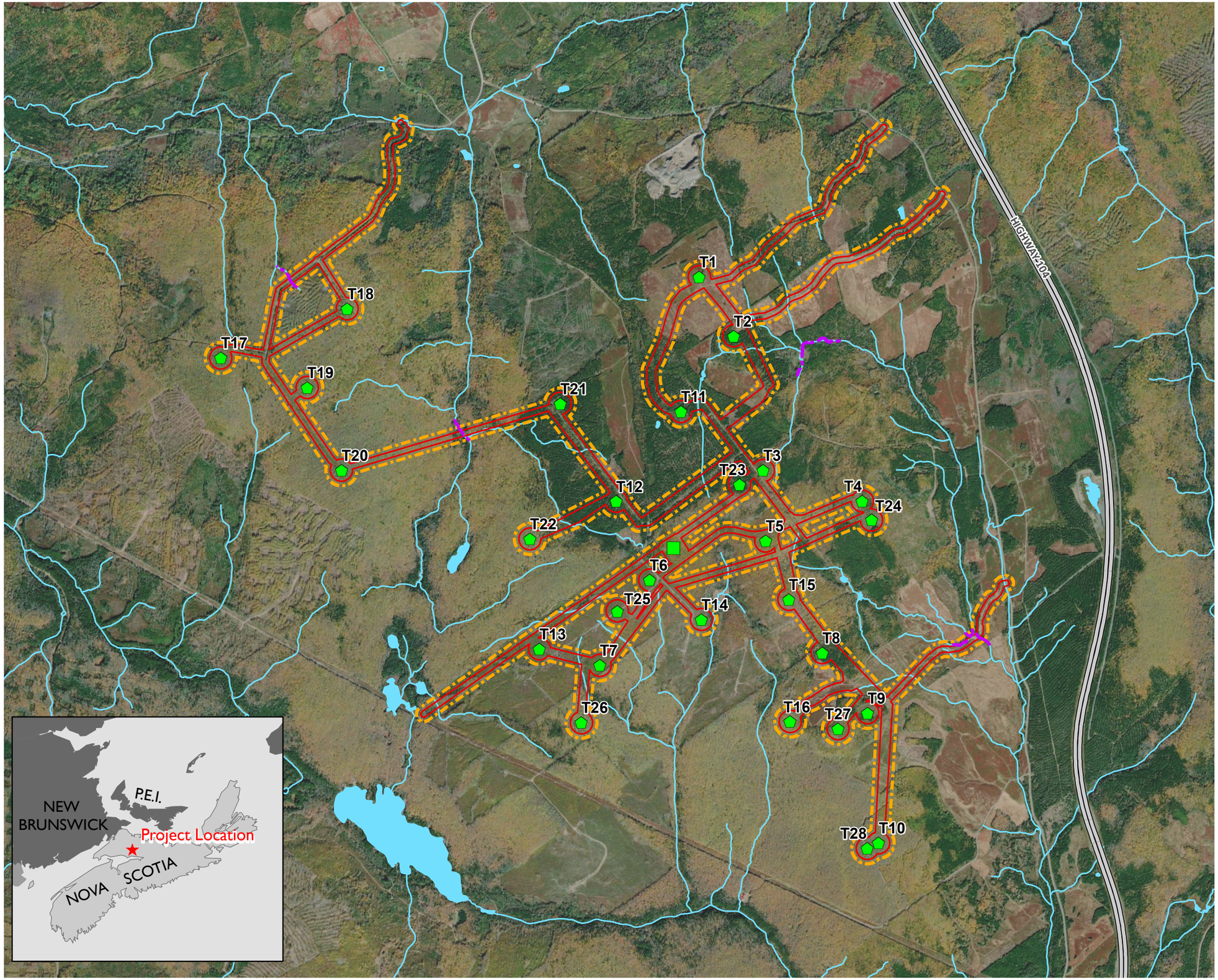
Field studies of terrestrial habitats were conducted between April and October 2021 and 2022, in collaboration with other targeted field surveys (i.e., bird surveys, wetlands, watercourses, baseline vegetation and rare plants). Biologists focused on the general characterization of available turtle habitats within the survey areas, as well as the potential for sensitive species or their critical habitats occurring in the survey area. The following criteria were documented:

- Occurrence of SAR/SoCC;
- Potential habitat for SAR/SoCC; and
- Incidental observation and documentation of observed turtles (regardless of conservation status), signs of turtles or their habitat.

Turtle habitat survey

Surveys for turtles and their habitat were included in the aquatic habitat assessments at request of NSDNRR due to the proximity of the Project to Critical Habitat for the wood turtle (*Glyptemys insculpta*). The West Branch of the Wallace River, beginning approximately 2 km from the PDA is considered Critical Habitat for wood turtle.

Informed by the results of the desktop assessment, two watercourses that intersects the PDA were identified as having the potential to support wood turtles (i.e., Gleason Brook and Mountain Brook). A habitat suitability assessment survey was conducted along sections of Gleason Brook and Mountain Brook that intersect the PDA (**Figure 14**). The purpose of a habitat suitability assessment is to identify potential conditions in which turtle species can carry out any of the components of their life cycle. For wood turtles this includes activities such as overwintering, mating, thermoregulation, nesting, and foraging, as well as their movements between aquatic and terrestrial habitats. For the purpose of this assessment, watercourse attributes primarily associated with overwintering, thermoregulation and nesting within a 25 m buffer of the watercourses' banks were documented using a hand-held GPS unit with photographs.



Natural Forces

WESTCHESTER WIND PROJECT

LOCAL ASSESSMENT AREA FOR TURTLES AND TURTLE HABITAT

FIGURE 14

- Proposed Turbine Location
- Proposed Substation Location
- Turtle Transect
- Potential Development Area (PDA)
- Local Assessment Area (LAA)
- Highway
- Watercourse
- Waterbody

0 0.25 0.5 1 km

N W E S

SCALE 1:25,000

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING, GEONB, NATURAL FORCES

MAP CREATED BY: DU
MAP CHECKED BY: KB
MAP PROJECTION: NAD 1983 UTM ZONE 20N

DILLON CONSULTING

PROJECT: 21-1329
STATUS: DRAFT
DATE: 2022-12-09

FILE LOCATION: K:\2021\211329\Product\Internal\Westchester_Figures_2022\Wildlife Figures 2022\WC_LAA_TurtleHabitat.mxd

The surveys for Gleason Brook were conducted during the month of June (i.e., June 7, 2021), when air temperatures can be anticipated to be warmer than that of the assessed watercourses (Brown, Cochrane, & Moen, 2017). This survey timing increases the likelihood of turtle detection, as most turtle species tend to utilize terrestrial habitat more often, such as basking areas to regulate their body temperatures during this time. In contrast, when air temperatures are colder than that of the water, turtles tend to stay submerged or on the surface of aquatic features such as watercourses or ponds (Brown, Cochrane, & Moen, 2017). Surveys to identify potential habitat within Mountain Brook were conducted in July (July 13 and 26-27, 2022) when water levels were at relatively low stage.

Any direct turtle observations were to be recorded including the species (if discernible), canopy coverage (%), and GPS (UTM NAD 83) location. Where turtles are protected species, if observed, no effort to capture, measure or disturb individuals was be made. All potential habitat features within 25 m of assessed watercourses were to be identified for the purpose of mapping potential habitat for wood turtles. Observations of suitable habitat features, if present, were documented with a GPS location (UTM NAD83), as well as an approximate size of the feature (m^2), slope (degrees), and aspect.

Results

Incidental reporting

During the 2021 and 2022 biophysical surveys for the EA of the Project, Dillon biologists recorded incidental observations or detections of wildlife, including turtles during the course of other targeted survey efforts, and when possible, photographs were taken. Such detections are rarely direct observations, but rather proxy evidence that is left behinds and remains identifiable for some time after the animal has moved on. This includes more readily-detectable indicators such as animal tracks in snow/mud or animal scat, but also less obvious indicators such as browse marks, dens and/or burrow structures.

During the 2021 and 2022 field surveys, there were no incidental observations of turtles within the LAA by Dillon biologists.

Turtle habitat survey

Targeted surveys for turtle habitat were undertaken within sections of Gleason Brook and Mountain Brook that intersect with the PDA. No turtles were identified during the 2021 or 2022 field surveys during targeted watercourse surveys or incidentally through other biophysical assessments.

3.1.4.3 Assessments Conclusions

The results of the field surveys confirm that fish occupancy and suitable habitats are present within the study area. With the exception of several small brook trout minnows observed in Gleason Brook and a tributary of Mountain Brook, no additional fish SAR/SoCC were observed during the field surveys. The results of the in-situ surface water quality measurements indicate that watercourses are present within the PDA that have physical and chemical characteristic to support salmonids and other fish species.

Though part of the PDA does cross through the Wallace River secondary watershed, the West Branch Wallace River connection to the Wallace River is located 18 km from the PDA and it is not anticipated to be affected by the Project. The Inner Bay of Fundy population of Atlantic salmon, however, have been identified throughout the Portapique River watershed (DFO, 2022), which has been identified as critical habitat for this species. Suitable Atlantic salmon habitat was identified during initial field studies.

For turtles and turtle habitat, no locations of suitable wood turtle habitat were identified in the assessed section of Gleason Brook or Mountain Brook as the watercourse do not contain the necessary characteristics to support turtle habitat (i.e., slow moving, relatively deep water, and/or sand banks/bars). As identified through the desktop assessment, Gleason Brook and Mountain Brook are connected to larger river systems that have could potentially support turtles.

The proposed WTG locations were selected to avoid encroachment of watercourses, are not within 30 meters of a watercourse. However, watercourse crossing with linear features of the PDA were identified in seven locations. These crossings are all associated with existing or proposed roads and/or collector lines. During the field assessments, three watercourse crossings with existing access roads were identified that have ineffective or raised culverts. The proposed road upgrades at these locations will enhance potential fish habitat by restoring flow and reducing barriers to fish passages at these locations.

The information obtained from the watercourse and turtle habitat assessment will be taken under consideration by the proponent when finalizing the project footprint and selecting the final 12 turbine layout. Where feasible, the design of the project will be finalized in a way to interact with as few watercourses as possible. Effects of the Project on watercourses and fish habitat and the proposed mitigation measures are described in **Sections 3.2.5.1 and 3.2.5.2**.

3.1.5 Birds and Bird Habitat

Scope of VECs

Nova Scotia is an important migration pathway for birds due to the extensive coastline and abundance of important bird habitats such as mud flats; therefore, bird assemblages can vary greatly across seasons and between regions. Several factors that influence the diversity and abundance of birds in Nova Scotia include habitat factors, geography and seasonality (i.e., the timing of important annual events including migration and breeding) (Davis and Browne 1996). Birds and bird habitat have been identified as one of the biophysical VECs, as they are valued in their relationship with other wildlife and wildlife habitat, and they have protection in Nova Scotia under both provincial and federal legislation.

The CWS (2007b) recommends selecting survey locations within representative habitats likely to be used by songbirds in the region and spacing the survey locations at least 250 m apart in forest, or 500 m apart in open habitat. Following this recommendation, a study design was developed that incorporated a LAA defined as a 500 m-radius buffer around the PDA. The survey locations selected within the LAA were designed to identify the Project-specific environmental interactions in relation to potential turbine locations.

To support the assessment of potential effects of the Project on birds and bird habitat, the scope of work for the bird surveys was based on the recommended CWS protocols (EC-CWS 2007a), and feedback from NSECC, and NSDNRR during the regulatory consultation process. The following scope of work was completed as part of the birds and bird habitat assessment for the proposed Project.

- An initial desktop assessment of birds and bird habitats near the Project;
- A desktop SAR and SoCC with the potential to occur near the Project or previously identified in the region;
- Two years of field Surveys for birds including:
  - Winter Residency Surveys (targeting overwintering/resident bird species);
  - Spring Surveys (targeting migrating birds using the area as a stopover and breeding nocturnal owls);
  - Summer Surveys (targeting breeding birds, including a targeted common nighthawk survey); and
  - Fall Surveys (targeting migrating birds).
- Two years of both radar and acoustic monitoring.

The SAR assessment is comprised of a review of two custom AC CDC reports and the SAR detected during the various field assessments. Details regarding approach, methodology and results of the bird SAR assessment are presented in **Section 3.1.7.5.**

It is noted that as field work progressed, and as more information became available, the surveys were refined based on the available habitat types and expected species diversity within the Project study area.

It is also noted that the radar and acoustic monitoring study was conducted independently to the field surveys. Therefore, the results are used in conjunction to support the findings of the surveys, rather than incorporated directly (**Appendix H**).

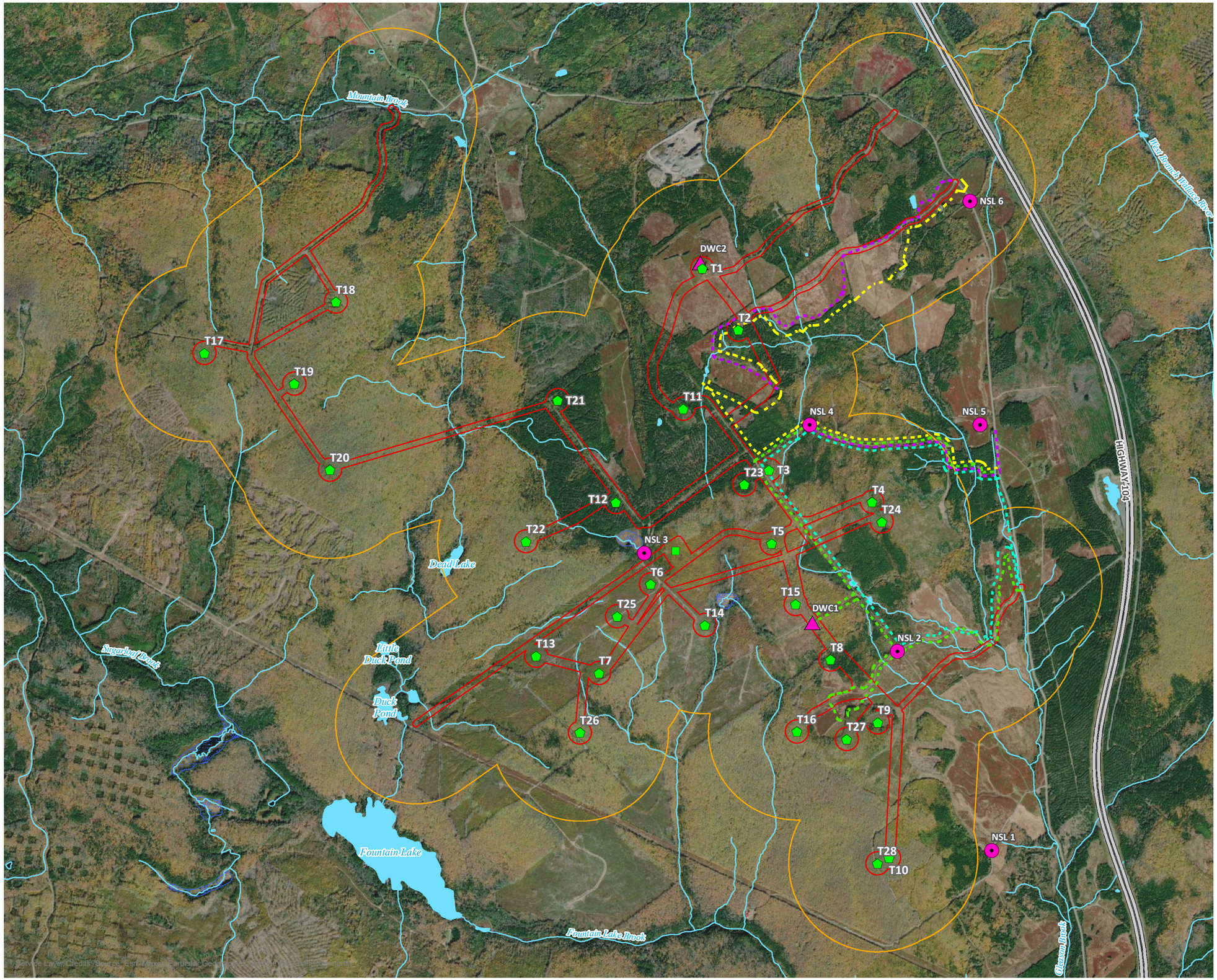
3.1.5.1 Desktop Forest Habitat Assessment

Approach and Methodology

The Project is located within the Nova Scotia Uplands – Cobequid Hills ecodistrict (Unit 340) (Neily et al. 2017). This ecodistrict is characterized by late successional Acadian shade tolerant hardwood forests (Neily et al. 2017). At higher elevations within this ecodistrict, such as those within the proposed PDA, softwood stands occur on moist, level terrain, with shade tolerant mixed-wood forests found along steep-sided ravines (Neily et al. 2017).

Mature forests typically have larger diameter trees and are effective habitat indicators for birds as they offer nest sites, perches, and provide sources for cavities that enhance the habitat for many forest birds (Treyger 2019). This assessment included a review of available background information sources and mapping to identify forested habitat for birds within the LAA. Information reviewed included the following sources:

- Publicly available GIS map layers (e.g., ecological land classification, forest and non-forest inventory, wetland inventory, Protected Natural Areas, Wildlife Management Zones);
- High-resolution Google Earth imagery, which was available for the site from September 2021, June 2020, November 2019, August 2018, and December 2017;
- Important Bird Areas (IBAs) of Canada mapping;
- NSDNRR Forest Inventory (NSDNRR 2021);
- Provincial Parks and Protected Areas mapping;
- Environmentally Sensitive Areas (ESAs) database;
- Federally-designated Migratory Bird Sanctuaries;
- Second Atlas of Breeding Birds of the Maritime Provinces (Stewart et al. 2015);
- Data Reports from the AC CDC (AC CDC; 2021 and 2022); and
- Identified Protected Natural Areas and Wildlife Management Zones.



Natural Forces

WESTCHESTER WIND PROJECT

STUDY AND LOCAL ASSESSMENT AREA FOR BIRDS (WINTER SEARCH AREAS AND DIURNAL WATCH COUNT LOCATIONS)

FIGURE 15

- Diurnal Watch Count Location
- Nocturnal Survey Location

Winter Area Search

- February 25, 2021 (5.4 km)
- March 13, 2021 (7.37 km)
- March 12, 2021 (6.44 km)
- February 26, 2021 (5.85 km)

- Proposed Turbine Location
- Proposed Substation Location
- Local Assessment Area (LAA)
- Potential Development Area (PDA)
- Highway
- Watercourse
- Waterbody
- Wetland

0 0.125 0.25 0.5 km

N W E S

SCALE 1:24,000

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING, GEONB, NATURAL FORCES

MAP CREATED BY: GAM
MAP CHECKED BY:CK
MAP PROJECTION: NAD 1983 UTM ZONE 20N

DILLON CONSULTING

PROJECT: 22-4065
STATUS: DRAFT
DATE: 2022-12-10

FILE LOCATION: K:\2021\211329\Product\Client\EA_WC_Sept2022\WC_F02_StudyAreaBirds.mxd

This assessment used available forestry data from NSDNRR which was verified based on field observations noted during the 2021 and 2022 field surveys. Mature forest stands were determined based on the NSDNRR forest inventory and diameter at breast height (dbh).

Readily-available information from reputable sources was reviewed to evaluate the potential for bird SAR and SoCC within the LAA. Dillon completed a review of the following sources and data lists for the purpose of characterizing existing conditions at the Project site:

- Data from the Atlantic Canada Conservation Data Centre (2021 and 2022);
- The federal SAR public registry (GoC 2022);
- The provincial Endangered Species registry (GNS 2022);
- Second Atlas of Breeding Birds of the Maritime Provinces (MBBA; Stewart et al. 2015); and,
- Final Bird Survey Report Study by Strum Environmental completed during previous iteration of the Project (Strum 2013).

Detailed descriptions of these species are presented in the dedicated SAR/SoCC Section (**Section 3.1.7.5**).

Results

In Canada, important bird habitats are recognized by the Important Bird and Biodiversity Areas Program. This program aims to conserve and monitor a network of sites that provide essential habitat for Canada's bird populations (Birds Canada 2022a). The nearest IBA, Cobequid Bay located within the upper Bay of Fundy (NS019), is located approximately 15 kilometres (km) south from the PDA. This IBA is approximately 480 km^2 and consists of intertidal habitats including mudflats, sandflats and salt marshes that provide foraging opportunities for migrating shorebirds. Between 1 and 2 million shorebirds use the mud flats of the Bay of Fundy in the fall for staging before the southern migration. (IBAC 2022).

As part of the desktop review, the locations of mature forest habitat in relation to Project infrastructure were identified within the LAA. Additionally, aligned with the recommendation from CWS, mature forest habitat within the LAA was identified in relation to Project infrastructure. Mapped polygons of mature coniferous forest, mature deciduous forest and mature mixed forest with an average dbh 15 cm or more within the LAA were included.

Areas identified as habitat for birds within the LAA are presented on **Figure 16**. Within the LAA, forested habitats were identified, and they generally consisted of a mixture of mature coniferous forest, mature deciduous forest and mature mixed-wood forest. The majority of the potential WTG locations (i.e., 19 out of 28) were selected in areas that do not contain forests with average dbh >15 cm.