

WETLAND DELINEATION AND CLASSIFICATION

8.0 METHODS

The state and federal jurisdictional wetlands within the project area were delineated and flagged by New Hampshire Certified Wetland Scientist (CWS), Barry H. Keith, during May through November 2018. The core candidate lands encompassed approximately 400 acres. The subject lots of record total 1279.36 acres. Supplemental wetland delineation along Douglas Drive and in adjoining areas adjacent to the site were delineated in 2019. Other wetlands and streams outside of the core candidate land area, within the subject property, were delineated and depicted on the topographic base plans using existing aerial photography and a reconnaissance level field review.

The delineation and wetland classifications were conducted in accordance with the following guidance documents:

- N.H. Code of Administrative Rules (Env-Wt 406.01(a) with the techniques outlined in the 1987 “U.S. Army Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1.”
- U.S. Army Corps of Engineers 2012 “Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0).” U.S. Army Corps of Engineers Research and Development Center, Environmental Laboratory.
- U.S. Army Corps of Engineers 2012 “National List of Plant Species that occur in wetlands: Northeast Region.” U.S. Army Corps of Engineers Research and Development Center, Environmental Laboratory.”
- U.S. Fish and Wildlife Service Manual FWS/OBS-79/31 entitled “Classification of Wetlands and Deepwater Habitats of the United States, Cowardin et al, 1979.”
- New England Hydric Soils Technical Committee, 2017. 4th Edition, “Field Indicators for Identifying Hydric Soils in New England.” New England Interstate Water Pollution Control Commission, Lowell, Massachusetts.

- U.S. Department of Agriculture, Natural Resource Conservation Service, 2010. “Field Indicators of Hydric Soils in the United States, Version 7.0.” USDA, NRCS in cooperation with the National Technical Committee for Hydric Soils.

Wetlands mapping was conducted by Horizons Engineering, Inc., New Hampshire Licensed land surveyors. Wetland flags were field surveyed using real-time Kinematic GPS methods in a base/rover configuration with a base position established with the on-line user positioning service or by sub-meter handheld GPS methods using a Trimble GEOXH unit and differentially corrected with post processing. All positions are based on the New Hampshire coordinate system, NAD83 (Grid North).

8.1 WETLAND DELINEATION & CLASSIFICATIONS – EXISTING CONDITIONS

The location, limits, and classifications of the existing wetlands are depicted on the accompanying “Existing Wetlands Plans” prepared by Horizons Engineering, Inc.

Pursuant to discussions with DES staff, the site’s wetlands were grouped in five (5) categories based on wetland size, classification, variability, and position in the landscape. Each category’s (A-E) functions and values were then evaluated (Section 9.1) in accordance with the U.S. Army Corps of Engineers “Highway Method.” Representative photos are found in Section 13.

Category A: Roadside Wetlands

Category A wetlands consist of largely man-made or altered wetlands adjacent to Douglas Drive. These wetlands are generally roadside ditches that are vegetated with palustrine emergent (wet meadow) and/or scrub-shrub species such as cattails (*Typha latifolia*), wool-grass (*Scirpus cyperinus*), sedge (*Carex spp.*), speckled alder (*Alnus rugosa*), and spirea (*Spirea latifolia*). These areas were classified as Palustrine Persistent Emergent/Broad-leaved Deciduous Scrub-Shrub (PEM/SS1Exd) wetlands that are seasonally saturated/flooded, excavated and ditched. In some areas, the drainage ditches have been periodically excavated allowing emergent vegetation to become dominant. Other areas that have not been regularly maintained typically have a greater scrub-shrub component.

Category B: Altered Wetlands

Naturally occurring wetlands along the main access road that have been altered/ditched in the past comprise the Category B wetlands. These wetlands are either small isolated wetlands or wetlands that have been interconnected by roadside ditches. Emergent vegetation is less prevalent. In addition to the scrub-shrub species cited above, winterberry (*Ilex verticillata*), and black willow (*Salix nigra*) are often present. Sapling to pole-sized tree species such as red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), and gray birch (*Betula populifolia*) are also prevalent. For the most part, these wetlands were classified as Palustrine Broad-leaved Deciduous Scrub-Shrub/Forested (PSS/FO1E) that have been altered, ditched, or excavated.

Category C: Altered Wetlands- Contiguous

This grouping generally includes naturally occurring wetlands one or more acre in size found primarily along portions of Douglas Drive. In some cases, these wetlands may have been historically isolated from other wetlands and/or the hydrologic connectivity between wetlands has been lost or altered due to changes in surface water drainage patterns or lack of adequately sized and positioned road culverts. Vegetation within these wetlands is often dense and exhibit greater plant diversity than in Category B wetlands. In addition to those species found in Category B, a greater component of needle-leaved evergreen and needle-leaved deciduous trees were found in the form of red spruce (*Picea rubens*), black spruce (*Picea mariana*), and larch (*Larix laricina*). These wetlands were classified as Palustrine Broad-leaved Deciduous Scrub-Shrub/Forested and Needle-leaved Evergreen (PSS/FO1-4E).

Category D: Upper Headwater Wetlands

The upper headwater wetlands are generally positioned on steeper slopes in the upper or eastern one-third of the Alder Brook drainage basin. These wetlands drain in a general westerly to southwesterly direction, connecting to the larger headwater wetland complex (Category E) positioned in the mid to lower portions of the Alder Brook watershed. The majority of these areas are positioned west of Douglas Drive within Phase I of the landfill and east of Douglas Drive

within landfill Phases II and III. These wetlands are primarily forested (PSS/FO1-4E) and often exhibit a scrub-scrub vegetative layer.

Category E: Mid-Lower Headwater Wetlands

In addition to surface water drainage from up-gradient wetlands and adjacent upland forests, the wetland hydrology is likely augmented by groundwater discharge. These wetlands are considered part of a larger wetland complex positioned south and west of the proposed landfill. They are interconnected by intermittent and perennial streams. Beaver colonies are found throughout the wetland complex. The wetland classes are diverse ranging from open water and beaver marsh areas to dense woody vegetated wetlands. Other than the landfill perimeter road crossing and other minor wetland fills, Category E wetlands are largely avoided.

8.2 WETLAND IMPACTS

The total project wetland impact is approximately 17.49 acres. The project will permanently impact 17.07 acres and temporarily impact 0.42 acres of primarily scrub-shrub and forested wetland within the upper portions of the Alder Brook catchment area. Approximately 1,046 linear feet of intermittent stream (R4UBJ) and 216 linear feet of perennial (R3UBH) stream will be permanently impacted. Temporary perennial stream impacts are 71 linear feet. In total, 1,333 linear feet of stream will be impacted.

**SUMMARY
Wetland Impacts**

Category	Impact Area	Acres	Linear Feet
A	Access Road Improvements	0.5	
B	Access Road Improvements	0.1	
C	Access Road, Route 116 & Infrastructure	0.6	33'
D	Landfill, Berm, Perimeter Road, Ponds	16.2	1,013'
E	Perimeter Road Stream Crossing & Fills	0.1	287'
TOTAL		17.5	1,333'

Wetland impacts are depicted on the accompanying “Wetland Impact Plans” prepared by Horizons Engineering, Inc. dated August 2020 and “Project Design Plans” prepared by CMA Engineers, Inc. dated August 2020.

Specific wetland impacts sorted by plan sheet number are listed in Section 8.2.1. Section 8.2.2 lists impacts by wetland classification.

Based on wetland category, class, and loss of functions and values for the cumulative wetland impacts, compensatory mitigation is proposed in accordance with State and Federal mitigation guidance. See Section 12.0 Compensatory Mitigation.