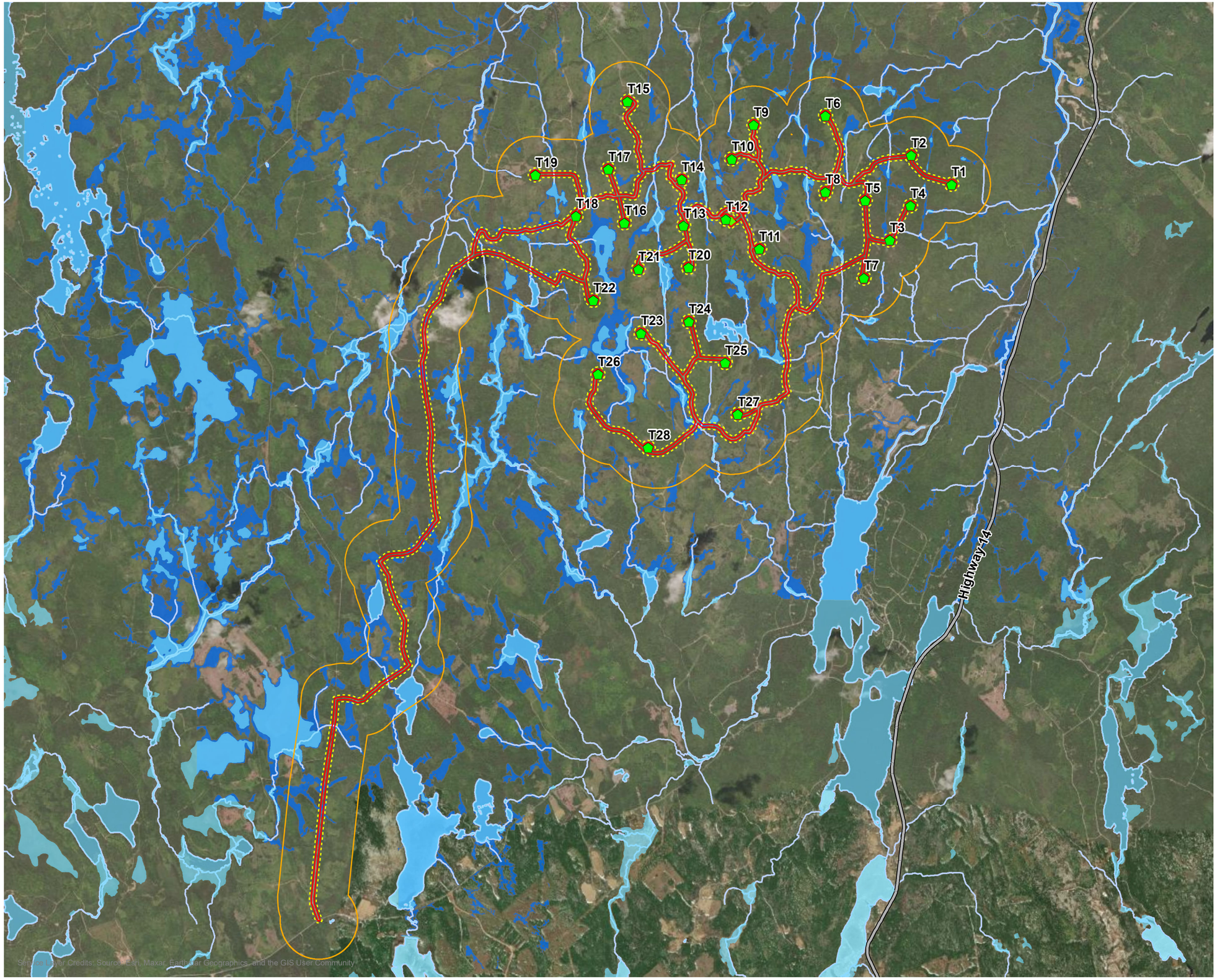

Natural Forces

BENJAMINS MILL WIND PROJECT

WET AREAS MODEL AND LOCAL ASSESSMENT AREA FOR WETLANDS

FIGURE 7

- Proposed Turbine Location
- Proposed Substation Location
- Study Area
- Potential Development Area (PDA)
- Local Assessment Area (LAA)
- Watercourse
- Waterbodies
- Predicted Wet Area Model

0 0.25 0.5 1 1.5 2 km

SCALE 1:55,000

N W E S

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3.1.3.1 Desktop Assessment

Approach and Methodology

Prior to field assessments, public information from reputable sources was reviewed to inform existing conditions of the Project LAA and to guide field surveys. Dillon completed a review of the following sources:

- High-resolution aerial imagery;
- The Nova Scotia Wetlands Inventory (NSDNRR 2021); and,
- Publicly available GIS map layers.

High-resolution Google Earth imagery was available for the site from August 2021, September 2014, June 2017, July 2019 and August 2021. The imagery was primarily reviewed for recent changes in land use (e.g., logging).

A site-specific wet areas model (WAM) was developed by Dillon using GIS to predict potential watercourse and wetland crossings not mapped in provincial or wetland watercourse datasets (**Figure 7**). Development of the model relied heavily on the availability of Light Detection and Ranging (LiDAR) Digital Elevation Models (DEM), which are freely available in Nova Scotia. As part of the modelling, a flow accumulation analysis was completed to determine the upstream area that flows into each cell (a 1 m by 1 m grid) within the study area. Using these data and applying a suitable threshold (i.e., greater than 100,000 upstream cells) is a useful predictor of watercourses, potential watercourses, and drainage channels within the local assessment area. The potential watercourses and drainage channels are then used as an input into potential wet areas modeling as an additional source of known mapped water features.

Wet areas modeling compares the elevations of each cell in a study area against the elevation of the nearest known mapped water features (e.g., lakes, rivers, wetlands, etc.). Where there are slight differences in the ground elevation against the elevation of these water features (e.g., less than 1 m in the DEM), these areas can be good predictors of potential wet areas.

Results

Desktop assessment and the wet areas model identified the potential for wetlands to be located in the LAA. The desktop-based analysis constraints mapping informed an avoidance-based design approach for the Project layout. Wetlands whose boundaries were predicted to overlap with the study area were then ground-truthed during the 2021 and 2022 field seasons to identify, delineate and conduct functional assessments. The results of the field assessment were informed by the results of the desktop assessment.

3.1.3.2 Wetland Delineation

Approach and Methodology

The wetland field surveys included the delineation, classification and functional assessment of wetlands within 30 m of the PDA. Field surveys of the wetlands in the study area were

conducted by qualified Dillon professionals experienced in wetland delineation and functional assessment. The preliminary wetland surveys were conducted between June 1, 2021 and September 30, 2021 by Dillon wetland professionals to classify and delineate the wetlands present within the study area. Following minor updates to the Project layout, the study area for the wetland assessment was adjusted in 2022. In August and September 2022, the wetlands in the updated study area were classified and delineated, and previously-assessed wetlands were revisited to confirm no changes had occurred to their previously-assessed classification and delineation. A functional assessment of wetlands within the study area was conducted concurrently.

Methods of wetland determination and delineation used in the wetland surveys were based upon established protocols from the US Army Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987/2010). Wetland Delineation Data Sheets that were adapted from U.S. Army Corps of Engineers form for Northeast-North Central Supplement for use in Nova Scotia (2011) were used to record data collected in the field. Wetland determination and delineation primarily focused upon establishing the wetland-upland edge, and was based upon the presence of positive indicators for three parameters, including:

- Hydric (wet) soil conditions;
- Hydrophytic (wet adapted) vegetation; and,
- Wetland hydrology.

Soil sampling is performed to a depth of at least 50 cm (or to a point of refusal, such as bedrock) to assess wetland soils for hydric soil conditions. Soil horizons are documented in terms of their texture, thickness, colour (Munsell value/chroma/hue), and presence of hydric soil indicators (when applicable). Hydric soil indicators (e.g., gleyed matrix, redox features) were determined following the “Field Indicators of Hydric Soils in the United States” (USACE 2012) guide.

For each wetland, a minimum of one plant plot was assessed to confirm the dominance of hydrophytic vegetation. For each wetland plant plot, plant species observed were analyzed at three strata (i.e., tree, shrub, and herbaceous) and were documented in terms of their percent (%) cover within a given plot size (10 m, 5 m, and 2 m radius, respectively). Wetland indicator status for plant species observed within the plant plots were determined as per United States Department of Agriculture (USDA) Region 1 (Nova Scotia and New Brunswick) listings for interpreting USDA Wetland Indicator Status.

At each wetland soil sampling pit and over the greater area of the wetland, observations were made on the wetland hydrological regime. To determine the hydrological regime, the wetland context, site location, and microtopography of the wetland area were taken into consideration. Both primary and secondary hydrology indicators were recorded, if present, at each wetland. To confirm hydric soil conditions, at least one primary hydrology indicator (e.g., surface water, a high-water table, soil saturation, or sediment deposits) must be present. Secondary indicators used (of which two are required in the absence of a primary indicator) include

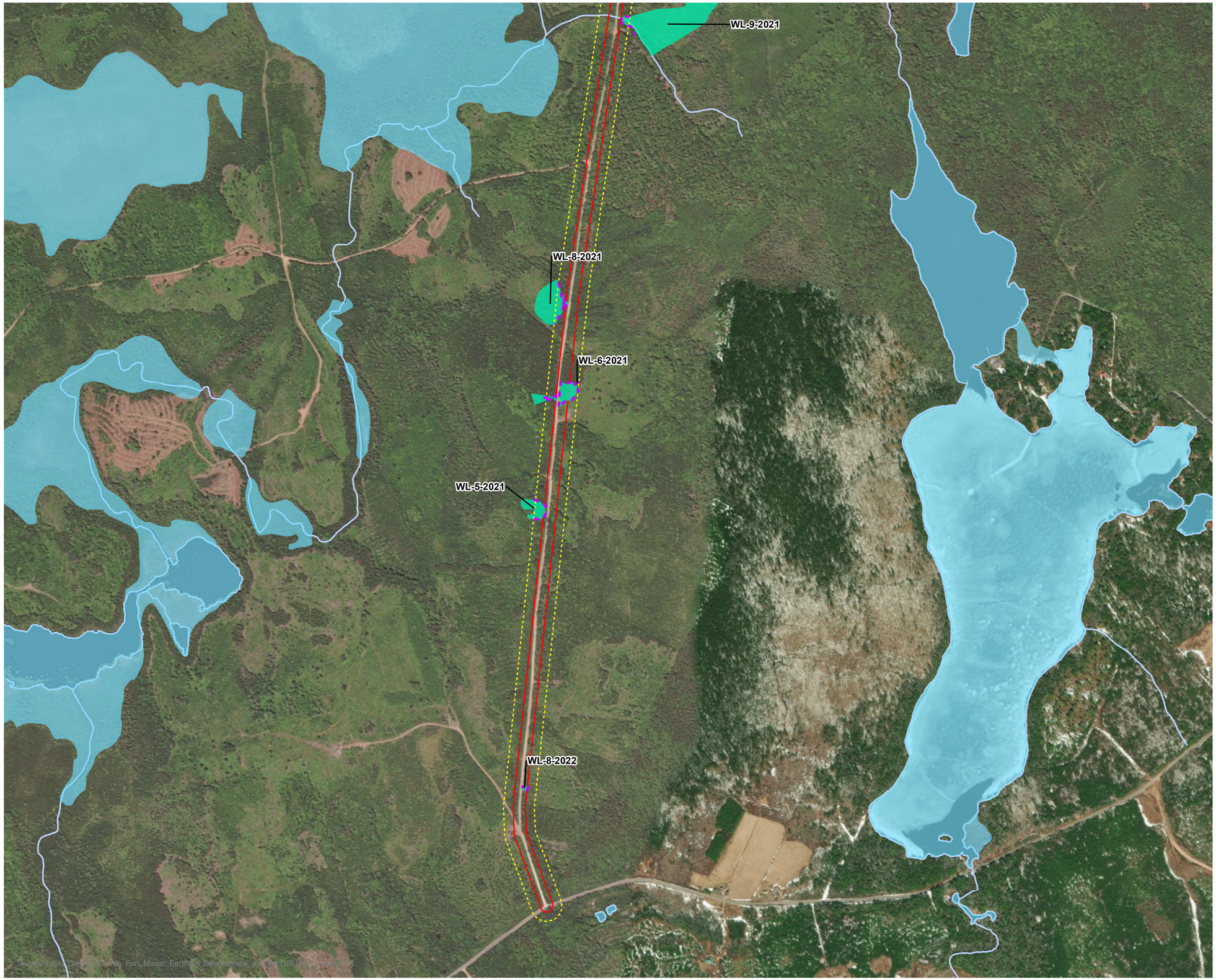
surface soil cracks, drainage patterns, moss trim lines, and drift or sediment deposits, among others (USACE 2012).

Results

Based on the wetland assessments conducted in 2021 and 2022, 77 wetlands were identified that were within or had a portion of their area within the Study Area. For wetlands that extended beyond the Study Area, the entire wetland was either field delineated if feasible, or the portion of the wetland outside the study area was modeled based on the site-specific WAM. The 77 surveyed wetlands are shown on **Figure 8**,and their general characteristics and proposed alterations are summarized in **Table 11**.

The wetlands within the study area included swamps (treed and shrub), bogs, fens, and complexes with both swamp and fen components. The wetland types are based on the Canadian Wetland Classification System (National Wetlands Working Group 1997). The wetlands identified within the study area were delineated following NSECC's recommended methodology (NSECC 2022) during the 2021-2022 growing season (i.e., June 1-September 30). Detailed wetland factsheets with representative photos are presented in **Appendix D.**

The Project layout was designed to avoid the placement of WTGs and their associated linear infrastructure within wetlands, to the fullest extent possible. While 77 wetlands were identified that intersect the Study Area (30 m from the PDA), only 10% of their total area (12.8 ha) is within the PDA. It is worth noting that several of the wetlands are found adjacent to existing forestry roads, with areas having been historically cleared.



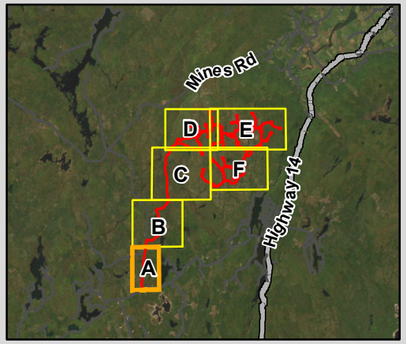
Natural Forces

BENJAMINS MILL WIND PROJECT

WETLANDS WITHIN THE STUDY AREA

FIGURE 8 A

- Proposed Turbine Location
- Proposed Substation Location
- Potential Development Area (PDA)
- Field Delineated Wetland Boundary
- Study Area
- Watercourse
- Waterbodies
- Model Interpreted Wetland Boundary



0 0.25 0.5 km

N W E S

SCALE 1:12,000

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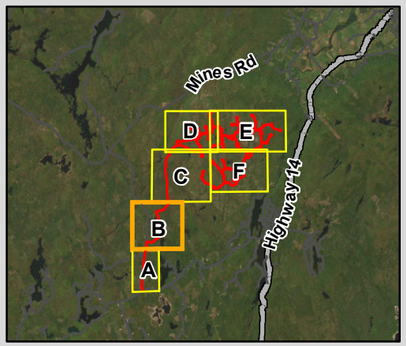
Natural Forces

BENJAMINS MILL WIND PROJECT

WETLANDS WITHIN THE STUDY AREA

FIGURE 8 B

- Proposed Turbine Location
- Proposed Substation Location
- Potential Development Area (PDA)
- Field Delineated Wetland Boundary
- Study Area
- Watercourse
- Waterbodies
- Model Interpreted Wetland Boundary



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N W E S

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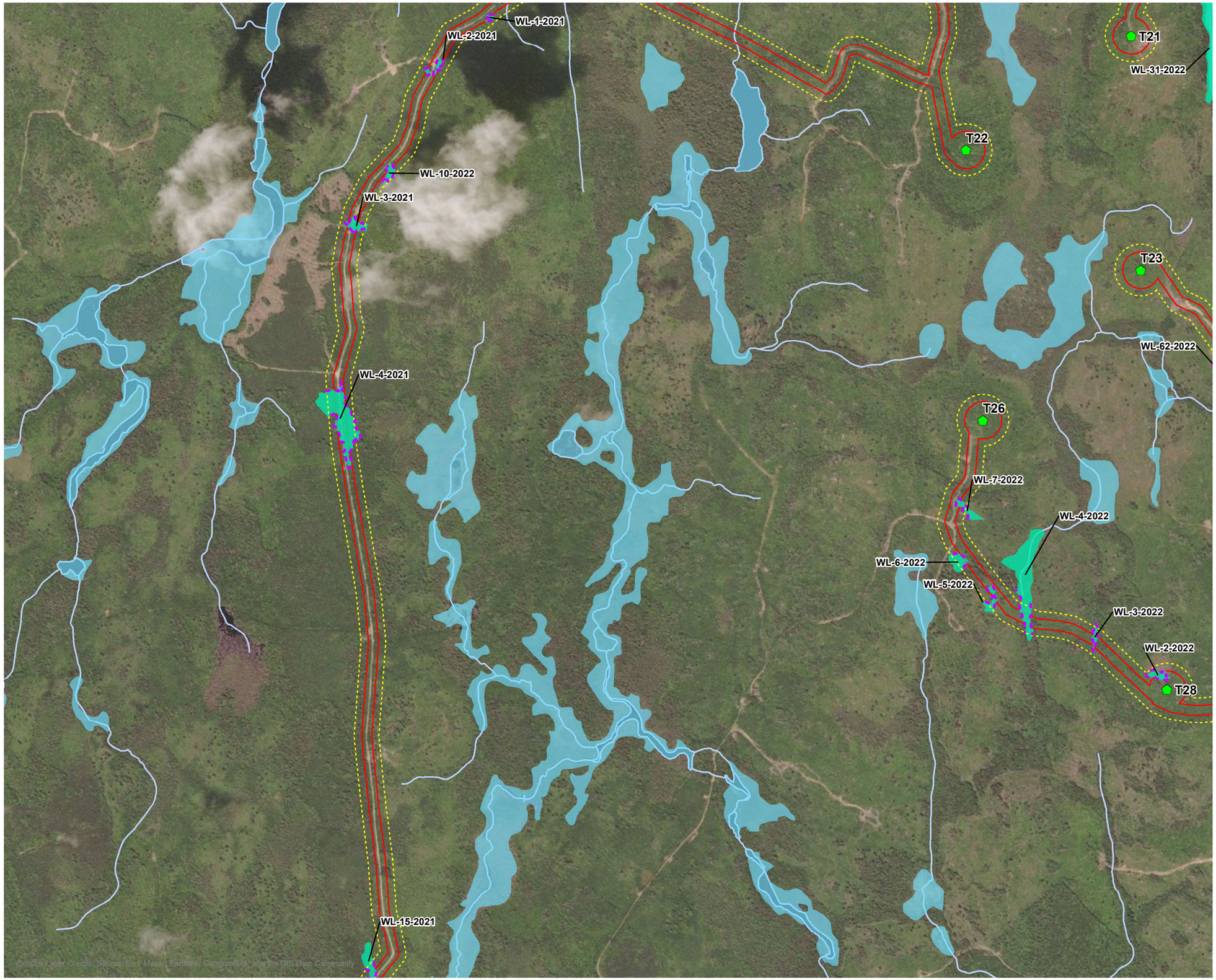


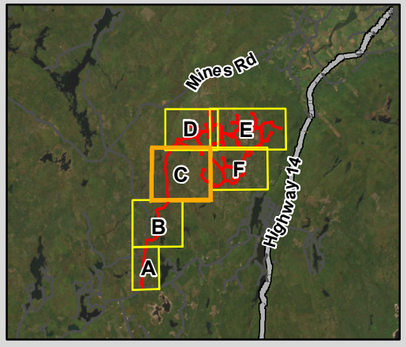
Natural Forces

BENJAMINS MILL WIND PROJECT

WETLANDS WITHIN THE STUDY AREA

FIGURE 8 C

- Proposed Turbine Location
- Proposed Substation Location
- Potential Development Area (PDA)
- Field Delineated Wetland Boundary
- Study Area
- Watercourse
- Waterbodies
- Model Interpreted Wetland Boundary



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N W E S

SCALE 1:15,000

MAP DRAWING INFORMATION:
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